

Toward Personal Learning

Reclaiming a role for humanity in a world of commercialism and automation



Stephen Downes

National Research Council Canada

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Stephen Downes

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Introduction

In the five years after *Connectivism and Connective Knowledge* was posted we saw the phenomenon of MOOCs appropriated and commercialized, the rise of artificial intelligence, analytics and personalization, and the ubiquity of mobile devices. It's all pretty much what was predicted, and yet the reality feels so different. We're not in an age of breathlessness and hope, as we were even in 2012, we're in an age of anger and cynicism.

This book reflects that. Many of the articles in the first half talk about the idea of the MOOC, looking more deeply into the concept, expanding on the idea of open online learning and open courses. Then, as most of the rest of the education technology world moved into learning analytics, I focused my attention on what I've come to call personal learning. This is *not* the same as personalized learning, and I draw the distinction several times, in several ways. And so over time I've focused not on better ways to automate education, but rather on ways to employ automation to make education better.

The result is another 750 page book, for which I deeply apologize. But don't worry, it'll go so fast it only feels like 550. As before, it's a collection of blog posts, published articles, transcripts from talks, some interviews (I'm saving most of those for a separate volume, one day), diagrams and images, and photos. Unlike the previous book, this one is organized chronologically, so you can feel the development of thought over time. And as the title suggests, it's unfinished business. I've tilted at the windmill of personal learning a number of times over the last decade, and the book reflects the challenges rather more than the successes.

Why personal learning? As a philosopher at heart, I could have chosen to devote my efforts to any number of significant problems. The neural networks which have become commonplace today could have captured my attention, as they have for so many others; this would certainly make sense given my own intellectual history. I could have focused even more deeply on the core idea of connective knowledge. I could perhaps have looked more deeply at scientific method in an era of discovery through the process of design.

But each age sets its own priorities, and personal learning I think captures what is important today.

The first is the idea of autonomy in a connected world. We are reaching the end-game in the century-long struggle between individualism and collectivism. I reject both, and essentially for the same reason: they reject the humanity of individuals. Individualism rejects the humanity of the other, while collectivism rejects the humanity of the self. Neither respects the idea that for society to succeed and for knowledge to grow, we must respect both the humanity of the self and the humanity of the other.

A second is the idea that we need to reorganize knowledge in such a way as to better prepare people for a complex and changing world. I capture this with the idea of critical literacies, which in turn shape how I think we should approach knowledge and learning. And it also speaks to the idea of learning not simply as the acquisition of content, but of the idea of learning as growth and development – the fullest expression of our humanity. This certainly isn't an observation unique to me, but it's something we need to recall and grab onto.

A third is the tension between commercial good and social good, especially with respect to open learning and open content, but also with respect to society and values generally. We have nearly reached the point, I think, an idea, innovation or invention is 'good' only if it can be commercialized. I have resisted that, and advanced the idea of knowledge and innovation for the social good. The increased commercialization of society is, I think, part and parcel of the increased dehumanization of society.

I'm calling this book version 0.9 for one simple reason: the references, some 700 of them (maybe more). I've carefully collected the URLs but it would take the rest of the year for me to look them up and present them nicely the way I have for the first 50. So I'm learning them as they are, with an invitation to readers to contribute a page or two, or maybe an article or two, of updated references.

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Experts and Empowerment

We all, [as David Wiley writes](#)¹, want to empower learners. While we read a great deal these days about education as job training and workforce readiness, what we really want to be able to do is to enable each person to make his or her way in the world, to pursue their own good in their own way.

This, to me, involves reducing and eventually eliminating their need to depend on experts. As I imperfectly expressed the point the other day, "It's about actually empowering people to develop and create their own learning, their own education. So not only do they not depend on us for learning, but also, their learning is not subject to our value-judgements and prejudices."

Unfortunately, this is often read as a casting of the student into the world to rely solely on their own devices. David Wiley echoes the sort of misinterpretation of this view that is common:

"It is hard to imagine any form of learning that does not involve an expert – except pure, unguided, trial-and-error discovery learning. Without reference to any person – or any artifact created by a person – of more experience than ourselves, all learning would be maximally inefficient. We would each be left to rediscover the entirety of physics from scratch. And the entirety of music theory. And the entirety of every other field, without a conversation or a textbook or a Wikipedia article to guide us."

Such a proposition is absurd, and as it is absurd one should conclude (I would hope) that it is not the proposition I am arguing for.

So let me be clear: in the world as I understand it, there are more than two options. There is an option somewhere between "depending on an expert" and "left to rediscover the entirety of physics from scratch."

And - to be clear - a great deal of 'expert content' exists. There is not only the aforementioned Wikipedia, there are also academic publications, magazine and newspaper articles, open online courses, blog posts, NASA videos, TED talks, and a host of additional educational content. Indeed, in today's environment, and for the foreseeable future, we are virtually swimming in educational content. It would be rash, irresponsible, and unthinking to say that a person should

¹ David Wiley, 2012. Wishing I Understood. Iterating Toward Openness.

<http://opencontent.org/blog/archives/2280>

not consult any of this when learning physics or any other discipline. So, that is not what I am saying.

What I am addressing with remarks like "we should not depend on the expert" is the *stance* that ought to be taken by the learner with respect to the learning material extant on the web and elsewhere. And I mean this two distinct but related ways:

- first, the learner should not accept the report of the expert uncritically. Expert advice on any given subject may not merely be misleading or misinformed, it may also be offered out of context, it may be outdated, it may be misunderstood, and in some cases it may be malicious. Examples of any of these cases may be found in abundance, especially on today's polarized and politicized media environment.

- second, the learner should resist the characterization of certain sources, certain perspectives, and certain content types **as expert**. While once we may have been able to rely on peer and publisher review to verify the authenticity and accuracy of the information, this is no longer the case. Moreover, an increasing body of verifiable and reliable information is being published outside traditional channels.

These two conditions amount to the assertion that the learner should take what amounts to a critically reflective stance with respect not only to expert content but with respect to all content. Maybe there was once a day when we could trust expert opinion, but today we live in an environment where not only can we not trust the experts, we cannot even trust that the people offered as experts in fact *are* experts.

This is an important point. While it is common to use terms like 'elite' and 'expert' interchangeably, they are in fact distinct concepts. To call a person an expert refers to their knowledge. A person is an expert in a discipline if they have a deep knowledge of the field, a base of experience in the field, and can talk about matters related to the field rationally and reasonably. But to call a person an 'elite' refer to their position in a community or society. A person who is elite will have accumulated a disproportionate amount of power, wealth or influence.

Sometimes a person will be elite as a result of their expertise. If we speak of, for example, "elite scientists", we may be referring not to the richest or most powerful scientists, but those with the most expertise. But in practice we are rarely so precise. And so the word 'elite' even in a scientific discipline may refer not to those with the greatest knowledge, but to those with the most power and influence.

My own experience in life is that the people who become elite do not always become so as a result of their generosity, but rather as a result of their parsimony. They achieve their status as elite not by sharing but rather by hoarding. Such members of the elite carefully cultivate a culture of dependence. By ensuring that their followers depend on them for knowledge, influence

and wealth, they augment their own position in society. The parsimonious elite are not interested in the empowerment of their students. They are greedy, selfish and self-interested.

Not all members of the elite are parsimonious, and not all experts are members of this elite. But the membership is sufficiently large that a learner ought not, as a general policy, place oneself in a position of dependence on experts. With every word of advice received, the learner must be in a position to ask whom the advice is intended to benefit. And the learner must be in a position to seek alternative sources of expertise, to weight options, and to decide what to believe for him or her self.

What is significant, to my mind, is that by being able to adopt such a critical stance with respect to expertise, learners are not only much better able to vet for themselves the reliability and authenticity of a piece of expert advice, they also acquire the capacity to look beyond a smaller set of 'trusted sources' and cast their gaze across the wider information landscape, as they will be able to select the reasonable and reliable even from such nontraditional sources as discussion lists, blog posts and alternative media.

It's like being able to read. Before we could read, we had to depend on the priest to tell us what the book said. After we learned how to read, not only could we see what the book says for ourselves, we can also read other books that may say different things. Being able to read not only increases our understanding, it increases our power to choose what will inform that understanding.

From my perspective as an educator, we should not be like the educator who reads to people, and who builds a large hall and charges fees in order to have people come to us to listen to use read to them.

Nor should we be like the educator who reads to people for free. This does not achieve our aims. 'Giving content for free' does not reduce the need for people to depend on a reader. Rather, it creates a new problem, that of sustainability - how are we to pay people who read for free?

We should be like the educator whose primary interest is in teaching people to read, so they do not need to come to us at all, so there is not only no need for a hall and for fees to be paid, but no need for our particular expertise, because everyone can have it.

*Moncton, Canada
May 8, 2012*

Transparency, Radical or Otherwise

Responding to [Doug Johnson](#)², who in turn is responding to [Miguel Guhlin](#)³, who has made his [RSS work](#)⁴ again. :)

My managers and co-workers read my blog (though not as speedily as I would like). My mother reads my blog. So I don't "write as though" they read it; I write knowing they read it. They all know I am fallible, that I sometimes have bad days, that I'll call someone out if they deserve it, and (most importantly) that I'm passionate and care about my work. Which makes most mistakes permissible.

I gripe where the griping will do the most good. If necessary, I'll redact names - my long tirade about my doctor didn't need to name the doctor, but it still needed to be said (and was probably read by him). I've written of the incompetence of our provincial government, just before the election in which it was defeated. I'll say good things where they're warranted - but the main point is, if I ever want to see my ideas implemented locally, I have to write about what's happening locally. (I find my influence on the global arena to be pretty minimal).

I sometimes write for edited publications, but I don't like it when they edit my work. Part of this is my own style - I really hate revisiting work I've already written. But part of it is aesthetics - I find first draft work a lot more authentic, if rough around the edges. Some people think by means of writing; me, I write in order to express my thinking. These are two very different acts. My employers have reacted negatively to my blog in the past, so it's hosted on my own server, which I pay for myself, and any other concern is relegated to our common understanding that I enjoy freedom of speech, even as a member of the public service (I add in passing that I am amazed at how many Americans say they can't say this or that for fear of reprisals, all the while proclaiming to be the most free people in the world).

I do write out of goodness, but it's not a stance I take in order to make the rest seem acceptable. I honestly believe that what I have to say is good and that I am producing good in the world by expressing it. This hasn't always been the easiest thing to believe. I have, as a matter of fact, been writing since I was young, but until I was 23 or so my writings remained mostly private. When I started university I joined the student newspaper, and had a very solid shell of shyness to

² Doug Johnson, 2012. Radical transparency or TMI? Blue Skunk Blog. <http://doug-johnson.squarespace.com/blue-skunk-blog/2012/7/11/radical-transparency-or-tmi.html>

³ Miguel Guhlin. Jellyfish Blogger - Radical Transparency. <http://www.mguhlin.org/2012/07/jellyfish-blogger-radical-transparency.html>

⁴ Miguel Guhlin, 2012. RSS Feed Problems - Please Read Subscribers!. <http://www.mguhlin.org/2012/07/rss-feed-problems-please-read.html>

surmount. I still grill myself on a regular basis: am I relevant? Is what I say accurate? Do people care?

So - this is the thing about transparency. It requires a lot of courage on the part of the person being transparent, but it requires more that the people observing understand that they are viewing a real person, with real faults, real opinions, real ideas and real fears. We harm ourselves and each other by assuming that everybody must conform to some sort of magazine-perfection.

*Moncton, Canada
July 12, 2012*

Connectivism as Epistemology

Responding to questions from Vance McPherson

1) What is your response to Rita Kop's suggestion that connectivism is a new epistemology but not a new learning theory?

As I understand Rita, she understands the pedagogical aspects of connectivism to have already been present in constructivism, and hence, connectivism is not proposing something new when it comes to giving guidance to instructional staff. There are overlaps to be sure, however:

- criticisms of a teaching practice, which may be grounded if working in a constructivist perspective, are not grounded in a connectivist environment. For example, I responded to criticisms from Heli Nurmi several times in this fashion.
- there is a universalist aspect to constructivism that is not present in connectivism; to be a 'theory' requires statements of general principles of teaching, and connectivism mostly doesn't have these
- and related, constructivism depends on intention in a way connectivism does not - it supposes that people are consciously building or constructing knowledge, whereas in connectivism this is not required

Connectivism is *definitively* a learning theory, or more accurately, incorporates learning theories (specifically, theories about how connections are formed in networks). It suggests some teaching theories (I have capsulized them as 'to teach is to model and demonstrate' and suggested that connectivism argues for the creation of an immersive learning environment).

But all of that said, whether connectivism is a *new* theory of epistemology or pedagogy is irrelevant to me and I don't spend any time worrying about it. I often preface my remarks with the sentence "everything I have to say has been said (often better) by someone else."

2) My understanding of connectivism is currently as both epistemology and learning theory, which presupposes that it has ALWAYS been correct and is not contingent upon modern technological developments to "work." Rather, technology casts light upon the nature of the model. But many authors are suggesting that the application of the learning theory is primarily to technology-based learning. What's your take on this?

It has always been correct (insofar as it has components that say anything is 'always' the case). Networks have always learned. Humans have always been a network (at least, since graduating from single-celled organisms).

Other aspects of the theory change over time. At the deepest level, the principles for stable (dynamic, learning) networks - autonomy, diversity, etc - are probably reasonably constant over different types of networks.

But the sort of environments that create learning vary greatly - the sort of environment that produces a modern information-age knowledge-worker for example varies greatly from one which would produce a skilled bow-maker in the middle ages.

Additionally, with the development of technology, new types of networks have come into being. While human commerce has always formed a network, it has been a relatively simple network and certainly a slow-moving one. There's only so much connecting that can take place via personal communication and the Royal Mail. Technology greatly accelerated the size and speed of the human network, producing in a way not previously possible more observable properties of a network (for example, cascade phenomena as an idea or meme propagates through the network).

3) M. K. Dunaway (2011) recently published a paper in Reference Services Review, where she describes connectivism as claiming that knowledge emerges from an individual's learning network as connections are recognized. If I'm understanding your position correctly, then Dunaway's description is inaccurate in placing the locus of knowledge with the individual learner's recognition patterns, and not in the network itself. But I may also have not correctly understood you, her, or both. Could you steer me straight on this?

I would have to read Dunaway to be able to provide a reasonable response - if you could link me to a copy that would be helpful.

That said - 'recognition' is a core thesis of my own theory. To 'know' x is to be capable of *recognizing* 'x'. To recognize 'x' is to assume an appropriate neural configuration when presented with an 'x', where 'appropriate' may be described in any variety of manners. I sometimes talk of 'knowing' 'x' to having the right 'feeling' when represented with 'x', a feeling of recognition. To 'recognize' is a property of a successful network.

Additionally, networks exhibit patterns or regularities. For example, a weather network may exhibit a characteristic 'storm front' or a murmuration of blackbirds may display shapes in the air. In my own work I often use examples like 'faces on a TV screen' or on the surface of Mars. These patterns in a network are phenomena that exist *only* as things that are recognized. To say a pattern 'x' exists in network 'y' requires a perceiver 'P' presented with 'y' and who instantiates an appropriate network state (a 'familiar feeling', a 'habitual reaction', a 'recognition') when presented with (a perspective of) 'x'.

4) I sometimes get the impression that you and George Siemens are not exactly on the same page when it comes to the epistemological aspects of connectivism, which of course would be perfectly fine in the context of a dialogic process, but I wondered if you'd care to comment on this.

George and I have our debates. My sense is that he is much more concerned with the pedagogical aspects of connectivism while I am much more interested in the epistemological aspects. Philosophically, George is a realist while I am more of an idealist - that is to say, he is more likely to say the phenomena we observe (be they chairs or colours or shapes and movements) are 'real' while I (for reasons just stated) say they require a perceiver.

One more thing, something of a comment. You've described semiotic processes (language, symbols) as epiphenomena of networks, but not essential to them. This reminds me a lot of Stephen Jay Gould's idea of "spandrels." I thought it was interesting because one of Bill Kerr's beefs with connectivism seems to be that there is not a good evolutionary / biological explanation for how connectivism is possible. But I think that, on the contrary, connectivism, if correct, would prove conclusively Gould's spandrel hypothesis, which is widely accepted in evolutionary biology circles. Just a thought.

I have described the patterns we perceive as supervenient on the phenomena that produce them. So that does make them epiphenomenal in a way.

The whole question of an evolutionary basis for connectivism is one I have not considered. But I think there's a good basis for such an argument. A network is at heart a recognition system; it responds in consistent ways to complex and variable phenomena. It embodies the capacity to adapt to change. The more complex an environment the more likely that a network, rather than a simple innate instinct, would ensure survival.

A language I think emerges quite naturally out of this. Given that humans have the capacity to make noises and gestures, and that these would be consistently produced given certain phenomena, it would not be long before the adaptive advantage of communication ensured its adoption. Most - if not all - of actual language is (in my mind) learned. But there is no question that the networks we are born with at birth are sensitive to the sounds and movements made by people like ourselves.

That said: language (as an entity) is a *social* phenomenon, not a personal phenomenon. Language is stigmergic. As Wittgenstein would say, there is no private language. Not because of some 'private language argument' (I think this is a recreation of Wittgenstein's thought after the fact, and not core to what Wittgenstein had to say) but because the properties of language - specific words (the associated sounds and symbols, and conventional meaning or reference), grammars and syntax, works in literature and art that constitute paradigms, etc. - are physical phenomena, present out there in the world and not in the humans that speak and write it.

Is language a spandrel - an accidental artifact of evolution? In one sense no - I think a look at language after the fact shows how important it has been to survival. But in another sense no - it's not an artifact of evolution at all, as it is not a property of individual humans.

But should investigation show a particular innate sensitivity to some aspect of language - a 'mirror neuron for syntax', say, that might be a spandral. That might be a selected preference for a particular aspect of language that *could* have been different (you could have an equally effective language without it) but was the way it was, and was selected for. It might show up in the way, say, an innate preference for the colour red might have - as an aid to identifying dangerous stuff in the world, which in an alternative history could well have been blue or green (think Vulcan) or whatever.

Good questions, interesting discussion, thanks. I will post these to my weblog, if you don't mind.

*Moncton, Canada
June 17, 2012*

Feelings of Science

David Hume's philosophy of morality is distinct from most approaches in that it does not postulate some set of principles or criteria for moral behaviour.

Rather, he argues that we are governed by a 'moral sense' that tells us when an act is right or wrong. "Extinguish all the warm feelings and prepossessions in favour of virtue, and all disgust or aversion to vice: render men totally indifferent towards these distinctions; and morality is no longer a practical study, nor has any tendency to regulate our lives and actions." (Hume, [Of Morals](#)⁵)

The idea here isn't that Hume is arguing for some sort of moral relativism and 'anything goes', though he has often been mischaracterized that way, but rather that other putatively "objective" measures of morality are crude instruments, and that our own sensations are fine-tuned detectors of moral nuance that can be developed, through practice and experience, into reliable measures of morality.

It's a bit like the difference between monitoring the gauges on a dashboard and a driver feeling how the car responds to the road around corners and while braking. An experienced and sensitive driver can tell if there's something wrong with the car well before any objective instruments can because the car doesn't 'feel' right.

Note again that this isn't an 'anything goes' theory of auto mechanics. There is an objective fact of the matter as to whether the car is performing badly or not. But this fact is not *equated* with dashboard monitor readings, or indeed with any particular measure that can be determined *a priori*. Prior to an actual breakdown or measurable malfunction, it's no more than wear and tear in a car's engine the human mind can sense well before any more coarsely-tuned measuring device can.

This sort of judging appropriateness by feeling isn't limited to ethics and auto mechanics. Rob Cottingham posted [this cartoon](#)⁶ today and then discussed how he came to produce it:

5 David Hume. 912 Reprint Of The Edition Of 1777. An Enquiry Concerning the Principles of Morals. Project Gutenberg. http://www.gutenberg.org/files/4320/4320-h/4320-h.htm#2H_SECT1

6 Rob Cottingham, 2012. ROFL? No, RSID (Ruminating Silently In Despair). <http://www.robcottingham.ca/cartoon/archive/rofl-no-rsid-ruminating-silently-in-despair/>



...And then, in 2013, this work signalled the start of the Great Schism, in which the "cats" faction decisively rejected the "LOL" faction.

He writes, "For me, the trick is to not overthink it, because that's a sure route to paralysis... ultimately, the goal is to create the cartoon I want to make, and then reach more of the people who will enjoy that cartoon." In a cartoon there can be a million variables that go into the definition of 'good' and the cartoonist does not create a cartoon to specifications, but rather, works by feel.

These considerations emerged today as I discussed the concept of a connectivist research methodology with Sheri Oberman. Now I hadn't really thought in such terms about connectivism - I remarked that I see myself as more akin to an explorer than an experimenter, and that my

methodology is based more in [Paul Feyerabend](#)⁷ than in anything else: "The idea that science can, and should, be run according to fixed and universal rules, is both unrealistic and pernicious. It is *unrealistic*, for it takes too simple a view of the talents of man and of the circumstances which encourage, or cause, their development. And it is *pernicious*, for the attempt to enforce the rules is bound to increase our professional qualifications at the expense of our humanity."

But again, this isn't an 'anything goes' methodology, and Oberman is right, I think, to suggest that a connectivist methodology would be based in some significant way on connections. And when I reflect on my own practice it does seem to me that my own work is based in forming connections - though, more specifically, it is based in acting as a node in a network, and not in network-forming *per se* (I think the concept of 'building networks' is a bit misleading; if we want to be a part of a network we must be *in* the network, as a node, and not outside it, as a god).

But what would *that* methodology look like? Again, I could probably draw out some criteria - I've talked about the importance of autonomy and diversity, etc., in the past, and these qualities certainly characterize my own practice. And perhaps, after the fact, you could measure my own research performance against, say, an 'autonomy index', and determine to what degree I practices and promoted autonomy in my own work.

But that's not how I *actually* evaluate my own work. It's not that the criteria are wrong. It's that, first of all, the criteria that determine whether my work was a success or not do not emerge until later, and second, even then, I evaluate my work according to how it feels against any such criteria (indeed, it would drive me crazy to try to evaluate against such criteria).

For example, the Skype conversation I had this morning, and practices like that Skype conversation (I have another in less than half an hour, and routinely have short conversations where I talk to people interested in this and that). I'll pose one 'research' question: should I record them? (Another: should I blog about them after? Etc.) I don't record them because I want the conversations to feel more like practice rather than performance. Is this a correct methodology? What would tell me whether it was? I *won't know* until some time in the future the basis on which these conversations were a success or otherwise. But I *do* know I have a pretty good *feel* for such things, so I that's what I use.

Would it be better if there were some criteria against which I made my decision whether or not to record? No, because the success of the conversation is based in much more than whether or not it is recorded, and so any such standard would be artificial and arbitrary. And, in some important respects, wrong.

Obermann mentioned knowing whether a dance is successful. It's the same sort of thing, again. I know whether I am dancing well by how it *feels* when I'm dancing. If I'm feeling awkward, not knowing where to put my feet, unsure if I'm holding my partner properly, and all the rest (and I

⁷ Marxists.org. Paul Feyerabend (1975) Against Method: Outline of an anarchistic theory of knowledge. <http://www.marxists.org/reference/subject/philosophy/works/ge/feyerabe.htm>

speak from experience here) then I know I am dancing incorrectly. By contrast, if these concerns fall by the wayside and I feel only a smoothness of motion and attachment to my partner, then the dance is progressing well.

Now, a couple of things. I *could* assess my dance against a dancing design pattern, consisting (for example) of a series of step marks imprinted on the floor (kind of like the old '[figures](#)'⁸ in figure skating). This would certainly be objective, and measurable. But it would be incorrect - I could dance poorly even while hitting every step, and dance well even though missing the mark. Indeed, the *point* of the dance is do no more than to merely replicate a best practice, it is to take it and make it something more.

Again, though, note that this is not an 'anything goes' theory of dancing. Nor is it even a theory that supposes that my own standard of 'good' dancing is static (and hence, forever primitive). As I dance, as I watch other dancers, as I discuss dancing with my dance partner (or with total strangers I've bumped on the dance floor) my sense of dance becomes more refined. What I feel changes. What *used* to feel pretty good now seems to me to be slow and simplistic. As I evolve, I strive to be a better dancer, and my sensation becomes one of detecting this *improvement* in my dance.

This is an important point. One of the fundamental difficulties with the empirical sciences is that the science of measurement - which is what we need in order to obtain experimental results - is *itself* an empirical discipline, and itself subject to amendment and improvement over time. Nowhere is this more evident than in personal perception - our tastes in music when we are young are (typically, and with some *caveats*) laughable when we are older. Did I really buy that [Bay City Rollers album](#)⁹? Yeah - I did.

The literature of aesthetics is full of references to things like the refined palate in wine tasting, the expertise of the chef in cooking, the appreciation of a master carpenter for a fine mortise and tenon. People who study colour closely are able to distinguish differences in tint and tone that will escape a novice. Our *quality of experience* improves over time, and it does so because our capacity to perceive nuance, distinction and difference is improved, and this reflects the impact of hundreds of thousands of individual experiences over time on our mind. Our brains, quite literally, become shaped into better perceivers (*given* the appropriate practice and experience).

As this is true of individuals, so it is true of the assessment of science and research in society generally. For while on the one hand we have today a trend toward objective criteria-based assessments of research and science, a connectivist approach (if there were one) would suggest

⁸ Wikipedia. Compulsory figures. http://en.wikipedia.org/wiki/Compulsory_figures

⁹ Wikipedia. Once Upon a Star. http://en.wikipedia.org/wiki/Once_Upon_a_Star

that the acceptance of a research methodology or a specific research program is an *emergent phenomenon* describable only in terms of that programs placement in the wider network?

What does that mean? One way of stating it is that society as a whole *feels* good about a given program, and senses discord about another. Think of the sort of social approbation or revulsion we feel for certain moral or immoral acts - there is for example in Canada a certain crime of murder and dismemberment that has just been committed, and there is a widespread sense of revulsion regarding the fact that it was recorded and posted on the internet. This isn't a matter of voting or counting individual preferences, or of violating some guideline, law or precept; it's more like a *whole body* response to the phenomenon.

What constitutes it? Well precisely it is the set of interactions each of us with the others, the call-in radio shows, the blog posts, and the rest, combined with our inner sensations about the act as they are expressed in a myriad of ways, some not even connected to the act (that's why simply counting votes would be inappropriate; it completely misses the changed way we regard each other in the grocery store, a change imperceptible and almost unidentifiable, but if you were sensitive to it and looking for it, you might say you saw it there).

This form of *social perception* is the ultimate judge of the adequacy of any research program (or musical taste, or dance moves, or cartoon, or any of the rest of it). Again, it is *not* an electoral process, nor a market behaviour (quite the contrary; these are mass phenomena intended and designed to magnify the needs and interests of individual members of society, rather than to reflect the sense of society as a whole).

And - importantly - like personal perception, social perception is itself subject to refinement and improvement. It's as Richard Duscho [writes](#)¹⁰, "the proper game for understanding the nature and development of scientific knowledge is engagement with the ongoing pursuit and refinement of methods, evidence, and explanations and the subsequent handing of anomalies that are a critical component of proposing and evaluating scientific models and theories."

The mechanisms we use to validate are - or ought to be - similar to those used to validate great cuisine, or dancing, or auto mechanics. Both society as a whole and experts in particular play a role. Society probably defines relevance - and again, relevance may not be immediately apparent. Most of society understands this, and we have always kept a place for abstruse researches, not because we understand them, but because we don't. Experts in the mean time are needed to distinguish the gold from the dross, the genuine from the imitation; their own inner sense of the discipline has been finely honed.

¹⁰ Richard Duschl, 2008. Science Education in Three-Part Harmony: Balancing Conceptual, Epistemic, and Social Learning Goals. Review of Research in Education, Vol 32, Issue 1, pp. 268 – 291.

<http://rre.sagepub.com/content/32/1/268.full>

We need both, and we need these to be *undefined*, rather than specified in terms of some sort of code of guidelines or best practices or whatever, not only because such are hopelessly inaccurate abstractions on the judgements that are actually made, but also because by their very nature they are resistant to the sort of growth and personal development every society needs. When societies learn to *feel* and not just to measure, arts and sciences flourish; when they return to standards and specifications, they have lost that capacity, and a decline has begin.

*Moncton, Canada
June 1, 2012*

New Forms of Assessment: Measuring What You Contribute Rather Than What You Collect

Once again, as we do at the start of every school year, we are hearing about the rampant cheating that goes on, especially online, but in fact, everywhere, and without remorse or regret.

As Nikhil Hoyal writes, "Cheating is an epidemic in schools across the nation. A 2010 [survey](#)¹¹ of 2,000 Stuyvesant students revealed that more than 72 percent of students copied their homework from others and about 90 percent of seniors cheated on [tests](#)¹²."

In the past I've commented on the likelihood that students will emulate their role models, and so if there is a cheating epidemic in schools, it is likely the result of a cheating epidemic in society in general.

So I've linked to articles with titles like "['Cheating culture' finds corruption everywhere in U.S. society](#)¹³." It reads: "Enron. WorldCom. Halliburton. These names are indelibly associated with ethics violations that have shaken the American economy and captured headlines in the past few years."

The cheating hasn't stopped with this 2005 article, and it's not limited to the U.S. Indeed, in the wake of the 2008 crash and findings of widespread manipulation of things like the stock market and [key interest rates](#)¹⁴, it appears that cheating has become mainstream. No wonder our students find cheating to be the most reasonable response to assessment and evaluation.

I have often wondered what society would look like if we took wealth out of the equation. What would it look like, say, if we limited salaries to a million dollars a year, corporate incomes to

¹¹ The Editorial Board, The Spectator, 2012. This Was Probably Plagiarized. <https://web.archive.org/web/20120702073832/http://stuy spectator.com/2012/03/11/this-was-probably-plagiarized/>

¹² Amanda Ripley, 2011. Testing Around the World. NBC News Education Nation. <https://web.archive.org/web/20111025083409/http://www.educationnation.com/index.cfm?objectid=344AE6BA-FB34-11E0-B00E000C296BA163>

¹³ Patrick O'Kelly, 2012. 'Cheating Culture' finds corruption everywhere in U.S. society. Seattle Post-Intelligencer. <http://www.seattlepi.com/ae/books/article/Cheating-Culture-finds-corruption-everywhere-in-1137391.php>

¹⁴ Mark Scott, 2012. Interest Rate-Fixing Scandal Puts Barclays at Risk With 2 Ratings Agencies. New York Times. <http://dealbook.nytimes.com/2012/07/05/attention-turns-to-barclays-future/>

\$100 million, and set corresponding limits on the accumulation of wealth (to reduce the [hoarding](#)¹⁵ that is wrecking our economy)?

Perhaps we can get some sense of this by taking the traditional incentives out of education. Typically, students perform tests, write essays, or complete projects for grades from instructors. Cheating occurs when they perform something other than the intended task in order to produce the result - copying answers, for example, in order to achieve higher grades than they would have earned on their own.

Even when the incentive is minimal, when we set up learning based on grades accumulated in the traditional way, it leads to cheating. Thus we see recent lamentations in [Forbes](#)¹⁶, the [Chronicle](#)¹⁷ and others "[concerning recent articles](#)¹⁸ on cheating and [skepticism](#)¹⁹ of online learning," according to [Dick Lipton](#)²⁰.

The response from companies like Coursera and Udacity was predictable: an [honour code](#)²¹ prohibiting multiple identities (and [authentication](#)²² if that doesn't work), the long-standing idea of [mastery learning](#)²³, or [creating](#)²⁴ in-person testing centres. And if none of that works, "the online exams are regarded as “practice” insofar as not counting toward a certificate of value."

To me, this is a failure of imagination. Surely, both in schools and society, we can do better than the dog-eat-dog accumulation of numbers representing real or fictional value for power and

¹⁵ Bloomberg, 2012. Mark Carney 'dead money' warning targets Suncor, Teck ...

<http://www.bloomberg.com/news/2012-08-24/carney-dead-money-warning-targets-suncor-teck-corporate-canada.html>

¹⁶ George Anders, 2012. How Would You Like A Graduate Degree For \$100? Forbes.

<http://www.forbes.com/sites/georgeanders/2012/06/05/udacity-sebastian-thrun-disrupting-higher-education/>

¹⁷ Jeffrey R. Young, 2012. Cheating Goes High Tech. Chronicle of Higher Education.

<http://chronicle.com/article/Online-Courses-Can-Offer-Easy/132093/>

¹⁸ Freakonomics, 2012. How to Cheat in Online Courses. <http://www.freakonomics.com/2012/06/08/how-to-cheat-in-online-courses/>

¹⁹ David Youngberg, 2012. Why Online Education Won't Replace College—Yet. Chronicle of Higher Education.

<http://chronicle.com/article/Why-Online-Education-Wont/133531/>

²⁰ RjLipton+KWRegan, 2012. Cheating Or Mastering? Gödel's Lost Letter and P=NP

<http://rjlipton.wordpress.com/2012/08/21/cheating-or-mastering/#comment-24130>

²¹ Udacity Legal Information, 2012. Udacity. <http://www.udacity.com/legal/>

²² Phil Hill, 2012. Four Barriers That MOOCs Must Overcome To Build a Sustainable Model. E-Literate.

<http://mfeldstein.com/four-barriers-that-moocs-must-overcome-to-become-sustainable-model/>

²³ Wikipedia. Mastery Learning. http://en.wikipedia.org/wiki/Mastery_learning

²⁴ Udacity, 2012. Udacity in partnership with Pearson VUE announces testing centers.

<http://blog.udacity.com/2012/06/udacity-in-partnership-with-pearson-vue.html>

profit. Surely we can reflect the achievement of individuals in some way that does not resemble a big stack of stuff.

The first thing that both the financial system and the grading system devalue is the worth of assistance and generosity *to others*. Oh, sure, there is a token 'charitable donations' check-box in your income tax form. But imagine your income went *up* if you gave time, money or resources to charity, even if you were living on social assistance!

In the schools, too, there is no reward for helping others (indeed, it is heavily penalized). Suppose educational achievement was measured at least partially according to how much (and how well) you helped others. The value of the achievement would increase if the person is a stranger (and conversely, decrease to zero if it's just a small clique helping each other) and would be in proportion to the timeliness and utility of the assistance (both of which can be measured).

The financial system also values *mass*. That is to say, it favours the creation of consolidated institutions that act as a single entity. There is limited incentive to work with others - indeed, it is often more worth your while to go to court against [long-standing business partners](#)²⁵. A limit on corporate size, by contrast, would create an incentive to cooperate with others. Changes in patent and trade law would make costly lawsuits counterproductive.

But all this is for naught if people have been educated since birth to engage in cutthroat competition with each other. Sure, we hear about fair play, but it is so rare that organizations like the Olympics issue [special awards](#)²⁶ when it happens. Far more often students see [cheating](#)²⁷, [doping](#)²⁸, and plain [bad manners](#)²⁹. Indeed, they learn [it doesn't even matter](#)³⁰.

Suppose instead students were rewarded for cooperation. Not collaboration; this is just the school-level emulation of the creation of cliques and corporations. Cooperation, which is a common and *ad hoc* creation of interactions and exchanges for mutual value. Cooperative

²⁵ Associated Press, 2012. Apple calls for ban on Samsung Galaxy smartphones. Fox News.
<http://www.foxnews.com/tech/2012/08/27/apple-calls-for-ban-on-samsung-galaxy-smartphones/>

²⁶ Olympics, 2012. Decathletes Ashton Eaton and Curtis Beach receive Fair Play awards.
<http://www.olympic.org/news/decathletes-ashton-eaton-and-curtis-beach-receive-fair-play-awards/172328>

²⁷ Chris Chase, 2012. Gold-medal swimmer admits to cheating in 100 breaststroke. Yahoo Sports.
<http://sports.yahoo.com/blogs/olympics-fourth-place-medal/cheater-swimming-gold-medalist-admits-taking-illegal-kicks-162450535--oly.html>

²⁸ Rick Maese, 2012. USADA strips Lance Armstrong's titles, bans him from cycling. Washington Post.
http://www.washingtonpost.com/sports/usada-strips-lance-armstrongs-titles-bans-him-from-cycling/2012/08/24/d6f7d382-ee04-11e1-afd6-f55f84bc0c41_story.html

²⁹ BBC, 2012. Olympics badminton: Eight women disqualified from doubles
<http://www.bbc.co.uk/sport/0/olympics/19072677>

³⁰ Kurt Badenhausen, 2012. Why Lance Armstrong Still Matters. Forbes.
<http://www.forbes.com/sites/kurtbadenhausen/2012/08/24/why-lance-armstrong-still-matters/>

behaviours include exchanges of goods and services, agreement on open standards and protocols, sharing of resources in common (and open) pools, and similar behaviours.

Imagine receiving academic credit for contributing well-received resources into open source repositories, whether as [software](#)³¹, [art](#)³², [photography](#)³³, or [educational resources](#)³⁴. Imagine receiving credit for long-lasting additions to Wikipedia or similar online resources (we would have to fix Wikipedia, as it is now run by a [gang of thugs](#)³⁵ known as 'Wikipedia editors'). We can have wide-ranging and nuanced evaluations of such contributions, not simple grades, but something based on how the content contributed is used and reused across the net (this would have the interesting result that your assessment could continue to go up over time).

Society does not in general reward contributions to the public good. Indeed, quite the opposite - in order to earn profit, corporations and individuals [bribe](#)³⁶ governments to act [against the public interest](#)³⁷. Companies are more interested in seeing services [privatized](#)³⁸, instituting [user fees](#)³⁹, or other measures designed to [wring wealth](#)⁴⁰ out of what might otherwise be a universal program. As for long range public good, such as [environmental protection](#)⁴¹, or society-wide [public good](#)⁴², such as energy and information access, more money is to be made ignoring the public good than supporting it.

³¹ Github. <https://github.com/>

³² Deviant Art. <http://www.deviantart.com/>

³³ Flickr. Explore / Creative Commons. <http://www.flickr.com/creativecommons/>

³⁴ OER Commons. <http://www.oercommons.org/>

³⁵ Nicholar Ciarelli, 2011. The Myth of Wikipedia Democracy. The Daily Beast. <http://www.thedailybeast.com/articles/2009/11/28/wikipedias-attack-dog-editors.html>

³⁶ Kumar Vikram, 2012. Bribed transport officials let rogue trucks unleash on Delhi roads. India Today. <http://indiatoday.intoday.in/story/bribed-transport-officials-let-rogue-trucks-unleash-on-delhi-roads/1/214754.html>

³⁷ Gidi Weitz, 2012. State Set to Close Landmark Bribe Case Against Former PM Ariel Sharon. Haaretz. <http://www.haaretz.com/news/national/state-set-to-close-landmark-bribe-case-against-former-pm-ariel-sharon.premium-1.460846>

³⁸ Paul Krugman, 2012. Prisons, Privatization, Patronage. New York Times. <http://www.nytimes.com/2012/06/22/opinion/krugman-prisons-privatization-patronage.html>

³⁹ Keith Jones, 2012. Quebec: Thousands protest Liberals' tuition hikes, user fees and privatization. World Socialist Web Site. <http://www.wsws.org/articles/2012/aug2012/queb-a24.shtml>

⁴⁰ Stephanie Simon, 2012. Privatizing Public Schools: Big Firms Eyeing Profits From U.S. K-12 Market. Reuters. Huffington Post. <http://www.huffingtonpost.com/2012/08/02/private-firms-eyeing-prof n 1732856.html>

⁴¹ Robert F. Moore, 2012. Coal vs. EPA: Profits, jobs shouldn't trump public health. Lexington Herald-Leader. <http://www.kentucky.com/2012/08/20/2304892/coal-vs-epa-profits-jobs-shouldnt.html>

⁴² Lim Guan Eng, 2012. "Piratization" of Penang port: Don't just talk, come clean - Guan Eng tells BN crony. Malaysia Chronicle. <https://web.archive.org/web/20130401003940/http://www.malaysia->

Imagine it was the opposite. Imagine private enterprise and individuals were rewarded for supporting the public interest - suppose, for example, they were rewarded according to the *actual good* they produced, *after* they made the investment, rather than through some contract or billing system. Imagine a phone company made money, not from privatizing the telephone system, but by adding value to the existing public system. Imagine rewarding energy companies for producing the more [environmentally sound energy](#)⁴³, not the cheapest.

There is, again, no reason why public service cannot be incorporated into individual assessment. Adding value to fire and police services by means of monitoring and reporting (not the piece-work model of something like [CrimeStoppers](#)⁴⁴, but actual prevention), supporting environment by counting birds, sampling water, servicing sports events by acting as a timer or umpire - all these can add to a person's assessment.

I'm not thinking of the simple sort of tasks grade school students can perform. Indeed, a person hoping to attain a higher level qualification would need to contribute to the public good in a substantial and tangible way. Offering open online courses (that are well-subscribed and positively reviewed by the community) should be a requirement for any graduate-level recognition. The PhD *used* to be about offering a unique research contribution to the field; now it's about paying tuition and being exploited as a TA.

These three things - helping others, being cooperative, contributing to the public good - are obviously not easy to assess. To be sure, it's far easier to ask students simple questions and grade the number of correct responses. But asking students simple questions, far from measuring putative 'content knowledge', is really an exercise in counting without any real interest in what is being counted. It acts as an invitation to cheat, as it places self-interest ahead of the values it is actually trying to measure.

This list of three types of assessment is intended only to stimulate thought. No doubt there are many other forms of assessment along similar lines, all based on measuring what you contribute rather than what you collect. And until we begin measuring achievement - and wealth - in this way, we cannot expect better than dysfunctional students and a dysfunctional society.

Moncton, Canada

chronicle.com/index.php?option=com_k2&view=item&id=37307:piratization-of-penang-port-dont-just-talk-come-clean-guan-eng-tells-bn-crony&Itemid=2

⁴³ <http://www.renewableenergyworld.com/rea/news/article/2012/08/recap-u-s-wind-energy-layoffs-continue-in-colorado-iowa-as-federal-policy-uncertainty-continues>

⁴⁴ <http://www.canadiancrimestoppers.org/>

Computer Use Guidelines

Responding to Alfred Thompson's [Ten Commandments of Computer Ethics](#)⁴⁵:

Leaving aside the questionable wisdom of framing generic advice within a construct specific to a certain religion...

The commandments say, essentially, "don't take or use other people's stuff without permission," which is OK in itself, but the way it is repeated over and over reveals an unhealthy fixation on property rights, to the exclusion of almost all else.

Here's my version:

- don't use computers to hurt people
- respect people's privacy
- don't take or use other people's stuff without permission
- be truthful in your communications
- don't send people unwanted messages
- don't write malicious or destructive code
- be generous and share what you create
- turn off the power when room and computer are not in use

Have I missed any?

*Moncton, Canada
August 29, 2012*

⁴⁵ <http://blogs.msdn.com/b/alfredth/archive/2012/08/29/ten-commandments-of-computer-ethics.aspx>

The Robot Teachers

"Can you recommend a good doctor?" This is the final question in an [article by Tony Bates](#)⁴⁶ about teaching, and it frames the debate nicely. We would be very disinclined to turn over the healing profession to automation, and in the same vein, should be equally hesitant when it comes to teachers.

My first thought on reading the question was, "they're all good." Obviously there is some variation between doctors - and I had a dentist once the year before his retirement I would not recommend to anyone - but the difference is slight, especially when compared to the difference between having a doctor and not having a doctor.

The quality of doctors is a combination of the educational system and the character of the individual who graduates from it. We live here in a society that values excellence in the professions, and highly skilled and motivated individuals join the professions. In Canada, this also includes teachers, mostly, and as a result, we have one of the [best educated societies](#)⁴⁷ in the world.

But it's funny. Medicine, of all the professions, is one of the most dependent on computers, machines and robots. From x-rays and MRIs to the monitoring devices of ICUs to electronic patient records (a work still in progress) to all manner of diagnostic and treatment systems. I take pills manufactured by robots (and dispensed by computer), my breathing at night is managed by a computer, the lenses on my glasses were shaped by an automated grinding system, and I get robocalls to remind me that I'm scheduled for a checkup next Tuesday at nine.

So we have two sides to this. On the one hand, in education, we depend on the professionalism of our teachers, and trifle with that at our peril. We depend on their education being excellent, and on their passion and motivation. On the other hand, if our doctors were as hesitant to employ technology as our teachers sometimes are, our lives would be measurably shorter and inestimably less comfortable and less secure.

So, while I understand what motivates Tony Bates to express such concerns regarding the automation of education, by the same token, I am wary of arguments that recommend we stop using the robots and the computers.

⁴⁶ <http://www.tonybates.ca/2012/08/31/my-summer-paranoia-computers-will-replace-teachers-in-higher-education/>

⁴⁷ <http://www.theglobeandmail.com/commentary/canada-is-not-becoming-outclassed/article4082381/>

Here's Tony Bates: "He (his editor) wanted me to change what I was writing to make the case that computers can replace teachers in higher education." Why? "He told me that his CEO and a number of CEOs from other companies all thought this was the right way to go, and were trying to influence the market to accept this."

And this brings in the *other* side of the debate about health care: privatization and corporate control.

In Canada we have a public health care system. Like our education system, it is one of the best in the world. Outcomes are [comparable](#)⁴⁸ to those in the United States, and frequently better, and Canadians spend about half as much on health care. Wait times are [comparable](#)⁴⁹ and, of course, nobody is turned away at the door of a Canadian hospital because everybody in the country has insurance.

By and large, Canadians feel a conversion to an American-style system of privatized health care would be a disaster, even with the salve that is Obamacare. This isn't a close election-style preference. Polls show that [94 percent of Canadians](#)⁵⁰ prefer the public health care system. Even while Canadians face a barrage of contrary media (for example, from the Fraser Institute) they aren't buying it. They can see the horror stories from south of the border, and [express](#)⁵¹ an almost zero desire to switch. [Who](#)⁵² can blame them?

This is the sceptre Tony Bates faces in his dream. It is the conversion, erosion and eventual destruction of one of the best public education systems in the world, under the guise of automation. It is the eradication of the professional that we today call 'teacher' or 'professor' and his or her replacement with the educational equivalent of an automated food-services operator asking "would you like fries with that?"

The results of such a system would be predictable, and again, one can point south of the border for evidence of that possible future. Though Americans pride themselves in having the best

⁴⁸ <http://www.openmedicine.ca/article/view/8/1>

⁴⁹ <http://www.ryananddebi.com/2008/12/19/healthcare-wait-times-us-vs-canada/>

⁵⁰ <http://www.newswire.ca/en/story/884001/support-for-public-health-care-soars-94-of-canadians-including-conservatives-choose-public-over-for-profit-solutions>

⁵¹ <http://healthcoalition.ca/wp-content/uploads/2011/11/NANOS-EN.pdf>

⁵² <http://www.cnn.com/2011/HEALTH/06/15/life.expectancy.united.states/index.html>

education system in the world, it [just isn't true](#)⁵³. What can be expressed with [statistics](#)⁵⁴ is also experienced by Canadians as fact. It is perhaps shameful to admit, but Canadians have long [made sport](#)⁵⁵ of the low level of American education. It's the whole health thing all over again.

The explanations are [myriad](#)⁵⁶. There is the income gap, which is much larger in the U.S., and reliable the best predictor of educational outcomes. There are structural and institutional factors - the wealthier districts tend to get better schools and more funding. There are cultural factors - in some cultures, we are told, education and achievement are valued more highly than in others. There are those who blame the teachers and teachers' unions (though of course teachers in Canada are almost 100 percent union).

Most of these factors, though, are mitigated, if not eliminated entirely, with public support for education. Again, it's like health care - yes, poorer people in both Canada and the U.S. are likely to have lower health outcomes, for a variety of reasons. But in Canada, poorer people are less likely to delay a visit to the doctor, less likely to allow an illness to become too serious to treat, less likely to die an early death.

Similarly, where education is a public good, the causes of low educational outcomes are mitigated. Funding between wealthier and poorer districts, instead of varying by parental income, is more or less equivalent (though the rich even in a public system extract a disproportionate share). Poorer people, in a public system, are more likely to be exposed to positive role models and to acquire the values of professionalism, passion, motivation, and the rest. And of course in a public system poorer people fund themselves - at least some of the time - in an environment that is informationally rich and intellectually challenging.

If the rest of the automation of education is to undercut education as a public good, Canadians - and society in general - have a great deal to worry about. And it is clear, as Bates shows, that an organized campaign is underway to create this outcome.

Bates again:

- [xMOOCs and automated marking and peer review](#)⁵⁷ to get around the awkward point that one instructor cannot provide adequate feedback to thousands of students.

⁵³ http://www.youtube.com/watch?v=h__uutzcQXc

⁵⁴ http://www.all4ed.org/files/IntlComp_FactSheet.pdf

⁵⁵ <http://video.google.ca/videoplay?docid=-7111005509913775935>

⁵⁶ http://en.wikipedia.org/wiki/Achievement_gap_in_the_United_States

⁵⁷ <http://www.tonybates.ca/2012/08/05/whats-right-and-whats-wrong-about-coursera-style-moocs/>

- the Republican Party of Texas whose [election platform contains the following](#)⁵⁸ (p. 12): "Knowledge-Based Education – We oppose the teaching of Higher Order Thinking Skills (HOTS) (values clarification), critical thinking skills and similar programs..."
- the [California two year college system has undergone nearly \\$1 billion of cuts](#)⁵⁹ since 2008, resulting in a waiting list of 470,000 students who cannot get into classes
- [Stanford University has just created a new Vice-Provost for Online Learning](#)⁶⁰, who turns out to be a computer scientist
- [the Ontario government is looking for more 'productivity' from the post-secondary institutions](#)⁶¹, and is asking how online learning can lead to improved productivity.

This is just a small sample of the evidence he could have assayed to make the case that automation is being used as a mechanism to privatize the educational system.

And again, probably every educational blogger experiences that gentle but incessant pull to write about and support initiatives that lead toward a privatized system. Want to get on [TED](#)⁶²? Don't support public education - instead, talk about how business and the markets can do it better. Want to get hired to write for [Britannica](#)⁶³? Espouse the market-based perspective. Want to win an award? Check the [gotchas](#)⁶⁴. Want to give your blog a boost? [Be](#)⁶⁵ an Apple Educator or Google Certified Teacher. Want to be known as supporting 'free education'? [Support the](#)

⁵⁸ http://s3.amazonaws.com/texasgop_pre/assets/original/2012Platform_Final.pdf

⁵⁹ <http://www.tonybates.ca/2012/08/29/californias-two-year-college-system-in-deep-trouble/>

⁶⁰ <http://news.stanford.edu/news/2012/august/online-learning-office-083012.html>

⁶¹ <http://www.tcu.gov.on.ca/pepg/publications/DiscussionStrengtheningOntarioPSE.pdf>

⁶² <http://www.ted.com/talks>

⁶³ <http://www.britannica.com/blogs/authors/>

⁶⁴ <http://blogs.msdn.com/b/education/archive/2012/03/09/how-to-win-microsoft-education-partner-of-the-year-2012.aspx>

⁶⁵ <http://wirededucator.wordpress.com/2010/12/13/the-google-teacher-academy-the-apple-distinguished-educator-program/>

commercialization⁶⁶ of educational resources. Want Shuttleworth⁶⁷ or Hewlett⁶⁸ money for your educational support or research project? Support the commercialized⁶⁹ approach.

There is an ongoing and incessant campaign afoot to privatize education. In the United States, education is almost the last bastion of public expenditure. In Canada, both health care and education face the forces of privatization and commercialization.

The results are wholly predictable. In all cases, the result will be a system that favours a small moneyed elite and leaves the rest of the population struggling to obtain whatever health and education they can obtain with their meagre holdings. As more wealth accumulates in the hands of the corporations⁷⁰ and the wealthy⁷¹, the worse health and education outcomes become for the less well-off in society.

But here's where the challenge arises for the education and university system: it was designed *to support income inequality* and designed to *favour the wealthy*.

(Indeed, from my perspective, one of the greatest scams⁷² perpetrated by the wealthy about the education system is that it has a liberal bias⁷³. But if you separate out social issues - beliefs⁷⁴ concerning "'multiculturalism, immigration and racism' (the most common category chosen by colleges), or 'environmentalism, animal rights and food'" - and focus exclusively on questions of economy and distribution of wealth, the purported liberal bias disappears.)

Examine the structure of the traditional university system, especially as instantiated in the United States, but also to a certain degree in Canada and many other nations. Admission is regulated

⁶⁶ <http://freeculture.org/blog/2012/08/27/stop-the-inclusion-of-proprietary-licenses-in-creative-commons-4-0/>

⁶⁷ <http://www.shuttleworthfoundation.org/>

⁶⁸

http://www.hewlett.org/grants/search?order=field_date_of_award_value&sort=desc&keywords=&year=&term_node_tid_depth_1=All&program_id=87

⁶⁹ <http://www.edexcellence.net/>

⁷⁰ <http://www.abc.net.au/news/2012-07-23/31-trillion-dollars-hidden-in-tax-haven/4147114>

⁷¹ <http://www.mybudget360.com/top-1-percent-control-42-percent-of-financial-wealth-in-the-us-how-average-americans-are-lured-into-debt-servitude-by-promises-of-mega-wealth/>

⁷² <http://sixthstate.net/?p=6354>

⁷³ <http://www.washingtontimes.com/news/2010/apr/16/liberal-bias-has-tainted-schools/?page=all>

⁷⁴ <http://www.foxnews.com/us/2010/06/21/liberal-book-bias-summer-reading-national-association-scholars/>

by [tuition](#)⁷⁵, and in the most elite institutions, the tuition is the [highest](#)⁷⁶. The recent British experiment in voluntary moderation was a [failure](#)⁷⁷. Admission in private universities is also enabled by [legacy](#)⁷⁸, the result of favours granted by and to alumni of the university. There is in addition a bias in elite universities toward graduates of a small number of [preparatory schools](#)⁷⁹.

In *this sort of environment* the preferred model of learning is very personal and very professional. Having a teacher or professor in this sort of environment is less like dealing with a hospital or clinic, and more like having a personal physician. It's all hands-on, it's all very close, supporting and caring. And it is very effective, at least, from the perspective of securing positions of power, privilege and wealth. The [associations](#)⁸⁰ created here last a lifetime, and are parlayed into [wider influence](#)⁸¹. Want to go to [Davos](#)⁸²? Say the right things, support the right causes.

So long as this is what educators believe they provide, they will serve as agents for the commercialization and privatization of their own discipline, rather than as protectors of the public system.

That's why I'm so concern about the turn taken in the article written by Tony Bates. Here he is again:

To successfully achieve such learning outcomes, learners either have to be incredibly self-motivated and already highly knowledgeable (i.e. already well educated), or they need an environment that supports the development not just of these outcomes, but also the development of their thinking and decision-making. This requires fostering or supporting their motivation to learn, dealing with gaps in knowledge or lack of learning skills, providing timely feedback, and above all providing guidance, criteria and direction

⁷⁵ <https://plus.google.com/103605590434772742623/posts/Xt4LShqGRQC>

⁷⁶ <http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/national-universities>

⁷⁷ <http://www.guardian.co.uk/education/2010/nov/03/universities-welcome-flexibility-triple-fees>

⁷⁸ http://ivysuccess.com/washingtonian_legacy.html

⁷⁹ <http://www.forbes.com/2010/04/29/best-prep-schools-2010-opinions-private-education.html>

⁸⁰ http://en.wikipedia.org/wiki/Skull_and_Bones

⁸¹ http://en.wikipedia.org/wiki/Bilderberg_Group

⁸² <http://www.weforum.org/>

to ensure that they meet the necessary standards to operate effectively in the real world. This is what I call teaching, and much if not all of it is difficult or impossible to automate.

This is the model of the private education, of the personal physician, of the service reserved for the elite, not the least because we cannot afford to provide it for everybody. And this is a key point of this article: so long as we cling to this as the model for education, we push it toward privatization.

To be sure, Bates is aware of this, I would think.

Yes, this was possible 50 years ago because we had an elite system, and few students per professor. Now we have, especially in North American Tier 1 public research universities, very large classes and many students per professor (made worse in first and second year by tenured professors focusing mainly on research and graduate education). So we have fallen back almost completely on 'instruction' rather than on 'teaching' in undergraduate programs.

And he is quite right. The system has drifted from the prep-school and Ivy-League model of learning, has drifted away from the boardrooms and warrens of Cambridge and Oxford, to resemble something much more structure, much less personal, much more 'outcomes focused', and much less attractive. It has devalued the role of the teacher and professor, relegating them to the role of tutor or instructor or semi-professional support system. In universities, much of the teaching is done by underpaid graduate students. In the public school system, teachers are under increasing pressure, facing lower pay. Even their pensions are under attack.

No, it is not a good system, and simply taking this and automating it is not a solution. And Bates is quite correct to warn of the most likely outcome: an in-person education system granted to a small number of people who actually attend these elite universities, and a mostly or fully automated system sold like CDs and television programs for the rest of us. We - those of us who are not in the one percent - would be reduced to being educated vicariously through others.

We know this model fails. " For over 30 years computer scientists, working in the field of artificial intelligence, have been trying since then to improve on 'programmed learning'⁸³, which failed to deal adequately with the development of cognitive thinking skills beyond the level of comprehension and memory." Yet this is the sort of education being designed today though systems such as [adaptive learning systems](#)⁸⁴ and common core. This is the sort of system

⁸³ http://www.gsis.kumamoto-u.ac.jp/en/opencourses/pf/3Block/07/07-2_text.html

⁸⁴ <http://www.atp.nist.gov/atp/97wp-lt.htm>

intended to be supported by [learning analytics](#)⁸⁵. And yes, the Coursera, Udemy, MITx and similar initiatives are the means to this end. A Netflix for learning. An Amazon for achievement. Except that it will sell a hollow dream, as the divisions between those who are genuine participants in academic and literary society, and those who are not, will be permanently established.

To be sure, this must be understood: this is as much a political outcome as an economic outcome. Those of us who end up on the wrong side of the vicarious education divide are and will be shut out not only from positions of wealth and power, but from any role or say in the definition of knowledge, intellect and culture. Those people we read, those influencers of public opinion, those who are credited with discovery and celebrated as innovators and inventors - they will all come from the in-person side of the vicarious divide. Political discussion, literature, culture - these are and will be shaped in the interests of, by and for, those with wealth and power. Dissent will not be suppressed, because it will no longer be necessary; dissent will [no longer be possible](#)⁸⁶.

If we cannot have an educational system that was designed by and for the industrial age, with classrooms and textbooks and standardized curricula, then *neither* can we have the education system that existed before that age, with professorial discussion circles, individual advisers and mentors offering support and collegiality, personal instruction, guidance, criteria and direction. We must move beyond what we have if we are to have a public system worth keeping, but not in a direction that further reinforces the divide between a high quality education for some and a facsimile for the rest of us.

I think there is only one way to achieve this: to develop teachers and instructors as a professional class at the service of a public education system, leveraging and working within a technological environment equally accessible and supportive of all. *Not* programmed learning, but also *not* the private-school education taken to be the high standard of learning today. Something *better*.

Let's first look at the recommendations offered by Tony Bates:

- using online learning, rather than building new campuses or physical facilities, to expand access.
- use of shared materials, and not just open educational resources, but developing courses or programs that can be used across several institutions.
- economies in the delivery of programs by maintaining content quality through the use of tenured or research professors for the design and development and monitoring of course

⁸⁵ <http://www.elearnspace.org/blog/2010/08/25/what-are-learning-analytics/>

⁸⁶ <http://www.nytimes.com/books/first/f/frank-dissent.html>

delivery, but reducing delivery costs through the use of well-trained online adjunct professors and automated marking where appropriate.

- course designs that move the work away from the instructor to the student. Examples are collaborative learning, development of self-management learning skills, problem-based learning.

This is the traditional system, with some technological enhancements, where education is still considered to be 'delivered' by means of 'programs'. It will not work, no more than a model of 'delivering' health care through 'health programs' would help a society be healthier (as evidenced by the [failure](#)⁸⁷ of the HMO model, which is exactly that).

We have to stop thinking of education as a delivery system. We have to start thinking of an overall publicly-accessible and supportive *educational environment*.

It's not about duplicating the success of the private school approach that has characterized the design of 'the best' education through the last century. It's about making that advantage irrelevant. It's about making it so *you can't get anything more* if you take the personal-physical or personal-teacher approach, because everybody already has access to the best. And - like live music - is we want we can sample it from time to time in person, because it's fun.

We must develop the educational system *outside the traditional system* because the traditional system is *designed* to support the position of the wealthy and powerful. Everything about it - from the limitation of access, to the employment of financial barriers, to the creation of exclusive institutions and private clubs, to the system of measuring impact and performance according to economic criteria, serves to support that model. Reforming the educational system isn't about opening the doors of Harvard or MIT or Cambridge to everyone - it's about making access to these institutions *irrelevant*. About making them an *anachronism*, like a symphony orchestra, or a gentleman's club, or a whites only golf course, and replaced with something *we own and build* for everyone, like punk music, a skateboard park, or the public park.

So what does a technology-enable 'public education health system' look like? As I said, it will be staffed by education professionals, and ultimately the design will be largely informed by these professionals, as once having taken over management of the system for themselves, they can begin to implement reforms that make educational sense, rather than follow prescriptions employed by economists or put in place for political reasons.

Education professions in this model may be affiliated with institutions, but are also regarded as providers in their own right. People in the community may access education either through the institution or directly through the professional. They don't 'enrol' in a particular institution, or

⁸⁷ http://www.nxtbook.com/nxtbooks/medimedia/managedcare_201204/#/26

'belong' to a class or curriculum, though they may tend to favour one institution or one professional. As with the health system, (at least in Canada) they can attend any institution they want, and have a wide choice in the educator they want. They may from time to time seek the assistance of specialists, for particular needs (for example, language training or compliance training).

What is most important is how education is *thought of* in such a system. It is *not* something that is 'delivered' or 'transferred' from an institution to a person. An education is *property* of a person ('property' in the sense of 'quality' or 'attribute', not in the sense of 'ownership' or 'possession') just in the same way as health and fitness are properties of a person, something they have all their lives, something they develop and grow and maintain, something they are *themselves* ultimately responsible for.

Just as a healthy person needs affordable and accessible food and water, housing and transportation, so also an educated person needs learning resources, intellectual challenges, role models and examples, employment and invigoration. They need, in the words of Seymour Papert, [hard fun](#)⁸⁸. There are many ways this can be provided in a technologically advanced society - transmission (via books and videos) and programmed learning are only two possibilities, and (probably) the most minimally effective of those.

In this model, the public education system isn't something you put aside 18 years your life to go to and 'access', no more than a child spends the first 18 years of his or her life in a health institution developing strength and fitness. In this model we find much more interesting, varied and engaging pass-times for children and young adults, integrating them more and more into the wide web that is society as a whole. Yes, children and young adults continue to have role models and mentors, but they only model in which *every* child can have access to this is one where *every* adult is in a position to fulfill this role.

The way we need to design such as system - and we need to begin designing it now, before the privatizers destroy what we have - is to begin designing educational professional support systems: the array of software and services we would want an educational professional to have at his or her fingertips on an as-needed bases.

We need also to begin designing the educational resource support system for individual learners, including access not only to free or easily affordable educational resources - the learning 'bread and butter', so to speak - but also learning environments, network support structures, and access to learning inside work and other environments. I have spoken in the past about treating educational resources as a utility like water or power; we need to begin building this utility and

⁸⁸ <http://www.papert.org/articles/HardFun.html>

putting it to work in hospitals, courts, manufacturing plants, parks and museums, and any other place people get together to work or play.

We will gradually begin assessing individuals by what they *do* and what they *contribute*, rather than according to what they earn or what they take. Systems that make this sort of assessment possible will need to be designed, and incorporated into the tools we use to make hiring decisions. (It would be the opposite of a phenomenon happening today, using a person's credit score to evaluate insurance or employment prospects - again, a measure intended to entrench the rich.)

And we need to put into place mechanisms of association that undercut and make obsolete the associations formed by the elite in their private institutions - the networks of connections that serve as alternative fora for political opinion, language, culture and dissent. These networks - of which the connectivist courses are early prototypes - will replace the *Skull and Bones* and similar societies, making them obsolete and ineffective.

And finally - we need to begin to define what we mean by a *professional* educator, a person who is the steward of this system and who accepts, as an individual responsibility, the support and maintenance of a high level of general education and intelligence, for all members of a society, in support of the individual and social good. I suggest it is a role that has very little to do with content delivery, very little to do with standardized curriculum, very little to do with textbooks and classrooms, and is only orthogonally attached to educational institutions.

And it will not be performed by robots.

*Moncton, Canada
September 2, 2012*

K-12 MOOCs and Communities

Responding to questions from Paul Genge:

My question is about what tools do you think I should use to connect students with genres or communities of practice based on their personal interests

The short answer is, whatever tools the experts are already using (presuming they have formed a community of practice of some sort, which is increasingly likely). Different disciplines interact in different ways, and ultimately people wishing to join these communities will need to use whatever tools they use.

I can see the question from the perspective of what tools might be employed to prepare someone for success using whatever tools will eventually be used. This is a list that probably changes every year. Currently, I would be stressing reading and viewing (through learning resources, video sites and the like), content creation (through blogs or video production or something similar), interaction (through social network sites such as Twitter and Facebook), immersion (in games or simulations) and community development (through wiki or other cooperative authoring sites). This list could probably be refined, but I think it's a good start.

Connecting to communities of practice is problematic in terms of content, most will be blocked because the wholesome nature of that experience cannot be controlled.

That may be, but I consider this to be an educational practice that needs to be reassessed. I think we're going through a period of time in which we are over-protecting children from 'unwholesome' influences. This is impairing their education. I think that in time as children who have grown up with the internet become parents we will have a more open attitude to what children can see and read.

I've checked some of the more progressive schools and can't find many people in the k-12 environment who are even talking about these ideas, which I'm sure will inform educational practice in the future.

Yeah, I wonder about that. There is an aspect of progressive education which depends heavily on close supervision and control; even as students are being challenged and encouraged to excel and respond to challenges, this is happening in a closed and protected environment.

I think progressive education of the future might be more rough-and-tumble. I think of Teemu Arina from Finland talking about how he created his own business at age 15. You can't create a business in a closed environment, and yet we want to encourage activities like this. Getting students into the community, even young children, means stepping back a bit from the constraints we've placed on them.

I read about parents driving their children to and from school, to protect them from the dangers of the city. I can't fathom that.

Do you think I should seek out individual communities of practice around each student's interest, connected to a cross curricular theme that a couple of my colleagues and I have come up with?

No. Let them find these communities themselves. Give them the tools they need to seek out and find community on the internet, and have them report on what they've found (so you can take action if they have a run-in with extremists) but generally let them find their own way.

I don't think there's going to be a nice pairing between communities of practice and curricular relevance. But again, if I had to choose between the two, I would choose the communities. Yes, I recognize that there are institutional challenges here. In the long run, educational professionals will be reactive – instead of bringing students to content and community, students will seek out whatever matches their own interests, and educators will supplement and support this work with resources from the curriculum, social- and content-related advice, and safety and supervision.

Have you heard of anybody having curated genres that work for k-12 students in any way? Would MOOC's work for this or are they pretty traditionally structured with a content laden syllabus? A MOOC that seeks to develop some of the literacies you spoke about in your talk would be interesting if you know of anything like that.

I haven't seen anyone curating work appropriate for K-12 students in this way, though I know that vast quantities of K-12 appropriate work have been created and indexed in various content websites. I couldn't even begin to attempt a cataloguing of that work, but observe only that none of it was designed for MOOCs because it all pretty much predates them.

Having said that, a MOOC organized for the purposes of K-12 education would be a fabulous idea.

I would organize these MOOCs around themes – for example, building quadcopter drones, or harvesting honey from community-based hives, or environmental monitoring of a local waterway, or community court reporting, or ... well, you get the idea. There are tons of such communities already on the web – a MOOC could form a nice bridge between them and students in classes. I would set up the MOOC to be persistent – that is, the same MOOC would run year after year, so there is an archive of information. Inside the MOOC there can be specific time-limited 'classes', which would help create and support networks. I think there's a huge potential for experimentation here.

Again, if it were me, I'd set up the framework, and see whether students couldn't organize their own MOOCs. And once they had done so, I'd join in the MOOC as a student, and model participation in a MOOC, bringing in resources and contributing to discussions.

I just wonder if you study just these high end spikes are your results generalizable to all of the others who practice that activity. Will our students need to be in the top quintile of whatever field they choose and therefore need to find that affinity group where their passion will get them to that high level and therefore find success in life.

That's a great question. My feeling is that the MOOC approach (again, thinking of a MOOC as an interconnected community of people creating and sharing) would appeal to all people. But this would of course be subject to confirmation in practice.

What we have seen in the MOOCs we have run so far is a clustering of very interested, active and motivated people at the centre, surrounded by a less connected set of observers and less active contributors, and surrounded by a corona of lurkers. This is what may be called 'legitimate peripheral participation'; there's no problem inherently with lurking. But it seems likely this structure would be reflected in K-12 practice, and that those who are lurkers would be the less able students, and vice versa. This would be less ideal, as it would become self-reinforcing. So I think there needs to be enough MOOCs so everyone can be at the core of one or another MOOC, and there need to be attractors in MOOCs that draw these peripheral participants in closer. I don't think that's a problem that has been solved yet.

I think the demonstrated learning and feedback of students and parents would demonstrate the power of these ideas

I agree, but I also think there's a matter of setting expectations too. Student learning, properly so-called, might not be any better in a MOOC, and if they become deeply engaged in a project, might actually be impaired. I can easily imagine a student becoming totally engaged in, say, a science project, and ignoring, say, geography class. I think that what a student would learn about science – not formulae and theorems, but actual practice, interaction among practitioners, and even the 'feel' of what to look for in a scientific environment, would be greatly enhanced in these communities, but the impact of this learning might not be observable for years, especially if it is not actively being measured.

Concordant therefore with the introduction of MOOCs I think it will be necessary to introduce alternative forms and systems of assessment. I've talked about this elsewhere.⁸⁹ <http://halfanhour.blogspot.ca/2012/08/new-forms-of-assessment-measuring-what.html>

I hope this helps.

*Moncton, Canada
September 17, 2012*

⁸⁹ <http://halfanhour.blogspot.ca/2012/08/new-forms-of-assessment-measuring-what.html>

Questions from Students at Vancouver Island University

I received a flurry of questions on some articles on my website yesterday, questions from students at Vancouver Island University. Rather than attempt to answer them individually, I'm grouping them here.

Sharing in a competitive environment

Breanne, Sonny and Marieke asked, "*we wonder how as teachers around the province create content, do we set up a sharing network when there is a strong competitive nature, and enable all instructors to share?*" Similarly, Ben, Tracy and Kim asked, "*How do we change the culture of competition that is present in delivery of online content, to make it more of a collaborative and open process?*"

I would have liked to have heard more about the competitive nature of teaching in this environment. It could perhaps have to do with teachers' being ranked or given [performance pay](#)⁹⁰ according to student outcomes, or some other competitive measure. Perhaps it has to do with [schools competing](#)⁹¹ against each other for funding, as occurs under legislation like No Child Left Behind.

Or, it may have to do with competition between students, as suggested by [studies](#)⁹² that argue that this sort of competition produces higher test scores (but, it appears to me, lower retention rates). Or perhaps they are thinking of themselves as future academics promoting competing theories and seeking to fund competing research agendas.

Speaking generally, I think that a perspective that views *everything* as a competition is limited and mistaken. It is clear that in many cases, including the four scenarios just described, there are instances in which every person in a group working together will achieve greater outcomes than a person working with nobody else. This is the economic basis for corporate organization and division of labour, as well as the formation of societies and communities.

By the same token, I think that views opposing competition altogether are equally mistaken. Beyond the highly impractical matter of obtaining collaboration in all things, and the desire of

⁹⁰ <http://www.stuff.co.nz/dominion-post/comment/6711917/Performance-pay-talk-for-teachers-is-flawed>

⁹¹ <http://www2.ed.gov/programs/racetothetop-district/2012-background.pdf>

⁹² http://www.ncspe.org/publications_files/OP85.pdf

people to pursue their own good in their own way, competition creates conditions under which different approaches and different hypotheses can be tested. Without competition there would be no evolution and no growth.

So the question is, in all four scenarios, not how we can eliminate competition and foster an attitude of collaboration, but rather, what degree of competition is appropriate in such scenarios, and how does the practice of sharing resources reconcile with that degree of competition.

I think that recasting our perspective on competition is important. Typically, competition is represented as competition against *each other*. We think of examples such as games or, in a jungle "red in tooth and claw," a battle to the death. But this is only one perspective of competition, a highly artificial one, and one that is limited in scope.

By far the greater range of competition, and (in my opinion) all forms of competition that realize greater economic benefits, are cases where the individuals competing compete not against each other but against some third party, ideally a non-human agent. In many sports, such as darts or archery, the battle, as they say, is "with yourself". In other endeavours, the competitors attempt to achieve some outcome in a hostile environment.

In this model of competition, it is not the diminishment of another that is the objective, but the augmentation of personal score. This is especially the case if the potential competition is not a single entity or team, as it is in artificial situations, but a large number of competitors, as is the case in more realistic environments. Though it may appear that you are in competition with the gas station across the street, you are in fact attempting to raise your own revenue, and this depends on the health of the community as a whole. This is the basis of [cluster theory](#)⁹³, which attempts to convince businesses, even competing businesses, in a community to work together and build their strengths.

And this is the basis behind [cooperative theories](#)⁹⁴ of education. The premise is that students can learn more individually while working together than they could working as individuals in competition with each other. Cooperation is not simply the absence of competition (which is why studies that use the [Herfindahl index](#)⁹⁵ are fallacious). It is the employment of mechanisms that promote interactions among individuals to create an environment that supports greater achievement for everyone.

⁹³ <http://www.isc.hbs.edu/econ-clusters.htm>

⁹⁴ http://www.co-operation.org/?page_id=65

⁹⁵ http://en.wikipedia.org/wiki/Herfindahl_index

For a typically Canadian example, consider the case of clearing the snow on the outdoor rink. One individual could skate better than another if he is able to clear some snow and the other cannot. But he cannot clear the whole rink without exhausting himself. But if everybody cooperates to clear the whole rink, then everybody skates better, even the person who could clear a section of rink for himself. This may reduce his effectiveness against the other individuals in the rink, but will increase his effectiveness in the wider world of skating. Indeed, unless the entire rink is cleared, he will not be able to compete outside his own rink at all!

So the argument to be made is, *even if* a condition of competition exists, if we analyze the nature of the competition, we can show that individuals who share resources are more likely to be successful than those who do not share resources. Cultivating a practice of sharing increases the baseline, so everybody is capable of that much more, which is useful in every form of competition except a direct personal combat between two adversaries.

Indeed, even boxers train together, teams play exhibition games against each other, and all share their understanding of the game with the wider community, both to promote the game, and to encourage the development of new players.

Responsible Internet Use

Andrew and Behn ask, "*How do we ensure that when we give students the ability to blog/post that they will do so in a mature and focused manner, most importantly the younger students?*"

My first inclination is to ask, "what do you mean by responsible?" The word 'responsible' is one of those code-words that hides a whole range of preferred behaviours, from respecting copyright to keeping the language clean to refraining from bullying and hurtful behaviour to staying on topic, sitting up, and paying attention.

I further would want to ask, "what do you mean by responsible for young children?" When I ask this, I suggest that we need to be careful not to expect a level of behaviour that is unreasonable. We don't expect children to assemble in small groups, chat politely, and discuss the topics of the day in hushed and respectful tones while they're out on the playground. We expect rowdy, noisy, boisterous behaviour - and we even think this is good for them!

So that's my first reaction to the question. My second reaction is that people don't learn what they're told, they learn what they're shown. It has always struck me as ironic that politicians who live one day away from indictment for fraud or tax evasion or whatever speak piously about the crime rates of about cheating in our schools.

How many teachers tell their students to blog without giving them examples of what good (age-appropriate) blogging looks like? When I wrote about [educational blogging](#)⁹⁶, I advised that the best first step was to have potential future bloggers begin by reading other blogs. This is not simply because the best blogging is in response to something else (though it is), it's because people learn from examples of good practice.

If we don't show children examples of good blogging, they will learn from and emulate the Simpsons, Fox News, the Jerry Springer Show, and similar unhealthy examples. The last thing we want our students to do is to behave like adults! Teachers who want their students to blog should begin by blogging themselves, and to develop their blogging tastes by linking to and talking about the examples of good blogging they find in the world.

Finally, my third response to this question is to question the emphasis. While there are obviously limits we want to set - we don't want them to use their blogs to [promote hatred](#)⁹⁷ (and violence in the Middle East), and we don't want them to use their blogs to share songs (and be [sued for millions](#)⁹⁸ by the music industry) - it is unclear why we would make the focus on internet use 'responsible behaviour'.

To me it is far more relevant to think about how we can use blogs and the internet to promote creativity, to promote lively interaction, to promote fun and games, to promote following one's interests and engaging with the wider community. While behaving responsibly obviously forms a part of this, it is in the greater scheme of things a smallish part.

I think there's something wrong with an attitude that *begins* with a perspective along the lines of "how can we control this to prevent the bad" rather than one that begins "how can we support this to extend the good". Most of the bad could probably be dealt with if we would only set some good examples ourselves, and the rest can be dealt with on an as needed basis.

The whole process of setting expectations is essential - but it's so much more powerful when expressed in terms of what you *can* do, as opposed to being framed in terms of what you *can't* do. Good learning empowers; it doesn't needlessly constrain.

⁹⁶ <http://www.educause.edu/ero/article/educational-blogging>

⁹⁷ http://articles.timesofindia.indiatimes.com/2012-09-15/internet/33862102_1_anti-islam-film-nakoula-muslim-world

⁹⁸ <http://www.billboard.biz/bbbiz/industry/legal-and-management/ray-charles-estate-sues-singer-s-children-1006649952.story>

Cloud Computing and Learning Theory

Laura and Margot ask, "*We're part of Vancouver Island University's graduate program in Online Teaching Development and are wondering how you see cloud computing shifting online learning models/theories.*"

I would begin by observing that the role of theory, properly so-called, is vastly overstated in education, and therefore would express the hope that cloud computing makes this a but clearer and more obvious.

The vast range⁹⁹ of educational theories should by itself show us that something is amiss. In physics we might disagree about the nature of gravity, but nobody disputes whether it exists. In education, there would be schools of thought devoted to the idea that gravity is a sham and that we ought to be studying natural motion¹⁰⁰.

I don't think that the shift to cloud computing carries with it a substantial change in theoretical perspective in and of itself, but I think it's a part of a wider change in perspective from education being a domain that studies *how we teach others* to a domain studying *how we teach ourselves*.

Because of information and communications technologies, the ways people teach and learn are becoming more visible, and hence, easier to study and emulate. As a consequence, not only can people learn for themselves, people can learn how to teach from others, with a result that the overall practice of teaching and learning are themselves changing in ways we can observe and study.

It may be premature to predict the science of learning that will eventually result from such observations, but it seems clear that the scholarship that leads to such a science will change. Closed and tiny studies measuring incremental improvements in 'performance' as demonstrated in pre- and post-tests of a single mid-west American classroom will no longer form the basis for theory and practice.

Quite the contrary. Many of the innovations will come from outside traditional scholarship. For example, few (if any) scholars predicted the Khan Academy, and most would have railed against the possibility, much less the educational effectiveness, but the success and widespread popularity of the initiative helped spawn a new approach to online learning and threatens to overturn what scholars believed they knew about the field.

⁹⁹ <http://www.learning-theories.com/>

¹⁰⁰ http://en.wikipedia.org/wiki/Aristotelian_physics

Educational theorists sometimes like to [pretend that they¹⁰¹ are doctors¹⁰²](#) and physicists and to study learning in fine-grained detail, but unlike doctors, they do not even know what they are studying, cannot agree on what counts as evidence, and have [no generally accepted measure¹⁰³](#) of what counts as 'improvement', much less 'good', in educational practice. And while doctors and physicists are at least willing to admit they are facing chaotic phenomena and to re-calibrate practice, educational theorists [continue to play¹⁰⁴](#) in the Newtonian world of objects and causes.

In the years to come, we will re-conceptualize the [role of the educator¹⁰⁵](#), and step back from a perspective of education as a domain in its own right, with a set of competing paradigms, and reimagine learning as a complex phenomenon lying at the intersection of disciplines such as health and nutrition, psychology, perception and memory, communications technology and social network theory.

Educators themselves will be professionals well educated in the above disciplines, functioning primarily in a support role (as do doctors and psychologists today) helping people manage their educational health and development in an information- and learning-rich environment. This isn't just a consequence of the move to cloud computing, but the move to cloud computing is a major part of this.

A Level Playing Field

Jane, Kevin and Michael ask, "*How can we ensure that all students have the basic skills, equipment and competencies to use DL, bring all learners up to a level playing field... ie: software and hardware?*"

This is actually a multi-part question that has no answer.

It's multi-part in the sense that it asks about two very different things, about the "basic skills" and "competencies", first, and about "equipment", "software and hardware", second.

And it has no answer because there is nothing anyone can do to "ensure" that all students have these, particularly for a wide definition of "all". Our best efforts may leave some children unprepared and under-equipped. We need to ask not how we can guarantee an optimal outcome,

¹⁰¹ <http://www.campbellcollaboration.org/>

¹⁰² <http://www.cochrane.org/>

¹⁰³ <http://www.downes.ca/post/60>

¹⁰⁴ <http://www.projectpro.com/icr/research/di/summary.htm>

¹⁰⁵ http://www.huffingtonpost.com/stephen-downes/the-role-of-the-educator_b_790937.html

but rather, what steps we can take to work toward that outcome. It's a small shift in perspective, but an important one, because it changes us from a perspective of managing and evaluating others, to a perspective of being change agents in our own right.

When we talk about the two parts, "skills" and "hardware", we need to ask a similar sort of question in each case: what counts as "basic", "adequate", "essential", and the like? These are both moving targets - especially when it comes to technology. What counted as "basic" just a couple years ago is considered "inadequate" today. Do your students have [LTE wireless](#)¹⁰⁶? Too slow! They must [replace their iPhones](#)¹⁰⁷ today! (Just kidding)

I have taken a stab at what I think are the essential skills with my account of the [critical literacies](#)¹⁰⁸. These are not the same as your typical definitions of either critical thinking, literacy in general, or computer literacy. I've tried to aim at a level that lies below those, to take into account varying languages and forms of representation, communications technologies and paradigms, and the rest.

I think that the best mechanism for ensuring that students have these skills is to expose them to progressive environments where these skills are valued, can be obtained, are reinforced through practice, and have pragmatic outcomes - for example, in gaming and simulation environments. I wrote a bit about this [here](#)¹⁰⁹ and [here](#)¹¹⁰ in recent days.

As for the technology (and actually, as to the education in general), I think that we need to be looking at policies that range well beyond education in particular. It has to do with the goals of education. Consider what Pasi Sahlberg has to say about the [state of education in Finland](#)¹¹¹:

Decades ago, when the Finnish school system was badly in need of reform, the goal of the program that Finland instituted, resulting in so much success today, was never excellence. It was equity... In the Finnish view, as Sahlberg describes it, this means that schools should be healthy, safe environments for children. This starts with the basics.

¹⁰⁶ http://en.wikipedia.org/wiki/LTE_%28telecommunication%29

¹⁰⁷ <http://online.wsj.com/article/SB10000872396390443696604577647921448070082.html>

¹⁰⁸ <https://plus.google.com/109526159908242471749/posts/ZNMHUM6cRb9>

¹⁰⁹ <http://halfanhour.blogspot.ca/2012/08/new-forms-of-assessment-measuring-what.html>

¹¹⁰ <http://halfanhour.blogspot.ca/2012/09/the-robot-teachers.html>

¹¹¹ <http://m.theatlantic.com/national/archive/2011/12/what-americans-keep-ignoring-about-finlands-school-success/250564/>

Finland offers all pupils free school meals, easy access to health care, psychological counseling, and individualized student guidance.

Ensuring children have access to technology means, in short, making it a priority. There is nothing particularly challenging about the concept, in the sense that we know how to do it and have a good sense of what it would cost. The challenge lies in the belief that somehow still prevails in some communities that education is a competition, and that you should reward the winners and drop support for the losers.

The Content on Websites

In a related question, Wendy asked, "*We thought, though, that adults are more discerning when it comes to weeding through the vast amount of information on the internet, and youth tend to believe everything they see and read. Do you have any strategies to ensure that students evaluate the validity of content on the web?*"

My first reaction to this question is that the bulk of [misleading content](#)¹¹² on the web comes from adults, and that it is adults who are mostly [misled](#)¹¹³ by this content.

I wrote an article a few years back, [Principles for Evaluating Websites](#)¹¹⁴, which outlines the major ways people can evaluate online information for themselves.

Having said that, I think the most important thing is to be careful not to foster an attitude in children that they can or must believe everything they are told. This actually runs counter to some educational practices, where they are intended to absorb information uncritically, and where the only educational value lies in demonstrating how well they have remembered what they have been told.

Even if it is true that constructivist methodologies teach less efficiently (and I have my doubts about this) these methodologies have the advantage that they require students to build their own knowledge piece by painful piece. There is now a penalty for being misdirected, and that is that it will be more difficult to build on false information wrongly believed.

¹¹² <http://www.foxnews.com/>

¹¹³

http://www.alternet.org/story/154875/the_science_of_fox_news%3A_why_its_viewers_are_the_most_misinform
ed

¹¹⁴ <http://www.downes.ca/post/4>

Placing students in environments where the more important skills are to solve problems, communicate with others and create solutions will reinforce in them the values of critical evaluation, inference from evidence and experience, and deductive reasoning.

Take computer programming, for example. You might be able to teach a person more quickly how to write a REST interface by giving them sample code and describing what to do - this is the '[worked examples](#)¹¹⁵' model. But these skills do not transfer to downloading and installing a security certificate - there's simply no conceptual overlap between the two. But if the REST assignment requires that students learn for themselves from examples and dialogue on the internet, they will not only learn REST interfaces, but also what to trust and what not to trust in online internet chatter about computer systems, which in turn will help them assess political discussion (say) more critically.

That's the thing with education. What we think is the 'outcome' of the process is never really the outcome. If you simply case whether or not they learn how to code REST interfaces, that's all they will learn. But if you want them to acquire a wider range of skills, you need to place them in a more challenging environment (and then encourage cooperation so they have a decent chance of success in that environment).

Innovative Tools

Suzi and Michelle asked, "*What innovative eLearning tools do you consider leading the way in the next 5 years?*"

I think [Google's announcement](#)¹¹⁶ that most campuses are not using Google cloud technologies, as well as their release of a [course-building tool](#)¹¹⁷ last week, point significantly to the direction of online learning in the future, particularly when you add to this things like Stanford's [new platform](#)¹¹⁸, Massive Open Online Courses ([MOOCs](#)¹¹⁹), and even my own [gRSShopper](#)¹²⁰

¹¹⁵ http://en.wikipedia.org/wiki/Worked-example_effect

¹¹⁶ <http://www.downes.ca/post/59069>

¹¹⁷ <http://edudemic.com/2012/09/google-course-builder/>

¹¹⁸ <http://www.downes.ca/post/59055>

¹¹⁹ <http://www.downes.ca/post/59014>

¹²⁰ <http://grsshopper.downes.ca/>

application, are pointing the way. These are all variations on the theme of the [personal learning environment](#)¹²¹ (PLE), and I think that this - or something like this - is the wave of the future.

It is important to understand that a PLE might be nothing more than your browser. At its core, the PLE is a mechanism for accessing a wide variety of cloud environments, including, but not restricted to, the Google cloud. And add to that what will in the future be considered essential personalization aspects - your personal educational record, your portfolio, and other personal metadata. Here's my [presentation](#)¹²² on personal learning environments (plus some volcano footage). Enjoy.

It's hard to overestimate the impact of this new approach. Last weekend I spent all day Saturday studying security certificates for websites. In my email the other day I received an offer from Coursera to enrol in a course on programming for IOS platforms that I seriously considered joining (even though it would cost \$40). I've been reviewing a huge pile of information from James O'Reilly on a simulation platform hosted on Steam called [Garry's Mod](#)¹²³. I taught myself [webcasting](#)¹²⁴ and this hobby led me to an extensive examination of [K-Pop](#)¹²⁵.

Given the means, and given the ability to follow their own interests and passions, people will be able to give themselves a deep, invigorating custom education in pretty much whatever they want. This changes the very foundation of education, and is doing so at an increasingly rapid pace.

Implementing Online Learning

Justin, Jane and Jean ask, "*How will brick and mortar schools in British Columbia successfully integrate the principles of online learning, given the obstacles of teacher training and the cost of equipment upgrade and management?*"

When you put the question like that, my answer is, "very badly." When means (once again) we need to examine just what is being said in the question.

¹²¹ <http://www.educause.edu/library/resources/7-things-you-should-know-about-personal-learning-environments>

¹²² <http://www.downes.ca/presentation/245>

¹²³ <http://www.facebook.com/groups/garrysmodeducationtraining/>

¹²⁴ <http://halfanhour.blogspot.ca/2011/01/live-skype-on-radio-ds106.html>

¹²⁵ <http://www.downes.ca/page/160>

There are four parts to this question: what it is to 'successfully integrate', what the 'principles of online learning' are, what the 'obstacles of teacher training' and finally, the 'cost of equipment upgrade...'

The first part contains within it a presumption that what is currently being done is more or less correct, and that online learning is something that will simply be added or 'integrated' into what is already being done. But in fact, I think it will *replace* what is already being done.

Let me demonstrate what I mean by analogy. Imagine that the great new technology wasn't computers, imagine it was 'field trips'. Suppose we decided for one reason that field trips should become an important part of education. Would we 'integrate' field trips into the class? Not really - you can't teach math while on a field trip, and you can't go on a field trip while you're teaching math - and efforts to combine the two will be strained and ineffective.

No, what would happen instead would be that field trips are gradually introduced. You might take an hour a week the first year, a day a week the second year, three days a week by year five, and have a 100% field trip-based education by the time you were done. Things like 'math class' and 'chem lab' would disappear and the much more effective methodology would replace them completely.

This is what I see happening with online education. I see it as gradually replacing traditional classes. Indeed, I see it as getting students *out* of those classes and into the community. This might happen only for a few hours at first, but over time, *all* traditional educational activities will be replaced with computer (and teacher) supported activities using computer technology to support participation in real world communities and activities.

So, next, what *are* the principles of online learning? I think it's a mistake to suppose that there are principles, properly so-called. I think that online learning encompasses a range of behaviours that are not governed by principles but are more like a skill or a profession. To learn online is to interact with an environment the way a surfer interacts with a wave or a doctor interacts with a patient.

The best way to obtain these skills is to practice. That is not to ignore theoretical background - even doctors have to study the books - but it means that the bulk of one's education is spent attempting to do the sort of things they are trying to learn to do, and beginning this process from a young age. So, say, when a kid says, "I want to be a firefighter," the result of this is that he actually spends some time in a fire hall learning how it's done. No, we don't send him into burning buildings, but he does learn how to put out fires using real fires. And where better to learn this than with firefighters?

Is teacher training an obstacle to this? I think that thinking of it as 'training' is an obstacle. I think that thinking of teachers as production workers or semi-skilled staff is an obstacle. I think that a lot of the 'training' teachers get - in, say, educational theory - is an obstacle. But I think that

advanced and professional education for teachers is not an obstacle, but rather, a necessary condition for making this happen.

Which leads, finally, to the cost of equipment upgrades, which I addressed briefly above, but which I'll revisit briefly.

In matters concerning expenditures the problem for the most part is not that we do not have the money, but rather, that the proposed expenditure is not a priority.

In some cases, we literally do not have the money. Canada probably has the technical capacity to send an astronaut to Mars, but we don't have the financial resources (at least, I don't think we do - I could be wrong about this). But for most everything else we could do in society, the money is there, but is being spent on other things.

I will highlight just two expenditures to make the point: [F-35 fighters](#)¹²⁶, and the [frigate](#)¹²⁷ construction program. Between the two of them expenditures total about \$50 billion. We could give every man, woman and child an iPad for that money, and stock them full of educational content. We won't do that because we have determined that the marginal improvements in security these military acquisitions would produce are more important.

But that said, in the end, education is expensive. Providing an education is expensive. What we need to do, if we can, is to put the conditions in place where people are able to provide their own education. Yes, we need to put into place programs that ensure maximal equity. Yes, we need to ensure that teachers can respond to individual needs with professional responses. But in the end, the best and only way to address cost issues is to eliminate the cost, and to empower individuals.

*Moncton, Canada
September 16, 2012*

¹²⁶ <http://www.cbc.ca/news/canada/story/2012/05/14/pol-f35-auditor-general-at-committee.html>

¹²⁷ <http://www.cbc.ca/news/politics/story/2011/10/19/pol-shipbuilding-announcement.html>

Being a Philosopher

My response to a comment from Pandora on a [post about philosophy](#)¹²⁸

"Isn't philosophy taught mostly like read this, talk about it, write about it, argue about it."

Yes, but it's how these are taught that results in the benefits. For example:

- "read this" - means more than 'skim' or even 'read like a novel' - we are taught to analyze structure, examine context, find voice, and more - what some call 'close reading', except for a philosopher, it becomes second nature

- 'talk about it' - means more than chat or describe experiences - it means learning to be an 'active listener', able to rephrase and reinterpret, to adduce information, to describe clearly, to again be sensitive to context, to be concise and clear

- 'write about it' - but again, this is more than just jotting down your thoughts; philosophers are expected to have a clear structure, to be precise about the use of terms, defining them where necessary, to write logically clear (and hence grammatically correct) sentences, etc.

- 'argue about it' - and again, this doesn't just mean defending your view (or as more frequently happens, restating it over and over) - it means responding to objections, examining evidence for and against, offering forms of inductive reasoning, inference to the best explanation, and more

"perhaps you learn there are no right answers just right ways of deriving answers... "

More importantly, I think, you learn that what counts as an answer really depends on the question, what makes an answer correct really depends on the evidence, and what counts as evidence really depends on what you're looking for.

It's not so much that there are no right answers - if there weren't, we wouldn't be able to function! It's that our answers are right 'to a degree' and 'from a certain perspective'.

I'll give you an example. One belief we used a lot when I studied philosophy was the belief that the ground won't open and swallow you up the next step you take. We believe this is true, heck, we *know* this is true, and as I say, we couldn't walk down the street unless we did.

And yet... and yet... always in the back of a philosopher's mind there's the possibility that something else might happen. And as it happens, just a couple weeks ago, reality triumphed over logic, not once, but several times:

¹²⁸ <http://www.downes.ca/post/59097>

- Girl Swallowed By Pavement In China¹²⁹
- Man dies after falling in a sinkhole in China¹³⁰
- Another person being swallowed by an unexpected hole¹³¹

So, now we know that the ground can disappear and swallow you whole. Philosophy is about dealing with that - being able to cope in a world of imperfect information, imperfect reasoning, imperfect people.

"I wonder why epistemology and logic isn't seeded into more research methodology courses."

So do I. Half the difficulties I face in talking about education lie in explaining to people why their conception of knowledge isn't sufficient to represent the complex phenomenon they are trying to explain. Yes, people learn things. No, knowledge isn't just stored in their minds like blocks of facts.

"Is the problem schools promoting the benefits of the study of philosophy that you have to think?"

Yeah. The problem is that philosophy is hard; it's easy to address the central problems of philosophy - morality, justice, knowledge, death, taxes - at a certain level. But beyond that level most people (rightly or wrongly, and we could debate that) simply hold firm to a belief, and will not yield to further argument.

It's fair enough; people don't want to have their beliefs challenged, and they don't want their children to challenge their beliefs, because they have too much other things to do with their lives. I can respect that.

Learning to be a philosopher is learning how to comprehend what people might believe even if those beliefs are not well founded, understanding **why** people might hold those beliefs, getting along with them anyways, and looking forward to a world in which the quality of beliefs and belief-formation gradually improve.

*Moncton, Canada
September 19, 2012*

¹²⁹ <http://www.youtube.com/watch?v=3z-yWnOZ3bE>

¹³⁰ <http://www.youtube.com/watch?v=3z-yWnOZ3bE>

¹³¹ <http://www.youtube.com/watch?v=YumfxuERFgk> – this video has disappeared from YouTube

The 'Course' in MOOC

A discussion taking place on the [OER-Forum Discussion List](#)¹³².

[Abel Caine wrote](#)¹³³,

"I have to intervene with the developing country perspective. Millions of smart, motivated children/students for many reasons do not complete regular school or university. Given the opportunity, these learners have a burning desire to 'complete' the course. "Well-designed and smartly-delivered" MOOCs with a valid, transferable certificate of completion (learning experience) may be 1 viable solution. I hope new global initiatives such as Education First will take this into account."

[Andy Lane wrote](#),

"Yes participants whether they complete or not can gain from the experience but we also know that many can be adversely affected by the experience through a sense of failure or lack of esteem. I have no issue with low completion rates as long as people do not claim that this is widening participation amongst the currently disenfranchised as I suspect most who complete MOOCs are already adept learners with plenty of privileges. At the UKOU we have struggled to support those suffering multiple deprivations in terms of access to education and the resources needed to support that education."

With respect to cMOOCs, the student experience is more like joining a community than working their way through a body of content. In this sense, the concept of course completion doesn't really make sense - what is it to 'complete' joining a community? You are more or less engaged with the community; you are more or less engaged with the material.

[John Sener wrote](#)¹³⁴,

"I agree with Stephen's observations in that it is unrealistic to expect high completion rates from MOOCs because of their structure. However, this structural characteristic is one of several reasons why MOOCs are better seen through the lens of open learning resources rather than open educational resources IMO. Perhaps the "C" in MOOC should be changed to mean "Community" in that case, because the concept of "course" does imply a sense of completion, i.e., something > with a beginning and an end which is

¹³² <http://lists.esn.org.za/pipermail/oer-forum/>

¹³³ <http://lists.esn.org.za/pipermail/oer-forum/2012-September/001589.html>

¹³⁴ <http://lists.esn.org.za/pipermail/oer-forum/2012-September/001583.html>

determined by an entity besides the learner. (Or change the name to MOOLE where LE = Learning Experience.)"

Here's why the C in MOOC continues to stand for 'Course'. A MOOC typically has a fixed start and end date. Between those dates there is a fixed series of events. I characterize them as being similar to a 'course of lectures' in the traditional sense¹³⁵ (eg. <http://archive.org/details/lecturescourseof02younrich>). Today, of course, they're not necessarily lectures any more. But the idea of a series of events structured around a topic continues. Hence, a MOOC is a 'course'. But again, it doesn't make sense to talk about 'completing' a MOOC, even if it is structured around a series of events, because again, like a community, you can dip into these events as much or as little as you want.

It's like watching a TV series. We don't typically talk about 'completing' a TV series (though you can do that if you want; last year I watched all 134 episodes of Xena; I 'completed' the series (it took me half a year)). Even if there is a story arc across the seasons of a series, we typically feel satisfied watching an episode at a time, and enjoy chatting about the episode with our friends. We do not - nor should we - feel we have somehow been deficient if we miss an episode; we can always go back to it or (eventually) pick it up on Netflix.

John Sener wrote a longish post saying, among other things,

"Education requires societally-defined expectations (at worst, imposed one way; at best, negotiated between the learner and society through its proxy institutions), but if "you can dip into these events as much or as little as you want," then that's learning -- user-defined and driven. Non-user-defined learning outcomes mean a less open, less MOOC-like experience.

"Calling MOOCs courses also fosters an expectation of moving through an entire "series of events structured around a topic" to an end which involves recognition (certification, grades, etc.) of completion based on satisfactory demonstrated performance of something gained (knowledge, skills, attitudes, etc.) related to that topic, and usually a comprehensive or broad rather than selective mastery of that topic."

John's post has two major objectives. First, it seeks to establish a certain definition of 'course' and 'education'. And then it uses those definitions to argue that MOOCs should not be called courses, and that people do not obtain an education from them.

¹³⁵ <http://archive.org/details/lecturescourseof02younrich>

The basis for these definitions of 'course' and 'education', according to John, is that the terms create certain expectations - the use of 'course' suggests they will be like what he calls 'traditional courses', and the term 'education', he writes, " requires societally-defined expectations."

I do not accept these definitions of 'course' and 'education', and John has not offered any compelling reason to accept them, except that he suggests people have these expectations. Perhaps some people have these expectations, but clearly not everybody does.

This is especially the case with the term 'education'. John suggests it entails " requires substantive interaction with designated knowledgeable facilitators (instructors, TAs, field experts, etc.)." But few, if any, define education in terms of the process; they define it in terms of the achievement. And this achievement need not involve tests and certificates. When Abraham Lincoln taught himself to read and write and to be a lawyer, we say he earned himself an education, not a learning.

And it is also the same for the term 'course'. I have already given an account of the traditional meaning of the word course, and this traditional meaning in no way entailed classes and lessons and tests and certificates. The formalized concept of the course is a recent invention, designed for a specific purpose, and today obsolete.

What MOOCs have demonstrated is twofold, and these speak directly to our understanding of how we may obtain an education, and how we may be recognized for it:

First, MOOCs taught us that rather than depend exclusively on "knowledgeable facilitators (instructors, TAs, field experts, etc.)," which are very expensive, a community working together can support itself. This is in fact how professionals further their own education, is common practice in existing institutions of higher learning, and now possible to the larger population via self-organized online communities (especially those formed around a series of learning events).

Second, MOOCs taught us that an education - properly so-called - may be obtained in this manner, and the learning thus obtained demonstrated and recognized via the production of artifacts and actions related to the subject of the learning; there is no prior set of learning objectives nor formal test (both of which can be, and routinely are, subverted) but rather a mechanism of recognition via participation.

These features satisfy quite well the meaning and usage of the terms 'course' and 'education', and they do so in a way which not only empowers students and enables them to design their own education, it does so in a way such that all members of society, and not merely those with wealthy and supportive parents, can engage and learn in the most challenging and professional environment possible,

Indeed, I would turn John's argument on its head. I challenge that the artificial forms we have come in recent decades to call 'courses' and an 'education' are outright fabrications, plasticized

facsimiles of the real thing to be offered at the greatest fee the market will bear to an unwitting public, while those who can afford it continue to have their much less formal and much more rewarding education at elite institutions.

What you have when you assemble an education filled with structured courses, formalized exams, and high-priced credentials, is a potemkin village, a cargo cult experience in which people attending Your City High School or the University of Your State act out as though they were graduating Eton or Radcliffe and Harvard or Yale but merely go through the motions, obtain a piece of paper, and move on with their lives not realizing they have been cheated out of what could have been a worthwhile education.

Ask anyone. Ask them what they valued from school and university: was it the learning objectives, midterm tests, and the accumulation of course credits? Or was it working on the student newspaper, participating in drama society, organizing a rally, or setting up a student enterprise? Or even leaving it all on the sports field or spending it all at the student pub!

No, I do not yield the ground regarding the terms 'course' and 'education'. I take them back from the institution, and I return them to the people.

*Moncton, Canada
September 28, 2012*

Improving Canadian Post-Secondary Education

We can read about 'five ideas to reform post-secondary education in Canada in [a University Affairs article](#)¹³⁶ by columnist Léo Charbonneau. The strategies (proposed by a Globe and Mail reporter in a now-paywalled column) are old canards, and I'll debunk them one at a time.

1. A National Strategy

Every time the subject of education reform in Canada comes up someone calls for a national strategy. Thus we are told "Canada 'is unique in its failure to develop a national approach to universities and colleges."

As Charbonneau says, "It's not going to happen, period." Education in Canada is a provincial responsibility; the federal government has no interest in intervening (nor should it), and the best the the [Council of Ministers of Education Canada](#)¹³⁷ could come up with was the Canadian Council on Learning (CCL), a \$64 million bonfire made of money.

More to the point, though, the presumption that a national strategy would make things better needs to be deflated. Look at our national environmental protection strategy - is it somehow better because it's federal? I would be inclined to [say it isn't](#)¹³⁸. How about national trade strategy - are we doing better because it's federal? [Arguably not](#)¹³⁹.

Things don't get better just because there's a national strategy. They get more centralized, and that means, when they go wrong, they go wrong all over the place, and there's no way to demonstrate a better alternative.

¹³⁶ <http://www.universityaffairs.ca/margin-notes/five-ideas-for-improving-canadian-postsecondary-education/comment-page-1/>

¹³⁷ <http://www.cmec.ca/en/>

¹³⁸ <http://o.canada.com/2012/10/22/its-open-season-on-canadas-waterways-is-your-favourite-lake-or-stream-protected/>

¹³⁹ http://www.winnipegfreepress.com/opinion/letters_to_the_editor/trade-pact-too-secretive-175193001.html

2. Making Teaching Central

This is another one of those things that comes up every time someone raises the subject of post-secondary education reform in Canada. It's hard to resist.

But I have a radical alternative suggestion: make students central. Make learning central. Or even more to the point, make access (by everyone!) to learning central.

As Charbonneau says, "good teaching requires resources, particularly *human* resources. This means hiring more full-time, tenure-track faculty. Who's going to pay for that?" The answer, we know, is all of us, through our taxes, and students, through their tuitions.

Again more to the point, though, why is it that the *professors* are central to the system? Yes, I know, they're the ones who provide the teaching, but (speaking very frankly now) they're *employees*. We wouldn't even be hiring them unless we wanted some sort of result. It's the *result* that's the important thing, not the process.

The slogan 'make teaching central' is based on the presumption that the only way to effectively and efficiently provide a post-secondary education to the mass of Canadians is to offer (good old traditional) teaching. But we know (from experience) that this means rationing post-secondary education to those who are good enough or (more often) those who can afford it.

I say, make learning central. Explore alternatives. I have no issue at all with the money we spend on post-secondary education; I'd go to the wall to defend it. But *make that money count*. Find ways to help Canadians educate themselves, and throw down the barriers to learning.

3. International Expansion

The call to 'expand internationally' rarely has any educational intent; it is usually intended as a way to raise money for our cash-starved system by enticing people (well, rich people) from China and India to pay premium tuition fees.

When I was president of the Graduate Students' Association at the University of Alberta one of my greater privileges was handing out cheques of \$435 each to international students, their share of the tuition-fee lawsuit we won against the university. These cheques were more than an international student *working* as a graduate assistant earned in a month.

Some of these students made real sacrifices in order to study in Canada. Others, though, were the beneficiaries of corrupt governments or simply their nations' respective one-percenters.

Canada's legacy shouldn't to leverage its educational attainment by squeezing poor nations for everything they can afford. Our legacy should be one of generosity, not parsimony.

That's why, when a former president of the NRC came through our offices, I declared my mission to be to extend free learning to every person in the world (to his credit, the president didn't flinch, though the Director-General accompanying him just about had a heart attack).

The idea of opening campuses abroad is a non-starter, especially in a world that is shifting *away* from campuses. These maybe worked back in the days when the American Universities were being established. Today they're just the educational version of McDonalds, fast-food-learning that the local poor cannot afford.

I *do*, however, support Charbonneau's suggestion of "a Canadian version of the [Erasmus](#)¹⁴⁰ student exchange program that would entice students to do a term abroad or even elsewhere in Canada." I've always thought this was one thing Australia did really well, sending its students and staff around the world to gain experiences and ideas (I've seen less of it recently).

Of course, we had such a program, at least inside Canada. It was called [Katimavik](#)¹⁴¹. The federal government ended funding for it last year.

4. *Accountability Benchmarks*

The old accounting maxim is, of course, "what is measured can be managed," or some such thing. The idea is that you don't know whether your policies are having any effect unless you measure outcomes. That's an idea that sounds fantastic in theory. In practice, it often fails.

Here's why: measurement is, at best, only the first step in a feedback loop. For measurement to *mean* anything at all, it needs to progress through some mechanism (aka 'management', though if you skip management and go directly to staff, then it becomes 'formative' assessment - same theory, though) that reforms behaviour in such a way as to influence the outcome in the desired direction.

This raises two questions: first, are you measuring the right thing? And second, does the feedback mechanism produce the right result? In many cases, the answer to both questions is 'no'. The reason is that most measurement systems, when implemented, are based on *short term* measures, such as grade scores. But education is a *long term* phenomenon.

A lesson taught at the age of three results in a behaviour at the age of 23. You can't effectively measure the behaviour 20 years later, so you test whether the lesson was learned at age three. Which it may well have been - even if it was the wrong lesson. An intolerance or a prejudice

¹⁴⁰ http://ec.europa.eu/education/lifelong-learning-programme/erasmus_en.htm

¹⁴¹ <http://www.katimavik.org/>

taught at a young age is an undesirable outcome, but testing mechanisms have no way to detect for and correct this.

Our demographic and economic data today are in effect measuring the effectiveness of the education system of the 1970s and 1980s. These data show (to me, at least) that while we excelled in the teaching of the arts and sciences, we were weak in literacy and severely lacking in ethics and policy. *These* failings (not test scores) should be fed back into our understanding of the school system.

But, of course, as Charbonneau points out, while our national government *should* "adequately fund a robust education division at Statistics Canada," we've seen instead "[recent cutbacks](#)¹⁴² at the federal agency." We've seen funding for other research, such as by the [Higher Education Quality Council of Ontario](#)¹⁴³, curtailed. Much cheaper to advocate standardized tests - it's quick cheap data. Useless, maybe, but the portions are huge.

5. Canadian Online Platforms

I have long argued for a [JISC-style](#)¹⁴⁴ mechanism in Canada that offers access to services, innovation, research and support. This includes, but is not limited to, online platforms. These calls have met with pretty much zero traction (at least we have innovative provincial agencies, such as [B.C. Campus](#)¹⁴⁵, in some regions).

But even with this recommendation, we have to be careful. The last thing we need is, say, a nationally-mandated learning management system (it's bad enough that there are some provincially-mandated LMSs). Putting that much purchasing power into the hands of a single agency is a recipe for corruption at worst and golf-course-ware (*) at best.

But there are many things we could support nationally and/or provincially here in Canada. Open up our library and museum collections. Open up a place where teachers and students can upload (and find, and use) learning resources. I've worked on various projects like this over the years - for example, [eduSource](#)¹⁴⁶ - but they all founder at the rock of commercialization.

¹⁴² <http://www.universityaffairs.ca/margin-notes/statistics-canada-discontinues-key-source-of-canadian-faculty-data/>

¹⁴³ <http://www.heqco.ca/en-CA/Pages/Home.aspx>

¹⁴⁴ <http://www.jisc.ac.uk/>

¹⁴⁵ <http://www.bccampus.ca/>

¹⁴⁶ <http://www.downes.ca/post/15>

We should have set up a system such that any teacher or student could set up an email list if they wanted, open a discussion group if they wanted, could host an online course if they wanted, set up a blog or wiki if they wanted, etc. Setting up and maintaining these basic services could (and would) be the basic platform for much more robust development and experimentation in online learning.

But - again - there is a big difference between *mandating* this for use, and *making this available* for use. But that is the difference between a national 'strategy' and a national 'infrastructure'.

And Finally

My take is that there isn't a whole lot wrong with education in Canada - after all, our high school graduates are demonstrably among the best educated in the world, our post-secondary system teems with creativity and inspiration, and our society as a whole has developed into a peaceful, kind, tolerant and prosperous home for all of us. Pretty good metrics, if you ask me.

The only major problem is that there isn't enough of it - too many people still miss out. People in rural regions are not able to access the diverse range of programs and services available in the cities. First Nations people miss out on even more (and have poor ('national standard') housing, economy and health care to deal with as well). At the post-secondary education the investment is large and getting larger, both in terms of time and money - too much effort is spent sustaining the system, while not enough attention is paid to the needs of students and (especially) potential students.

And it's too expensive. Again, I do not begrudge the funding, but I do not agree that costs in education (and especially tuitions) should continue to rise so much more quickly than the inflation rate. We need to find ways to ease the cost pressures - but *not* by limiting access to the most eligible and not by privatizing core components of the education system (when we think about where privatizing book and journal publication got us, one would think that current excesses in academic publishing are a knock-down argument against privatizing any other part of the system).

I do not believe in the wisdom or efficacy of trying to reform the system, especially when that reform comes from the top. I think we (developers, educators, policy-makers) need to work around the edges, supporting and developing creative and innovative programs. Some of these programs should support free and open access to learners in Canada and around the world. Others should support other agendas - it is folly to think that *my* vision of education is the only vision that should be acted upon.

And let me clear about this, too - I *loved* university. Compared to the misery that was high school, it was academic paradise. I want to preserve what was insanely great about the experience - I want to preserve the madness and creativity and late-night sessions and arguments,

I want to preserve the exposure to new ideas and cultures, the time to read great books (and these days, to watch great movies and videos), to be influence and challenged by music and art and culture and sports. Turning this whole experience into one in which the economic imperative prevails cheapens and destroys it: I want learning to be about developing into the most skilled and interesting person you can be.

University may not be for everyone but *something like it* should be for everyone. I know, there are many people out there who have far better things to do than to study - but *learning* is about far more than studying. People in their late teens and 20s who are not at university should have alternatives, things like (and I'm just thinking out loud here) rock camps, machineries (places where people assemble to work on - and create - machines), bakery and culinary schools (as at the colleges), and so much more.

(*) 'Golf Course Ware' is educational technology that is marketed to executives, usually at highbrow events on the golf course, rather than to teachers and learners who actually have to use the resource.

*Moncton, Canada
October 23, 2012*

Learning in the Digital Age: The Reality and the Myth

Presented to Learning and Teaching in a Digital Age: Myths and Reality, Tallinn, Estonia, Estonian e-Learning Development Centre, April 13, 2012.

Let me tell you story¹⁴⁷ of the great bear. It's a story from First Nations People who lived near where I was born in Canada, the Iroquois people. It's a story from long ago.

They didn't have very much. They had a small community around a campfire. They lived on deer and rabbit.

Time passed and a great bear came to plague their campground. Every day when they woke up, they could see the tracks of the bear around their campsite. The bear was eating all the game, eating all the deer, eating all the rabbits. The people began to starve.

They sent hunters out to shoot the bear, but when they shot bows and arrows at the bear, the arrows just bounced off. The bear would kill the warriors. One or two would straggle back and say, "The bear killed us." They were getting desperate and they didn't know what to do.

Finally, three warriors on the same night had the same dream. They said, "I dreamed that I killed the great bear. I dreamed that we went together and we shot the bear. The bear bled and the bear died."

The chief decided that it's a spirit dream; it must be true. He sent the three warriors, even though they were his best three warriors.

They went out and they shot the bear. They were able to draw blood. They chased the bear. The bear was bleeding. They continued to chase around and around, but they never caught the bear.

To this day, when you look up in the fall sky, you can see the stars, three hunters chasing the bear. You know that they're chasing the bear because the leaves all turn red, which is the blood of the bear that they shot.

It's through the creation of myths that we talk to each other. Our myths are not just explanations of where the stars come from or why the leaves turn red. They're the expressions of the full range of human emotion, from human reason to irony, to anger, to argument, to explanation.

We speak in myth because reality is ineffable. It cannot be expressed in words. All language is, as in the first instance, based in myth, based in some idealization, some abstraction.

¹⁴⁷ <http://www.downes.ca/presentation/294>

We forget this. We think today as though what we say expresses reality in some way. It's as though our words were fully and literally true, but this is seldom the case. Even the words themselves are metaphors, capturing reality through myth.

You might think, how can this be? When you look at language itself, you can see this. There's a French word, *croc*. I'm picking French because it's not English and it's not Estonian. It's neutral. You can think of your own language and see if this is true.

We have the French word *croc*, which means tooth or fang, something crooked, something hooked. We have the idea of the crocodile, an animal with fangs. We have in French the idea of *crochet*, and to *crochet* is to create a rug using hooks. We have the idea of *entre crochetin* French, between the brackets, between the hooks. You have *crochet a bouton*, or button hooks, the things you use. Or, in French, a *crochet du gauche*, a right hook.

You see this over and over, in French and in other languages, how the single root morphs and twists. The single concept creates the image that underlies all of our concepts into the future.

We comprehend the future in terms of what we understand today. This is the basis of the origin of these myths. This is really important to understand.

When we start talking about what cannot be known we lose our place or we experience only confusion. We are lost in a swirl of chaos. It's chaos that, in fact, characterizes all reality.

We project our thoughts, our ideas, our beliefs, our features onto the chaos. This is how we understand the chaos. We look at the chaos and we see ourselves. In seeing ourselves in the chaos, we comprehend the chaos, but it's a myth. A lot of the time these patterns, these projections, are primal and basic like bears, like tragedy, like fangs and hooks.

At the same time, as we try to comprehend the future, we also make the future. We strive to make tomorrow safe and comfortable as it was for us in the past, or at least a mythical past -- a hearth, a home, a story, a family, a community. Another myth.

Sisyphus, you may know, sought to cheat death and he succeeded.

But he was caught by the gods and punished by being sentenced to push the boulder up the hill forever.

When he gets the boulder to the top of the hill, of course, the boulder rolls down the hill. He goes down the hill after it, and has to push the boulder up, and so on for the rest of time.

"The Myth of Sisyphus," it's very famous, very well known.

When we worry about the future, when we worry about the Internet, when we worry about e-learning it's not because we don't know what to expect, it's not the unknown. It's because when we project into the future, we project a future like "The Myth of Sisyphus." We project a future that has been taken away from us by some nameless form, e-learning, and replaced with pointless labour at the service of the gods.

In a future that's constantly changing, a future that we can never comprehend, a future where our degrees mean nothing a year or two years after we got them. That's a future we saw described just yesterday. It appears to be a future where we have no hope like Sisyphus.

In such a scenario, e-learning does not appear to be a solution at all. Rather, it seems to be a surrender, a ceding of our authority, our independence and our autonomy.

One thinks of Adam Curtis' videography "All Watched Over by Machines of Loving Grace." If you're not familiar with it, I certainly recommend you look it up and set aside several hours.

What Curtis is saying is the Internet age brings us into an age where we lose our independence and autonomy and become parts in this large machine, that our contribution to knowledge is beyond our control, that there is no room for the individual, the thinker, the creator, the idealist. The only future is the one that's created as society as a whole that is, as Curtis says, all watched over by these machines.

Some would have a say it's a future that we have to accept. Camus would say, "The struggle itself is enough to fill man's heart." One must imagine Sisyphus as happy.

These days we say, "Well, at least Sisyphus has a job." We forget. We forget that Sisyphus achieved his objective. He set out to defy death, and in the end that's what he got, but it was at the cost of eternal labour. It's this cost that makes us wary.

When people point to things and say, "It's just a myth, you're wrong," it's almost like they're asking us to surrender to this inevitability like Sisyphus. What we hope and dream has no meaning or, worse, will be realized and shown not to be gold, but to be worthless dross.

It's funny how most myths seem to finish this way. The hunter forever chasing the golden bear, Sisyphus forever pushing the boulder up the hill.

For all that, we never stop creating these myths. We never stop trying to understand the world, trying to comprehend the world by drawing pictures, telling stories and imagining what it could be.

Steve Wheeler tells us the idea of the digital natives or the net generation is a myth. Of course it's a myth. It's just a story that Don Tapscott tells and you should not believe that what Don Tapscott tells is true. It's a myth. We shouldn't think of it as true.

It's also a way of understanding the world and that's the value we need to draw from it. It's a way of saying that our children are different from us. They have different experiences, they have different ways of seeing the world, they are different people.

Simply saying, "This is a myth," washes all of that under the bridge, reassures us that our view of the world is on solid ground. Why worry about change? It's all just illusion, it's all just a myth. You may have dreams, but the reality is it's all just a myth.

We are warned by the story of Adam and Eve; we are warned by the story of Prometheus, who stole the secret of fire from the gods, to be aware of the dangers of too much knowledge. As Plutarch, so we are told, says, "The mind is not a vessel to be filled, but a fire to be kindled."

Again, we can look at these myths as not-real representations of the story of creation or the story of the discovery of fire. Or we can look at these myths as cautions, not against education in general, but against a certain approach to education.

We can see these myths as telling us, with some clarity, that knowledge is not something simply to be consumed, like an apple, that knowledge is not something that can be stolen from the gods like fire. I thought Christian Port yesterday expressed this really well. I think we were all interested to hear his presentation.

"Imagine," he said, "we built a robot." I love the myth making in the middle of a talk.

"Imagine," he said, "we built a robot and sent it to a planet where there's something we need like some ore. We programmed the robot, the more you mine the better you feel." Remember that?

The robot learns, over time, to know itself. It comes to realize that there's a button that makes it feel better, so instead of learning how to mine the ore, it learns how to press the button.

Port asks, "What is it that motivates a human being to develop, to move on?" He says, "It's in the central nervous system where we get dopamine. We press the dopamine button and the outcome becomes a culture of cheating." It's like artificial sweetener. It's like caffeine. I love caffeine. It's like drugs, it's like green, it's like Facebook friends, it's like e-learning.

The concern that e-learning is this thing that our myths warn us about. It's a shortcut. It's the pressing of the button. It's the activation of the dopamine, but it's not really the learning.

What is this feeling? It gives us a confused feeling. The myth gives us two elements. It's an expression of what we want, but it's a warning about getting what we want too easily.

Steve Wheeler talking about myths, I counted seven in all. I probably could have kept going. You analyze his talk; all of his myths really are cautions against the easy score.

Consider what he says about learning styles. They're a lot of nonsense. You'll read that. There's all kinds of studies that say learning styles are nonsense.

He says, "There is one true thing. There are as many learning styles as there are people. The problem," he says quite accurately, "with learning styles is they try to pigeon-hole students into categories. They try to define students by the activities you impose on them based on what you believe as teachers."

If we think about learning styles as the magic shortcut to more effective learning, we are deluding ourselves. Even if it is true that people learn differently, and it is true that people learn differently, we don't achieve magical results simply by catering to that.

A learning style isn't a shortcut to memory because learning isn't about remembering at all. It's a myth, but it's useful. It's a myth that tells us, that warns us, that not all of our students are the same. They're not going to react the same, and most importantly, they're not like us.

There's a deeper lesson here that Wheeler touched on when he noted that learning styles motif had been visited over and over by people like Mumford and COLT. We could add Gregorc, Myers-Briggs. We can also add that the stage-based learning models, Piaget, Bloom, method-based approach in Gagne, or I saw this morning the SECI model from Nonaka and Takeuchi -- I'm never good at pronouncing names -- described by Carayannis.

All of these things where learning is described by slicing and dicing, categorizing, drawing into stages, outlining a process. It's the same model in each case where we're taking something very complex and trying to find little bits in it. We're going to try to study these little bits, these little segments, these little categories and that will be the shortcut to understanding the difficult process of learning.

It's modeling. That's fine if we understand that modeling is myth making. In general, the approach of trying to pigeonhole students, pigeonhole stages of learning or whatever leads to methodology. It leads to, on the one hand, a struggle to understand the world, albeit without science, and on the other hand, an attempt to realize our objectives more simply, more easily, an attempt to create a shortcut.

It's nonsense to say that there are no categories. There are categories. The world is filled with categories. What it's nonsense to say is that these categories are fundamental to learning, that they express the fundamental nature of perception. It's nonsense to say this categorization will, by itself, magically lead to some new understanding as though our mythical categorizations somehow expose the nature of reality.

We do not make things simpler by multiplying entities. We do not make things clearer by breaking them down into parts, though we are tempted to do so.

Today's candidate for breaking things into parts and making them simpler, so-called, is competencies, as though we can understand the really difficult nature of mathematics by understanding 10 subsets of mathematics or whatever. In my mind, searching for competencies is taking one really difficult problem and breaking it down into 10 really difficult problems.

Another myth. I was up this morning preparing this presentation, watching the news in English. You may have seen this if you were listening in English.

You may have actually seen this commercial from DuPont and this is a quote. "The need for science-based solutions is more pressing, as is the collaboration to find them. Coming together is how we will better protect the Earth and the billions on it."

So says DuPont. So says, in her own way, Alison Littlejohn. She tells us, "People first connect, then they consume and use the knowledge, then they create new knowledge, an artefact, a conversation, a trace, etc."

She gave us the use case of Sally, the new chemist, who has to create a new substrate for drilling a new type of rock. I don't know what that means because I don't know much about drilling. She needs to create a new tech. I'm drawing that from "Star Trek."

She says that you draw from a whole range of different resources. You also draw from knowledge of different range of people and, at any point, you may be working as an individual,

group, network, collective, etc. You connect, create, contribute, or you join with others with similar goals. This turns out to be central to the presentation.

"What are the binding forces," she asks, "that draw people or resources together?" Via social constructivism, people communicate via knowledge objects. People communicate working in networks, etc.

I'm sitting there. I'm asking myself, how do I understand this? I can't understand it literally. She's talking about binding forces that draw us together as though we must succumb to being joined together by some external force like what, gravity?

The myth somewhere through the talk has become the reality. She says, "We need something, an object, that brings people together, but what is this object? In turning, we use a goal as that object." I loved this. I really did.

There's in English two words, objective and objective, and object and object. You can have an object, which is a thing, or you can have an object, which is a goal. You have the same word with two different meanings and it's interesting to see how the two different meanings slide together here.

We have very traditional outcomes of this, various social objects such as work or learning activities, reports, patient health case report, common problems, learning goals, things that would be familiar to us from 20 years ago. The myth making has served its purpose and brought us back to the comfortable and familiar.

There's another myth you may be familiar with. It's the story of King Midas.

King Midas was a very greedy king, as you know, and was granted a wish based on a most thoughtless fantasy that everything he touches turns into gold.

Of course, he starts turning things into gold.

Everything seems really good until his daughter comes for a goodnight kiss. He gives her a little kiss and his daughter turns to gold.

As the web page where I got this from, "Freezes solid like an Oscar statue." I love the way they use metaphor in order to describe a myth.

Midas pleads to the gods for nullification. He's able to wash away his gift and lives a virtuous life thereafter.

We can read the myth very superficially. You don't always want what you wish for, or some things are worth more than gold.

I draw a slightly deeper lesson, or at least to me it's deeper. I'm going to say it's deeper because it's me. We often hear about gold of one sort or another described as a prescription for everybody.

I was thinking of Stephen Harris's school and these terms that he described it just before this talk. Imagine if everybody had Stephen Harris's school. Would that even be possible? Would it make

sense or would it bankrupt the education system? Can you imagine the furniture companies giving every school furniture? Who would they sell to?

It's not just that. In the North American context, there's this idea that everybody should learn science, technology, engineering, and mathematics, or the so-called STEM courses, but if everybody learns science and technology, nobody's an artist.

It's not that there's no art in the world after that, there's no conception of art. There's no way to represent art because we've lost the words. It does not scale, cannot scale.

The principle of the categorical imperative tells us when somebody prescribes something as a solution, to imagine everybody in the world adopting that solution and then to ask whether it makes sense.

Everything turning to gold does not make sense. Everything turning into that one special school does not make sense. Everything turning into science, technology, engineering and mathematics does not make sense.

Sameness is a myth. Sameness is the shortcut. We think, we are tempted to think, if everything could be the same, it would be so much easier. It's inevitable, as we learn from Prometheus, that in our efforts to make everything the same, we destroy everything that we value and we come to discover that sameness is meaningless without that value.

It's classic myth formation. The approaching presence of some evil or danger, globalization, the end of energy, I don't know, too many penguins. The only way to respond to that danger is to become part of the whole, to work as a team, to subsume our personal interests.

Why, I would ask, should we suppose that sameness or subsumption to the whole will solve the problem? Why is the push to collaboration, shared objectives, shared goals, somehow the answer to whatever it is that's coming on us?

There was a comment. Somebody made a comment in the session just before this one. There are too many convening theories, incommensurable vocabularies, and we could solve this if we had one vocabulary and one theory. That would fix that.

I remember the RSS standards wars of the late '80s, early '90s. RSS was a syndication format and there were too many different flavours of RSS.

Somebody said, "Let's create a new standard and there will be just one standard covering them all. We'll call it Atom." Then after that we had RSS and Atom, two different standards.

Then somebody said, "Let's create one standard that will bridge the gap between RSS and Atom." Then we had three standards, and so it goes.

The attempt to standardize creates multiplicity. Myths of conformity, as though conformity makes better.

In 1793 they came up with the idea of interchangeable parts. Eli Whitney first put this into practice in the manufacture of muskets. Saying this really worked, it created more guns. We had

the idea that in the long run, if we have sameness of production, all the changes that need to be managed by management.

Here's something from Duncan Kennedy. "Legal education is training for hierarchy. Because students believe what they are told explicitly and implicitly about the world they are entering, they behave in ways that fulfill the prophecies the system makes about them and the world. This is the link-back that completes the system. Students do more than accept the way things are and ideology does more than damp opposition. Students act affirmatively within the channels cut for them, cutting them deeper, giving the whole patina of consent, and weaving complicity into everyone's life story.

It's Sisyphus all over again. Sameness simply brings us back to doing the same thing over and over again at, if you will, the behest of the gods. If we lose our difference we lose our meaning.

George Orwell put it well. "It was an enormous pyramidal structure of glittering white concrete soaring up terrace after terrace 300 meters into the air. From where Winston stood, it was just possible to read, picked out on its white face in elegant lettering the three slogans of the party. War is peace. Freedom is slavery. Ignorance is strength."

Sameness breaks down the distinctions we need even to have a goal, or an ambition or a dream.

An Indian legend, again.

I'm sure you're all familiar with this legend, the six men of Hindustan who went to see the elephant. The problem was, these men were blind and so they could not see the elephant.

Each man touched the elephant.

One man touched the side of the elephant and said, "It's huge like a wall."

Another man touched the tusk of the elephant and said, "It's sharp like a spear."

Another one touched the ear of the elephant and he said, "It's flat and floppy like a leaf."

Another one touched the trunk of the elephant and he said, "It's like a snake."

The myth ends with these men fighting amongst each other, each of them sure because they had the experience for themselves of what the elephant was like.

Of course, as the myth tells us, none of them were wrong, but none of them were right.

It's interesting where Janssen is talking about in omnia, talking about it being lifelong learning, serendipity, but also entrepreneurship, e-learning, m-learning, etc., helping people meet their goals. She points to, I think quite correctly, adding value by combining competencies.

She said, "In Nokia, they hired only engineers and that's where their problem started." What they tried to do instead was to bring together people who were young, people who were old, people who were students, people who were professionals. I think that was a good idea.

The idea here was that people would do their learning in context, so it would have real meaning for them. They would have opportunities to succeed and to fail, where the intent was to bring out the expertise in everyone, the different types of expertise.

The other side of her story was that these teams were to be entrepreneurial. They were to create entities that would compete in a marketplace. We have also in this picture this myth of the marketplace, this myth of the commercial approach solving the problems that the management approach cannot solve. It's the invisible hand of the marketplace, the myth created by Adam Smith. Surely, we don't think that this is real.

I ran in my newsletter just the other day a report showing that study after study has looked for evidence that the marketplace moves forward toward some advantage, some stable position, some progress, but there is no built-in advantage to the invisible hand of the marketplace. The invisible hand of the marketplace is a myth. There is no guiding hand. There's just chaos.

Here's a model for understanding this chaos. It's just a myth, but it's a good myth. It will help us see through some of these other myths. It's called the TIMN theory, tribes, institutions, markets and networks. It describes the evolution of organization over the years. It may well be familiar to many of you.

It also describes forms of learning. When you think of tribes and apprenticeships in the same light, institutions representing the model of professors, scholars and scholarship. Markets representing the model of arguments, debate, the clashes of ideas, classes, categories and theories, etc., and networks as communications. I put in my notes here creativity.

The first two models are built on a kind of sameness, the sameness of genetics, the sameness of family. The last two are based on types of diversity. One type of diversity results in Atomism. The other type of diversity results in networks.

Putting somebody into entrepreneurship programs is putting them into competitive markets. It's preparing them for, I would say, the world of the 1990s, the world before the Internet, the world before we began communicating with each other in these networks.

It's interesting. Steve Wheeler talking about the flipped classroom, talking about the real flip, the flip toward what he called bear pit pedagogy, having them fight it out, debate it, arguing from both sides.

I listen to that and I think of the competitive market approach. Having students argue and debate is like having students try to create companies, try to compete against each other and, again, preparing for the market model of the 1990s.

What I want to say about myths is the same thing that I want to say about learning. It's that the content of the story is, for all practical purposes, irrelevant. That doesn't mean that there's no content. It just means that the content is the thing that moves the learning forward.

What matters in learning is not what is said, but how it is said. As McLuhan would say, the meaning is, in fact, in the message or, maybe to paraphrase him a bit, the meaning is in the mode of the message.

The TIMN model, again, different ways of teaching. The tribe model, story by the campfire. The institution model, a lecture by a university professor. The markets model, a shouting debate. The network model, a conversation.

People like Weinberger and others tried to say this in the "Cluetrain Manifesto," markets are conversations. What he should have said, in my mind, is that our markets are becoming networks. Competition is becoming conversation.

Networks aren't a shortcut, either. Networks aren't the magic solution any other than markets are the magic solution, any more than professors are the magic solution. Networks have to avoid two forms of what might be called network death.

On the one hand, collapsing into sameness. That might be called the *collaborative principle* where every entity in the network becomes the same and, consequently, all dialogue, all meaning, ceases.

On the other hand, the network has to avoid disintegration into atoms. That might be called the *competitive principle* where the network falls apart. Both the social and the individual are forms of network death. What we want is that happy middle ground where the network is dynamic and capable of reacting, adapting and adjusting to the future.

I've tried to describe in my own work methodological principles that allow networks to do this. Of course, these are myths as well, but they're practical myths. As long as we don't think of them as describing reality, we can use them the way we can use other myths. The principles are autonomy, diversity, openness and interactivity.

It's interesting when we look at the myths, when we look at the myths that I've talked about so far in this talk, that in many cases, arguably all of the cases, the myths are warning us against abandoning diversity, against abandoning openness. They warn us against trying to make everything the same. They warn us against trying to determine the objectives, the goals, the values of people.

In my own work with a number of my colleagues, people like George Siemens, David Cormier, Rita Kop and others, we've created a type of online learning called the MOOC, or massive open online course. What a MOOC is, is a recognition. It is first of all a recognition that there are no shortcuts, that we are not going to try to design e-learning as simply a faster way of cramming content into people's heads.

That would be failing to heed the lessons from the past, the lessons that go all the way back to Prometheus, Sisyphus and the rest. A MOOC in the parlance of this talk is about creating a future, not succumbing to it. Kristjan Korjus talked about the open organization of the students at Tartu. This is the same principle, only applied to a single course.

Success in the course is what you determine it to be. Participation in the course is what you want it to be. There is no content in the course. There are topics. We talk about different things. Each week we may bring in a guest or we may talk about some concept or idea, but it's a lot like the artist that was described, I forget which talk it was. I think it was Stephen Harris's.

The artist, instead of teaching his students how to paint, went to the class and painted and led his class all the way through the process from painting all the way to hanging it in the gallery. Yeah, it was Steve Harris.

The content is like that. It's what the instructor does, but it's not something that the student has to consume and memorize. There is no content or, conversely, there's too much content. The student needs to navigate or learn to navigate through this by connecting with themselves, by connecting with other people.

The idea here isn't to teach content, but to start as a starting point for our thinking. You might ask, what's the purpose, what's the objective if there is no content? There is no purpose. There is no objective. More accurately, each person decides what their own purpose is. The idea here is to promote diversity and promote autonomy.

There is a process that we talk about and recommend. It's only talked about and recommended, it's not required, of aggregation, remix, re-purpose, feed forward. Very similar to what Alison's proposal talked about, but without filtering, without creating, without evaluation.

I was going to say I'm more interested in people creating, but that would be incorrect. I'm more interested in people conversing with each other, using objects to express their hopes, their fears, their ideas, their dreams, creating their own myths.

Not pedagogy, there is a way of talking about the skills that would be required to flourish in such an environment. I sometimes talk about them under the rubric of critical literacies.

They range all the way from the skills involved in arguing, as Steve talked about, to skills involved in recognizing patterns, motifs, principles, organizations. Also, the pragmatics, the use of symbols and images, the context, the placement, and the frame in our world view and understanding change, dynamics, evolution, and prediction in this environment.

These are skills you don't get in front of a classroom, say, "OK, we'll start with skill number one, part A." These are skills you acquire only in an environment where you see them and you acquire them by doing them, by practicing in them, by conversing, using the language in which these skills demonstrate success.

I'll finish off with one more myth.

It's a story by Arthur C. Clark called "The Nine Billion Names of God."

There were some monks in the Himalayas. They'd been working for the last 300 years and they developed a new language. They're laboriously writing down, one by one, each of the nine billion names of God.

It's calculated it will take them another 13,000 years to finish.

When some Westerners arrive at their monastery and they talk about computers, the monks think and the Westerners think this could be a really good shortcut.

We could get the computers to write out all the names of God for us. That's what they do. They set up computers.

The Westerners are very careful because what's going to happen after you write out the nine billion names of God? Well, nothing.

The Westerners set up the computer to print out the names of all the nine billion names of God, but to finish printing only after they've left so the monks won't be mad at them.

The story ends with the Westerners are climbing down the hill and the computer finishes churning out all the nine billion names of God.

They're walking down the mountain. They look up and, one by one, very simply, the stars are all going out without any fuss.

I was thinking about Arthur Harkins' talk, cyborgs and preparing for the Information Age, preparing for the 1970s, and thinking about preparing for an age when computers take over. That's the future I was asked in the previous session, what's the future you most fear? It's the future where the nine billion humans are each, one by one, replaced by a computer.

It's conceivable. We can think about it, but you know that there's a new myth here as well.

The myth is that, one by one, each human is replaced by a machine, nine billion of them. After all this time, the machines are able to have perfect conversation with each other, no ambiguity, no misunderstanding, an ideal language, complete comprehension. They discover with all the humans gone there's nothing left to talk about.

We can imagine a future filled with machines. We can't imagine a future without meaning. We have to continually hope for the impossible, not the possible, because if our ambitions were actually achieved, it would be a disaster.

*Tallinn, Estonia
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The Paradox of Democracy

During my days as a student activist studying philosophy in Alberta one was described me as "a moderate socialist and a radical democrat."

That description is probably still apt 20 years later. The bulk of my work in online learning and media is dedicated toward the idea that people should be able to manage their own lives and their own futures.

But the phrase 'radical democrat' was and still is the source of some ambiguity. By 'democrat' I do not mean, of course, affiliation with the Democratic party in the United States. Rather, it means 'supporter of democracy', whatever that is.

Modern democracies consist of two parts:

- a mechanism enabling the majority to plan and carry out a form of self-governance for a region or nation as a whole, and
- a mechanism defining and ensuring the protection of basic rights and privileges accorded to all members of society.

Most people not surprisingly focus on the first part of democracy. Some even deride the second under the heading of 'judicial activism', as though democracy should *only* be defined by the former.

But I have never believed that a simple counting of votes is sufficient for the governance of a region or a nation, not the least because of the likelihood of what Mill calls the 'tyranny of the majority', but also because the majority is simply unable to govern without these basic rights and privileges.

In modern democracies, one way we determine the will of the majority is by means of the vote (it may surprise people to know that this is not the *only* way to determine the will of the majority; a reading of Rousseau on '[the general will](#)'¹⁴⁸ for example reveals a more organic alternative process; others, by contrast, cite the '[invisible hand](#)'¹⁴⁹ of the marketplace).

The premise behind the exercise of the vote is that it reflects the opinions of an informed citizenry. What constitutes 'informed' has varied over the years. Voting was once limited to landowners, a privilege still enshrined in bodies such as the British House of Lords and the Canadian Senate. It was also at different times limited to free persons, to men, and today, to

¹⁴⁸ <http://www.quebecoislibre.org/05/050715-16.htm>

¹⁴⁹ <http://plus.maths.org/content/adam-smith-and-invisible-hand>

adults over a certain age. Robert Heinlein [has suggested](#)¹⁵⁰ it be limited to those who serve in the military.

The need for this is found in a two-part argument [formed by Thomas Jefferson](#)¹⁵¹:

- "Compare again the ferocious depredations of their insurgents, with the order, the moderation and the almost self-extinguishment of ours. And say, finally, whether peace is best preserved by giving energy to the government, or information to the people."
- "Educate and inform the whole mass of the people. Enable them to see that it is their interest to preserve peace and order, and they will preserve them. And it requires no very high degree of education to convince them of this. They are the only sure reliance for the preservation of our liberty."

It is a reflection at once of both Hobbes and Locke, the idea that peace in the land is ensured by a government that serves the will of the people, and that it is through this desire for peace that people will participate in, and support the mechanisms of, that government.

But this, in turn, depends on the people actually desiring something worth desiring. Here is [Heinlein](#)¹⁵² again:

"What is supposed to happen in a democracy is that each sovereign citizen will always vote in the public interest for the safety and welfare of all. But what does happen is that he votes his own self-interest as he sees it... which for the majority translates as 'Bread and Circuses.'"

Two dilemmas occur. The first is created when a person's self-interest is contrary to the interest of the interest of society as a whole. The classic instance of this is criminal behaviour, but in a democracy, many forms of self-interest are legal, even encouraged, even though they act against the interest of the whole.

The second is created when a person is mistaken about what lies in his own best interests. History is replete with examples of people acting, *en masse*, in a manner that harms their own well-being and security. And individual cases of self-harm or self-defeating behaviour exist in all societies. As [Mill](#)¹⁵³ would argue, no person is best served by bread and circuses, but often, this is what they want.

¹⁵⁰ <http://www.nitrosyncretic.com/rah/ftp/fedrlsvc.pdf>

¹⁵¹ <http://www.gutenberg.org/files/21002/21002-h/21002-h.htm#385>

¹⁵² http://www.goodreads.com/author/quotes/205.Robert_A_Heinlein

¹⁵³ <http://www.gutenberg.org/ebooks/34901>

In my own [discussion of autonomy](#)¹⁵⁴, I describe four major areas in which a person can enjoy more or less self-governance:

- *the capacity to know* - this includes being in a position to have relevant experiences, the capacity to reflect on those experiences, and to do so independently of incentives or coercions
- *the capacity to act* - this includes flexibility and mobility, the absence of legal constraints, barriers and locks, and the resources and entitlements necessary to make action possible
- *the range of behaviour* - this is described by media of expression, association and transmission of ideas, background noise, tolerance and quality of choices
- *the capacity to have an effect* - described by the audience for an idea or its efficacy, as well as the nature and extent of improvements possible

In a simple democracy government by the votes of the majority, we can observe ways in which individuals, as well as the majority, are limited in their capacity to know, decide and act.

In a full and complete democracy, individuals would have the widest degree of autonomy possible, in a manner consistent with the autonomy of other members of society, in order to define and pursue their own best interests, and as necessary the best interests of society.

But it is clear that the protection and enhancement of this autonomy is not enabled by the simple process of voting alone (indeed, if even at all). For we find ourselves in a paradox: we need to vote to ensure the greatest degree of autonomy for ourselves, but we need the greatest autonomy for ourselves in order to show us how to vote.

We can see in any election (including the present American election taking place today) ways in which the autonomy of the voters is subverted, and hence, their ability to act in the best interests of either themselves or society:

- the information they receive is controlled and manipulated, they are unable to reason effectively on that information, and they are subject to rewards of government spending and coercion through loss of employment
- individual mobility is limited, both internationally, by means of immigration restrictions, and nationally, by means of limited access to social services and health care; a person's first interest, in most democracies today, is employment and personal welfare
- the right to associate and demonstrate is increasingly limited by police powers, while one's individual voice is being managed via copyright and trade restrictions, and limited access to the press and popular media

¹⁵⁴ <http://www.downes.ca/post/54222>

- the desires expressed by individual votes, and the mass of votes, are being subverted by influences placed on elected officials

In other words, it is not *simply* that people vote for bread and circuses, it is that, often, bread and circuses is the best they can get, because of the circumstances they find themselves in, and their inability to demand, and get, more.

This is why - and how - I am a radical democrat. My commitment to democracy extends well beyond support for the mechanisms of democratic decision-making, but additionally, to mechanisms and measures supporting the greatest degree of autonomy and self-governance possible.

In this (ironically and perhaps to some rather surprisingly) I am affiliated with the most conservative and libertarian voices in society today.

Where I differ is that I do not define 'intrusion' in our lives narrowly as 'government intrusion', first, and second, I do not define 'autonomy' simply in terms of my own individual autonomy, but in a manner that promotes the autonomy of all persons equally.

For if one of us is not free, none of us is free.

In this, therefore, my support for democracy hinges on two elements that are very similar to Jefferson's two major points.

- The need to meet the basic conditions of autonomy for all of us, including a robust definition of rights that includes both the means and capacity to act and make decisions freely, and
- The need to enable for each person the capacity to become critically literate, that is, to be able to reason cogently and arrive reliably at those measures and conclusions most reflective of his or her self interest.

The former requires a charter of rights and freedoms that goes well beyond the 'bills of rights' that would be granted to people already in possession of the means to act upon them. 'Freedom of the press' is meaningless if one cannot own a press; 'freedom of speech' matters not at all if there is no means to be heard.

In practice, I support something like the [Universal Declaration of Human Rights](http://www.un.org/en/documents/udhr/index.shtml)¹⁵⁵. And in particular, I aver that no person can be free if he or she lacks sustenance and nourishment, housing, clothing, education, a sense of belonging, and a sense of meaning or purpose. If a

¹⁵⁵ <http://www.un.org/en/documents/udhr/index.shtml>

person, or people, live in poverty, none of us is free. As Foucault [might say](#)¹⁵⁶, the rich are as bound by the trepidations of the poor as are the poor. Or as Chandler might say, when people are poor, you always have to [watch your back](#)¹⁵⁷.

We cannot be free if we are in want; we cannot form the conditions for self-government from the condition of poverty.

With regard to the second, I have discussed elsewhere the needs of critical awareness and reflection under the headings of various [types of literacy](#)¹⁵⁸. And I have described, in much more general terms, [what people need to learn](#)¹⁵⁹. In both cases, the objective is to develop a capacity to perceive accurately, to reason with clarity, and to act with foresight.

Ultimately, my understanding of democracy is one in which the emphasis on decisions taken by majority vote decreases and finally wanes to almost nothingness.

The need for a vote, after all, represents and reflects an *incapacity* on the part of the electorate.

In the first instance, the vote reflects an incapacity to govern at all. The vote is, in the first instance, not an opting between ideas, but rather, a selection of representatives who will do our governing for us. It reflects a time and an era in which the process of governance required more travel and more time than any of us could afford.

This is a time that has arguably already passed. Modern communications technology makes most travel unnecessary. And today's legislators have had to spend so much time learning how to campaign, raise money, and earn our vote, that they are barely more capable of representing our own interests, even in complex matters, than we are ourselves.

And in the second instance, it reflects an incapacity to resolve through more gentle means the tensions and conflicts that flare in modern society. The vote represents a form of conflict, one in which the ballot has replaced the bullet, to be sure, but one in which existing market or legal mechanisms do not enable people to govern themselves directly.

And, in a final paradox, the tensions and conflicts being addressed in the ballot box today revolve around the question of whether there should be democracy at all. They revolve around the persistence of poverty and resistance to the efforts to alleviate it. They revolve around the

¹⁵⁶ <http://foucault.info/documents/foucault.omnesEtSingulatim.en.html>

¹⁵⁷ http://www.baas.ac.uk/index.php?option=com_content&view=article&id=230%3Aralph-willett-hard-boiled-detective-fiction&catid=18&Itemid=11

¹⁵⁸ <http://www.downes.ca/presentation/233>

¹⁵⁹ http://www.huffingtonpost.com/stephen-downes/things-you-really-need-to_b_788989.html

persistence of ignorance and resistance to the efforts to educate. We are not now debating the question of what kind of society we would like to have, we are debating the question of whether we want to have a society at all.

Democracy, predictably, is unable to resolve the paradox of its own existence. In an existential incompleteness theorem, it is unable to determine whether democracy is, after all, the best form of government. And perhaps most damaging, it is unable to ensure its own existence. Democracy tolerates, at best, and encourages, at worst, the prevalence of poverty and the subversion of reason that give society a reason to exist.

For my own part, the resolution of the paradox lies in the explicit rejection of the proposition that some people are more important, or more valuable, than others. Or, more positively, an explicit endorsement of [Kant's maxim](#)¹⁶⁰ that very rational being has intrinsic and not merely instrumental value, that to treat a person as a means to some end is to deny their essential humanity.

Some people arrive at this maxim from [religious reasons](#)¹⁶¹. "Not even one sparrow dies and falls on the ground without God noticing it." For me, the import of Kant's maxim lies in the nature of society itself. A society that subjects its members to arbitrary and discriminatory treatment cannot sustain. Such a society exists in a state of perpetual war with itself, a draining of wealth and resources that ultimately leaves nothing but death and stagnation.

So today people vote, and exercise what limited social autonomy they have in their grasp. But in their vote, they should see the need for a wider democracy, one in which the vote is no longer necessary, but rather one based on a mechanism of exchanges of mutual support and benefit, a society defined not by cartels and cabals and conflict, but where sustenance and prosperity are ensured through cooperation, through exchanges between equals to their mutual benefit.

In other words, the reason we have a democracy at all is that at some level we believe every human being has the same basic worth. We understand that this sense of a basic equality is necessary for us to have a society at all, and that having a society is our best and only hope of having and sort of existence worth having.

That's why I'm a moderate socialist and a radical democrat. I believe this last is not negotiable. I believe that the basic equality of individuals in our society is all that protects us from the abyss, that the chains that bind us will, unless unshackled, be the weight that drags us down into oblivion.

¹⁶⁰ <http://bellevuecollege.edu/artshum/materials/phil/Updegrove/Fall05/100/EthicalTheoryofKant.htm>

¹⁶¹ <http://www.onlythebible.com/Bible-Gems/how-much-are-you-worth.html>

*Moncton, Canada
November 6, 2012*

Free and Not Free

Everton Zanella Alvarenga tossed a hand-grenade into the OER discussion group: "*An interesting text by Stallman... [On-line education is using a flawed Creative Commons license](#)¹⁶² ... 'the CC-BY-NC and CC-BY-NC-SA licenses, as they are today, should be avoided.'*"

When I asked Richard Stallman about the use of open licenses for educational materials, first he complained because I didn't use the word "free", then he said that he wasn't interested in educational content, that his arguments applied specifically to software. Clearly his views have been modified since then, as this post attests.

Without extending this into a full-blown debate, as I have already written at length about this elsewhere:

- licenses that allow commercial use are *less free* than those that do not, because they allow commercial entities to charge fees for access, to lock them behind digital locks, and to append conditions that prohibit their reuse
- works licensed with a Non-commercial clause are fully and equally open educational resources, and are in many cases the only OERs actually accessible to people (because the content allowing commercial use tends to have costs associated with it)
- the supposition that works that cost money can be 'free' is a trick of language, a fallacy that fools contributors into sharing for commercial use content they intended to make available to the world without charge
- the lobby very loudly making the case for commercial-friendly licenses and recommending that NC content be shunned consists almost entirely of commercial publishers and related interests seeking to make money off (no-longer) 'free' content.

The problem with this is the Flat World publications or the OERu assessment scenario - content deposited with the intent that it be available without cost is converted into a commercial product. It's not free if you can't access it. Content is different from software, it can be locked (or 'enclosed') in ways free software cannot, without violating the license.

In sum, this discussion would be better conducted without further debated about which open license 'is best' and especially with fervent declarations in favour of commercial-friendly licensing. The suggestion that the free sharing of non-commercial content is not 'practical' is not Stallman at his best, and is refuted by the experiences of millions in the field.

¹⁶² <http://stallman.org/articles/online-education.html>

Wayne McIntosh objected, "Stephen, your assumption is incorrect with reference to access to learning materials and the OERu assessment model.."

Again, not to pursue the argument regarding the One True License beyond reason in the present forum...

- I very specifically referred to OERu assessment, not content, and assessment will cost students \$1000 for a typical 5-course semester
- I have been following and commenting on WikiEducator and OERu since the beginning, and have expressed my concerns in this regard on numerous occasions
- In particular, I expressed my concerns regarding the 'logic model' employed by OERu, as well as the 'founding partners' methodology, both of which entrenched educational institutions as an essential part of the process,
- No mechanism for recognition of learning exists, or was even contemplated, other than institutional recognition, which as noted, carries a significant financial burden

I have no objection to the mechanism whereby OERu converts OERs it receives for free from volunteers into revenues for universities. What I object to is the ongoing campaign by OERu staff to depict non-commercial OERs as 'non-free' and to lobby for their exclusion from the definition of 'free educational resources'. I wish to pursue my support of OERs in such a way that does not impose significant cost on students. To this date, the best and only mechanism for ensuring their use of OERs remains genuinely free is through the use of the NC license.

As an aside: there is always in this context a reference to the 'original' version of open source licensing, and of course Stallman's four freedoms. I would like to point out that open source licenses existed before GPL, and open content licenses existed before Creative Commons. Until the intervention of staff from large U.S. universities (Berkeley-Stanford-MIT-Harvard) these licenses required that distribution be unencumbered with cost. It is only with the intervention of staff from these institutions that 'free' comes to mean 'commercial'.

Again: people may attach licenses allowing commercial use to their work if they wish. I have no objection to this. But such people should *cease and desist* their ongoing campaign to have works that are non-commercial in intent, and free in distribution, classified as 'not free'. Content that *cannot* be enclosed within a paywall, and *cannot* be distributed with commercial encumbrances attached, is *just as free* - indeed, *more free* - than so-called 'free' commercial content.

Also...

To follow up on some points made by Rory:

Content (under whatever license) is 'enclosed' when it is contained behind a barrier such as proprietary encryption, a digital lock or a paywall. Enclosure does not restrict the content itself,

but restricts access to the content; access is granted (typically under some other name) only via some concession, such as payment, or provision of personal information.

To my understanding, all of Flat World's content will now be enclosed behind a paywall. OERu assessments enclose assessment content. This mailing list (OER-community) encloses content behind a subscription requirement (I can't even link to discussions in my newsletter; all non-subscribers see is a barrier).

Enclosure is an important concept because it leads to 'conversion'. The process of conversion is one where what was once a resource that could be freely accessed is (for all practical purposes) accessible only through a barrier of some sort; in other words, the content is free, but has been effectively completely enclosed. This is what happened (for example) to many UseNet newsgroups. It almost happened to Wikipedia, and would have happened, had Google not intervened.

Having said that, let me be clear how *perspective* plays a significant role in the free / not-free debate:

- from the perspective of someone who *already has the content*, the content is 'not free' if there are limitations on the *use* of that content, including the right to sell it
- from the perspective of someone who *does not already have the content*, the content is 'not free' if there are barriers preventing the person from *accessing* the content (note that the putative assertion that the content 'could be made free somewhere' does not constitute a removal of the all-too-practical barrier)

It is not to me surprising that the people with wealth - namely those in U.S. universities - could view 'free' from the perspective of those who have the content. But I speak from the perspective of one who does not have access to the content. And my argument, in a nutshell, is that the second perspective is just as valid as the first (even though the second perspective cannot afford lobbyists).

Content behind barriers - for example, content that is being sold - is 'not free'. This perspective matters. For 99 percent of the world, it's the only perspective that matters.

And finally

Totally agreed with [David Wiley](#): "It would be great if the world were simple enough that One License to Rule Them All could exist, but it doesn't."¹⁶³

¹⁶³ <http://opencontent.org/blog/archives/2611>

It needs to be recognized that for many people, 'open' and 'free' do not mean 'commercial'. For many people, the idea of 'selling a free resource' is a contradiction in terms. For many people, access to the resource, rather than making money from it, is the primary concern.

I don't wish to continue restating this (though it seems the campaigning from the CC-by people against NC is endless). I would simply urge UNESCO to respect the wishes of those people who are not commercial publishers or multi-million-dollar educational institutions, to recognize the intent of people creating NC-licensed resources to ensure they can be accessed for free, and to recognize resources licensed with a NC clause as OERs with equal standing.

This is consistent with the 2012 Paris declaration, which I remind people, refers to OERs as "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits **no-cost access**, use, adaptation and redistribution by others with no or limited restrictions." (My emphasis)

Ilkka Tuomi wrote, "Logically, CC-BY-NC is a subset of CC-BY. In this sense, it is more restricted."

Not so. No entity in the set "CC-BY-NC" is also in the set "CC-BY".

It's a trick of the way CC licenses were originally formulated. The designations *in fact* mean:

- CC-by-Commercial (CC-by-C)
- CC-by-Noncommercial (CC-by-NC)

So as you can see, the two sets are disjuncts, specially, not-C and C

The creators of CC treated 'Commercial' as the default. There's no reason why they should have had to do this. They could have established the licenses the other way (indeed, the way I would have done it):

- CC-by – allows all free uses, ie., no limitations on access and distribution
- CC-by-C – allows commercial vendors to restrict distribution contingent upon payment

In fact, each of CC-by-C and CC-by-NC create restrictions. They create different sets of restrictions, which may be more or less limiting, depending on your perspective.

The 'commercial-by-default' world in which we live is something recent and something that has been created through the use of language and the setting of assumptions. The creation of a 'non-commercial' clause is a way of setting 'commercial' as the default. It makes it *seemas* though 'commercial' implies no additional restrictions. But it's just a trick of language, just a trick of perspective.

That's why it's false and misleading to say that 'CC-by-C' is 'more free', and why people shouldn't do it.

*Moncton, Canada
November 27, 2012*

People Don't Need Experts; They Just Need Someone Who Knows

This¹⁶⁴ is a really good analysis. I think you correctly identify the missing bit – helping students over those rough patches.

Interestingly, to my mind, although the problem of understanding and responding to a student question is an almost intractable problem for machines, it is generally pretty straightforward for humans. So what we have tried to do with cMOOCs is connect people with the humans they need to connect with to get over the rough patches.

You don't need an expert for this – you just need someone who knows the answer to the problem. So we have attempted to scale by connecting people with many other students. Instructors are still there, for the tough and difficult problems. But students can help each other out, and are expected to do so.

An example of what I mean: I just purchased a new xBox and a copy of MLB 2K12, which is a baseball simulator. My first effort to pitch saw me walk most of the batters, throw numerous wild pitches, and finally get out of the inning only after giving up 14 runs. The problem was, I didn't know what to do; the MLB 2K12 instructions are far too vague, and if there's in-game help, I haven't found it.

I don't need an expert in MLB 2K12 to show me how to pitch. I just need someone who knows what to do. Someone who can say "Well you move this control here then here and you're trying to line this up with that." Millions of people know the answer to this question. but I'm connected to none of them. Indeed, I don't even need them to do the actual explaining. They simply need to recognize what my problem is, then point me to a video or instructions that outline the solution.

Machines will eventually be able to do this, but they will first need to master natural language processing. This is going to take a while. In the meantime, if we want massive learning, we need to structure learning in such a way as to make asking questions easier, and as necessary, to provide more incentives to people to answer them.

I don't think the xMOOCs are ever going to do this, because their focus is on placing all the emphasis on the expertise of the instructor. To the extent that they respond to this need, they will become cMOOCs. But to the extent that cMOOCs become viable, the value proposition behind

¹⁶⁴ <http://mfeldstein.com/where-xmoocs-and-adaptive-analytics-both-fail-for-now/>

p.106

the elite universities is weakened. People don't need experts; they just need someone who knows.

*Moncton, Canada
November 27, 2012*

What Makes a MOOC Massive?

Responding to [a LinkedIn Discussion](#).¹⁶⁵

When people ask me what makes a MOOC 'massive' I respond in terms of the *capacity* of the MOOC rather than any absolute numbers.

In particular, my focus is on the development of a network structure, as opposed to a group structure, to manage the course. In a network structure there isn't any central focus, for example, a central discussion. Different people discuss different topics in different places (Twitter, Google Groups, Facebook, whatever) as they wish.

Additionally, my understanding is that for the course to be a *course* it has to be more than just a broadcast. Otherwise, 'Adventure Planet' is a MOOC. Or National Geographic Magazine is a MOOC. A course actually requires these interactive and skills development activities, rather than simply consumption of content.

So what is essential to a course being a *massive* open online course, therefore, is that it is not based in a particular environment, isn't characterized by its use of a single platform, but rather by the capacity of the technology supporting the course to enable and engage conversations and activities across multiple platforms.

In the first connectivist MOOC, for example, we have 170 individual blogs created by course participants (in Change11 we had 306 feeds). What made the course a MOOC is that these contributions were comprehended as a *part* of the course, and were all accessible to course participants, either directly, through the newsletter, or through alternative syndication using an OPML list.

Similarly, there wasn't just a Twitter conversation, or Second Life event, that happened coincidentally with the course, but rather, these events outside the 'main platform' were construed as part of the course, and comprehended in the course description, relevant links, newsletters, etc.

The big danger, to my mind, in a large online course is that through strong group-formation activities, it can become a small online course. This happens when a central clique or insider group is formed, or where you have inner circles and outer circles. The inner circle, for example,

¹⁶⁵ http://www.linkedin.com/groups/When-can-MOOC-be-considered-4652870.S.204279532?qid=0ecad02c-560e-4de0-ba19-6e01b792bb8a&trk=group_most_popular-0-b-ttl&goback=.gde_4652870_member_204279532.gmp_4652870

might expect and demand preferential access to and individual attention from the course facilitators.

When this happens the dynamics of the course change - for example (and not these are my observations and opinions, not hard established fact) the primary value becomes cohesion and agreement, rather than diversity and distinct perspectives.

When the course functions as a small group, there is an expectation that everyone will agree on the course content, objectives, and domain of discussion. But, in fact, to be a massive course, it must needs respect a wide variety of individual objectives, perspectives on course materials, and opinions about relevant topics of discussion (not to mention technological platform and language of 'instruction').

Consequently, when I have been asked in the past what number a course needs to attain in order to be considered 'massive', after providing the caveat just given above, I provide the figure of 150, Dunbar's Number, as the cut-off line.

Now to be clear, this would refer to *active* participants, and not merely the number of people who signed up. Thus for example the course that has 170 active blogs *does* qualify, while CFHE, which had 83 blogs, is on the cusp (it would need another 70 people active on other platforms, such as Twitter or Google Groups).

Why Dunbar's number? The reason is that it represents the maximum (theoretical) number of people a person can reasonably interact with. How many blogs can a person read, follow and respond to? Maybe around 150, if Dunbar is correct. Which means that if we have 170 blogs, then the blogs don't constitute a 'core' - people begin to be selective about which blogs they're reading, and different (and interacting) subcommunities can form.

I sketch the difference between 'groups and networks' in this diagram¹⁶⁶ - http://www.flickr.com/photos/stephen_downes/252157734/

*Moncton, Canada
January 17, 2013*

¹⁶⁶ http://www.flickr.com/photos/stephen_downes/252157734/

Sustainability and MOOCs in Historical Perspective

Presented to Simposio Internacional Estado Actual Y Prospectiva De La Educacion Virtual, Bogota, Colombia, Asociación Colombiana de Instituciones de Educación Superior con Programas a Distancia y Virtual, November 15, 2012.

Thank you everyone. *Buenos Dias*. It's a genuine pleasure to be able to be back in Bogotá, back in Colombia, and to be able to speak with you today. I have good memories of my time in Colombia, and I'm adding to those memories with this trip.

Today I want to take you through a bit of a historical journey. We're going to talk about the factors that led to the development of the Massive Open Online Course and Connectivism and the new phenomena in learning today. But, a few preliminaries before I start the talk, because it's all about open education. :)

This presentation is available now at [that website](#)¹⁶⁷. The slides are already posted on the website so you can download them at any time. They're pretty close to what I have here. I was making some last minute changes during the introductions.

There will be audio recording as well on this site. And I know that they are recording video back there but I always like to do things myself as well. So I'm recording video off of my own computer and I'm just using [Google Hangout](#)¹⁶⁸ so it's free.

And because I can, I'm broadcasting this talk, using a YouTube live video stream, to people around the world. I have no idea how many people are watching this, probably not that many, maybe none. But the idea is that it's *possible*.

Online learning begins in the 1980s, it begins in the 1990s and it's born out of two major things. And like the strands of DNA we will see these things repeated through the history of online learning. The first basis is in distance learning. Distance learning is the idea of learning that takes place outside the classroom at any time, at any place. Distance learning therefore required the

¹⁶⁷ <http://www.downes.ca/presentation/304>

¹⁶⁸ http://www.youtube.com/watch?v=vuu5H3btQt&list=UU6mk-nJCobXFBXE9AUZtDzQ&feature=player_embedded

creation and distribution of learning content, of course packages that would support independent study.

The other basis for online learning is the traditional classroom, learning that we all grew up with, where there is a class, a cohort of students, who go through a body of content or a curriculum, who interact with each other when they conduct activities and conduct projects.

We see the two major sides here. We see the content side, and we see the interactivity side. And there are two major pedagogies of online learning when they're born out of these two bases.

There is a transmission model of learning that is born in more transactional distance learning, distance education. It has its origins in communications theory, and it's about the integrity of the message being sent from the professor to the learner and being able to be sure that what was received by the learner was the same message that was sent by the professor.

We also have a more recent theory, constructivism, which has so many varieties I cannot count and won't try, but it's based essentially on the idea of social interaction, negotiation of meaning, finding a common ground, and a model of learning where learners construct their own model. So the content models of distance education with the course packages and the content would follow the transmission models, and the class-based interactive models, which follow the constructivist model.

In the mid-1990s, people began to develop learning management systems. I'm sure you're all familiar with learning management systems.

It's a basis in technology that we all understand and we're all more or less comfortable with. Companies like Blackboard and WebCT and Desire2Learn started companies, commercial enterprises, based on the idea of managing online learning.

They had these two different models. They had the model of the course packages, and they had the model of the classes. WebCT in English stands for "Web Course Tools." It was intended to be a set of tools that a classroom instructor would use, but it was adapted to distance learning.

In addition to this commercial stream, we had the open-source stream and, most especially, learning management systems called Moodle, which I'm sure you may be familiar with, and Sakai, which is less common, but was created by a consortium of American universities.

So we had two models for learning management systems. One model where the company, and Blackboard began this way, would post all of the technology on their site, and you would buy the service from them.

Or the other model, where you would obtain the software and install it and complete the work yourself and host it on your own website. You see what's happening here, underlining these

already, we're beginning to get the basic building blocks of technology and pedagogy in models of online learning.

For the rest of this stuff, you'll see more and more of these building blocks being added and interconnected. As my wife likes to say, "It's all a great tapestry."

Early online learning featured conferencing and this, of course, would be the interactivity type of online learning. I remember in the 1990s taking a massive Internet course "Welcome to the Internet" and it was delivered by email. I would sign up for it. It was based on a mailing list. Thousands upon thousands of people would receive emails every few days introducing them to a new aspect of the Internet. It was my first experience with massive online learning.

There were also conferencing systems, early conferencing systems. Early discussion board systems. People would log on and leave messages. Simple to be able to use that technology. We began to see systems like FirstClass developed specifically for online learning. Here are technologies that may not be familiar with you because they're so old. They disappeared almost a decade ago but they were important elements in the development of the Internet we have today.

Of course, we had instant messaging. I remember using ICQ. In English, it stands for "I seek you." ICQ. Get it? Very clever. That was copied by AOL instant messaging and Microsoft messenger. My ICQ number was 1287181. It was one of the earliest. I was so proud of it, a low ICQ number, and then the company went away.

At the time, things began to be more formalized and an idea came out, partially out of the United States, partially out of Canada, mostly out of the military and the aviation industry, to create something called learning objects. The idea of a learning object was to patent some educational content, digital content, in a standardized way. There was something called LOM, Learning Object Metadata, that was used to describe these objects.

The intent here was to create a system whereby educational resources would be discoverable, sharable, and interoperable, where we could have a common pool of learning resources that these technologies could draw upon. This is a very significant development and people today say learning objects were a waste, but they were not a waste because they established the fundamental principles of educational objects, educational resources, and the sharing and distribution of these resources.

Then the IMS, the Instructional Management System consortium, based mostly in the United States but with participation around the world, built a series of standards around learning objects. One of these was content packaging. Content packaging was a technical way to represent the original distance education course packages. Learning design was an attempt to emulate what was called programmed learning in the course packages, a way of leading the student through the materials one step at a time. It was the idea of managed learning or learning management.

Over time, the concept of learning objects and learning object repositories lead to the idea of learning object repository networks. We can picture this really simply in our head. We think of learning objects as objects, maybe like books, maybe like Legos, maybe like flowers, whatever. A repository is just a place where we keep a whole bunch of them. The idea is we create our learning object and we store it in the repository.

Over time, as different institutions developed their own repositories, to encourage the idea of sharing, they created repository networks. I spent a number of years in Canada with people from across the country building a repository network of Edusource. Edusource no longer exists, sadly, but the idea was interesting and we learned a lot during it.

One of the things we learned was the tension that exists between open online resources and commercial resources. When you're creating a network of repositories, how do you enable sharing freely while at the same time allowing commercial resources to remain commercial and not shared in the way music was shared? This was early 2000/2001/2002. Content producers looked at things like Napster and music sharing and they were having heart attacks.

One of the reasons why our repository network failed was because of the constraints that commercial publishers wanted to place on it. There's a fundamental dichotomy between open content sharing and commercial markets and that's what we were experiencing in repository networks.

There were also open content repositories developed around this time. The Open Archive Initiative (OAI) created software and a set of specifications for uploading and downloading objects from repositories. That was taken by MIT and turned into something called DSpace. That exists even to this day. It's used mostly for academic publications, not so much for learning objects and learning resources. That's because academic publications is a big industry, learning resources not a big industry. So far so good? Excellent.

It's like this story. We progress through and bit by bit we're adding elements to the mix here. It's important to see this not just as a history but as a cataloging of the elements that are going into contemporary online learning. Here's another major element, and this element was developed around the same time as the learning management systems and around the same time as the learning objects, and that is the idea of learning communities.

I remember [doing a talk](#)¹⁶⁹ about Etienne Wenger and mispronouncing his name the whole way through. That was the first talk I recorded on audio so the evidence falls into the saying, "Sometimes there are mistakes you cannot escape." The concept of the community of practice is

¹⁶⁹ <http://www.downes.ca/presentation/102>

important. It actually has its origin in the philosopher Thomas Kuhn who talked about networks of researchers who shared a common paradigm.

Kuhn is most famous for the idea of scientific revolutions, but equally important, I think, is his characterization of what he called "normal science." What "normal science" is, and I should probably put it in quotation marks, what "normal science" is is not simply the facts and the data related to a discipline. Physics, the discipline of physics, is not simply about the formulas but it's the vocabulary, it's the interaction, it's the shared assumptions, it's a common understanding of what evidence is important and what evidence is not important. It's the dialogues. It's the *feel* for what it is to be a physicist.

Kuhn used to say that the knowledge of being a physicist isn't the material at the front of the chapter; it's knowing how to solve the problems at the end of the chapter. It's a way of seeing the world and being able to solve the problems is demonstrating that you see the world in the right way.

This is a kind of learning that is generated not through transmission, not even through knowledge construction, but through something else. The ideas of community and practice are important and the fundamental building blocks to the concept of learning that we have today. Like everything else, there were the, what would we call them, open communities of practice. We've heard so few formal accounts. There's almost no history of them.

Then there were the more commercialized communities. I remember being hired by the University of Alberta to create a commercial community practice called [MuniMall](#)¹⁷⁰ and it was modeled on a book called "Net.Gain" by Hagel and Armstrong. The idea of this online community was that it would be like a shopping mall. A shopping mall of physics or, in my case, a shopping mall of municipal governance.

The idea was content providers would share their resources or, more accurately, *sell* their services and their resources, and participants, people who work in that community, would interact with each other. The interaction part of MuniMall worked really well and, in fact, the community lasted for 10 years from the original design. The commercial part, not so much. Interesting lessons.

As we began to see more of these connections, we began to see learning objects. We began to see online communities that look like shopping malls. We began to see content packaging. There was a stream of thought based on the idea of open source software, based on the idea of open sharing and open content. It came, over time, to be called Open Educational Resources. This name, Open Educational Resources, was formalized by the UNESCO in the early 2000's.

¹⁷⁰ <http://www.slideshare.net/Downes/munimall-a-review>

The idea represents educational content that is shared openly. They came up with an early version of open content and an open content license and the idea here is that a person or a company or a university would create an educational resource like a learning object (but maybe not a learning object; we don't need to be that particular) and would attach to it a license that allows it to be shared freely. The resource has two parts, the content of the resource and the license.

A major initiator of that support for open educational resources, I'm sure many of you are familiar with this, is Creative Commons, and, in just the same way, Creative Commons is a way of attaching a license to a piece of content to allow that content to be freely shared. This is really important. It's really important because the default assumption for content is that content is privately owned and cannot be shared. In my mind, that's the single largest barrier to open learning as of today, the default assumption that open learning is illegal, and so we need the licensing to make open learning legal.

If it was up to me, it would be the other way around. If it was up to me, content would be free by default but if you attached the license to it then it would be commercial, but people don't agree with me on this. It's interesting, though. I look sometimes at the roots of open content licensing and creative commons and think that open licensing and Creative Commons come out of the same place that open source licensing comes out of, places like Berkeley, places like Stanford, places like MIT.

At MIT, I give a talk and saw Richard Stallman's office with a paper handwritten his name on the door (since he's not that permanent). It's interesting that this perspective, that the default is commercial, and the exception is open, has its origin in these major commercial American universities. We will come back to that.

My involvement in open educational resources, aside from producing them, producing photographs, producing reporting, whatever, was in the area of sustainability. I did [a study](#)¹⁷¹ for OECD on models and sustainability of open educational resources. This is where the thread of sustainability enters the picture. Hasn't been in the picture so far. We've had the thread of opening resources versus commercial resources or open source software versus commercial software, but now we have this idea of sustainability, which is almost like the middle ground.

The core idea of sustainability is, if you have or if you want to produce open educational resources, how do you pay for them? That's a good question. I analyzed a few different models of sustainability that existed at the time. This is a quick summary. That picture looks much nicer on my screen.

¹⁷¹ <http://www.downes.ca/post/33401>

One model, and this is a model that's actually in the field of academic publishing, is called the Gold model. It's a model where the author pays a fee in order to publish the resource and then the publisher makes the resource available. There are some journals, academic journals, that operate along this principle. I don't know of any educational resource initiative that operates on this because I haven't seen a big willingness on the part of people who create educational resources to pay for their publication.

It happens informally a lot. I pay for my own website. In a way, that's an author pay system. People pay for their own Internet access and that's kind of like an author pay system. There's certainly an element of author contribution here. The size of that element of author contribution tells us how accessible the market to create open educational resources is for people. People don't often think about that.

Another model that's very popular in the United States is the foundation model. You have the William and Flora Hewlett Foundation, you have the Wellcome Trust, you have the Bill and Melinda Gates Foundation. There's the Shuttleworth Foundation and there are many other foundations. What these foundations do is contribute money to develop the development of learning resources.

The thing with the foundation model is, foundations run out of money or foundations stop providing money. So when you're funded by a foundation, you are always faced, at the end of this funding, with the question now of "How do we become sustainable?" About half the time what happens is the open educational resource becomes a commercial resource.

I just spoke of David Wiley. He was involved with a company called Flat World Knowledge. Flat World Knowledge was intending to publish learning resources for free and they would make their money on the printed version. Only recently, Flat World Knowledge announced they would no longer publish learning material for free. There would now be a fee, but they would be competitively priced. This is a pretty common sort of thing.

Here's the public service model, and that's actually mostly my model (where I work). That's where government pays for the cost of the infrastructure and the cost of ongoing support. It'd be very similar to the public broadcasting model. Is there a public broadcasting in Colombia? There is? It's one of these things I should check before I do my talk. In Canada we have the CBC, which is a publicly funded radio, television, and Internet broadcasting. Just as an aside, it should be available here - if you want to hear great new Canadian music go to CBC Radio 3.. Fabulous. I hope it's available here. I listen to it all the time. It's all independent Canadian music. It's like the open educational resources of the Canadian music industry. I love it. That's an aside.

Finally, there's the community model. The community model is very important because the community model taps into the idea of the community of practice and it taps into the idea of the people who consume, to use a bad word, that consume the resources are also the people who produce the resources.

In the end, this is the model that I recommended to OECD. The pro-commercial organization promptly rejected it, but the model is that people create their own educational resources. People create their own educational communities. One of my major arguments for this is, in the long term it's the only truly financially sustainable model, the community based model of resource production. Any other model, I think, will eventually lead us to a commercial model.

We have, now, this other piece of the puzzle. Around that time, things really became interesting because the idea of consumers producing their own content was found not only in learning but in the Web as a whole. In English there's a term "prosumer." It's a combination of the term producer and consumer. Is there a similar term in Spanish? Sorry? *Prosumiero*? I'll work on the pronunciation of that after the talk.

This is happening around the middle of 2005, 2006. People were now gaining access to websites and web services that allowed them to create their own content. These are all sites you're familiar with. Blogger. Right? Blogging exploded. People don't talk about blogging so much now but there's a lot of blogging happening right now. YouTube. Right? Remember when everything was YouTube? YouTube was going to change the world? It actually did change the world in many ways. I'm using YouTube now. Hi, YouTube people. A site I use a lot to store photos, because I take a lot of photos, is Flickr.

It's interesting because these content sharing sites adapted an innovation that was created by the instant messaging services. Remember I talked about ICQ? The way ICQ worked was you have a list of friends. AOL called them buddies (typical AOL casual language). I don't know what MSN network called them because I never used MSN network. The idea is you would have a list of friends. When we started using systems that allowed us to create our own content like blogging systems we imported this idea. The original version of blogging was something called the blogroll. I don't know if there's a Spanish word for that but in English it's the blog roll. It's a list of blogs that you read.

Also in other things, content sharing sites like what came to be called social networks the list of friends almost became more important. What you had was a combination of content creation and a list of friends. Everybody focuses on the social of social networking, but the content creation is equally important. Facebook is the world's largest repository of photographs. People don't realize that. They should because they've been uploading them like crazy.

A content sharing network like Twitter borrowing from SMS, which is why they use 140 characters. With these kind of services comes a bit of an evolution in our understanding of what a website actually is. It used to be all about presenting content. Web 1.0, that was old learning. That was the content based paradigm. Web 2.0 became about interaction and communication and it made us think about content a bit differently.

Content is very important. It became data. Content was something that was stored in a database and then presented in different ways or shared or manipulated around what was called the mash-up.

The mash-up, what you'd do is take content from one database and content from another database and mash it up. You would take Google Maps, for example, and a list of every Starbucks and create a map with all the Starbucks on it (which I never use because I hate Starbucks). In Canada we have Tim Horton's coffee.

What's interesting is these websites became places not only where you shared data, they became places where you manipulated data and created new data. Websites actually became like little programs, like little applications. There was a slogan, "the Web as platform." That phenomenon is still very much at work today. Every website you go to almost is a platform of some sort. Different platforms, different ways of doing things, but what they are all doing is integrating data. All of them, except old websites that were created in 1995 and nobody's done anything with them since.

Here's what I worked on. This is a version of Web 2.0, a version of the whole idea. What I would do is, I would take data from different websites in a data format called RSS and all you need to know about RSS is it's content computers can read. That's all you need to know. I would take that content and I would use my computer programs to join it and use my computer programs to filter it and produce output. That's pretty handy.

I started, for example, and I did create a single feed (which is what the output is called, a 'feed'), a single feed of all the content about a certain subject. I have one you can look at it now, I'll do it right now, listen to the music, on www.mooc.com. [indecipherable 0:42:21]. It looks like a great site, that I write every day, but I don't. I read it. It's pretty interesting. I don't do a thing to create it. It's just aggregated content on the subject of MOOCs joined together and then output as a newsletter.

This is an incredibly powerful technology. I cannot emphasize how powerful this technology is. It puts into the hands of people the capacity to create qualitative resources, the capacity to bring resources from wherever they may be on the Internet and create a single resource. Or the capacity to create a single web page that is dynamic, that is always current, and draws on data from different places.

If you go look at a weather page they operate in the same way. Exactly the same way. There are hundreds of weather stations around the world and they pull these weather stations, the content is in a certain code, they decode the content, and then they present the information. That's how weather sites work. This leads us directly to the concept of connectivism.

You see how easy this is? We've gone from connecting content, connecting content, to connectivism. The idea here now is that we have all of these resources, all of the content produced by all of the people on their blogs, on YouTube and Flickr accounts, wherever, and you

can have all of these people with lists of their friends in social networks maybe or as email contact lists or whatever. They create this network. We have the technology now, finally, to join all these things together.

Connectivism is the theory of education that you come up with when you think about how education can work using this connected technology. The term, of course, derives from George Siemens who wrote an important paper called "Connectivism" and he describes connectivism pretty much as a pedagogy.

The phrase, "I store my knowledge in my friends," is one of the slogans from his original characterization and the idea is I do not need to memorize everything I know, in other words I don't need to know everything I know, I simply need to know where to find it. It's a new type of skill. It's the skill of creating networks and traversing networks. It's a new kind of understanding.

My contribution to connectivism is the depiction of knowledge as a network state. What I mean by that very precisely is to know something is to be in a certain connected state. That's kind of a hard concept, in one sense, but it's an easy concept in another sense.

To know something, in my theory, is to be able to recognize it. That's how I know Diego when I see him. He doesn't wear a name tag, although if I did that's how I would recognize, but I look at him, I see his face, I do this. Sorry, I'm just kidding. I recognize him.

That's how a physicist solves the problem at the end of the chapter. The physicist looks at the problem and recognizes "Oh, it's that kind of problem." What is that recognition? What is that capacity? We, as humans, are composed of a network as well. It's a neural network. You have, I don't know, 100 billion neurons. These neurons are all connected to each other.

To learn is to create those pathways between neurons. To know something is to have a certain set of connections. What happens technically and literally? When I recognize Diego certain connections fire in my brain. Those connections are created from previous experiences. That's how I created them. I got out there, I went to Columbia, I saw Diego, I walked around, I talked with him for a while. I'm not very good with faces so it took several visits. I formed the neural network in my mind.

What's interesting about connectivism is that societies learn that way, too. Societies have knowledge that way, too, and this is what George was seeing. George was seeing social knowledge. I see personal knowledge. It's two different kinds of knowledge but it's created the same way.

In society, we connect to people and we connect objects like learning objects, like flowers, like maps, like YouTube videos, like photographs, like pictures of my cat. We connect all of these together. What a society knows is expressed by those connections. Society learns by creating

new connections. There is some knowledge that only a society can have. It's knowledge so large, so complex, no individual person can have it.

There are examples all around us of that kind of knowledge. Look at this room. Could any of you or any one person build this room? Not possible. Nobody could know that much, especially if you include the computers and the software on the computer and all your clothing and all the wiring and the lighting systems and the translation booth and the knowledge of two languages to make that work. No one person could do it, but collectively, or maybe more accurately cooperatively, all of us together, through interaction, create the knowledge that is represented by this room.

This phenomenon of creating knowledge in an object is called 'stigmergy' in English. I have no idea what that would be in Spanish. It's the same thing for an anthill. An anthill shares knowledge one ant to the other by creating physical artifacts. A scent, a tunnel, an object left behind. That's how ants communicate, using objects.

We have this picture of connectivism. We have this picture of learning as connecting, as knowledge, as a network of connections. We have this idea of learning as immersion into an environment. What we want to do, what we want to happen, is for people to recognize.

We know that we cannot create recognition just by telling people things. You cannot create recognition just by describing. Sometimes people can recognize me by description, but generally it doesn't work very well.

In order to recognize you need to be in the situation, you need to be practicing with the materials that you want to be able to recognize, the type of material. There's a whole complex series of connection through inferences that we make. Jay Cross characterize this as informal learning, and what is informal learning? Informal learning is learning that you conduct for yourself, through your interactions in a community. That's a model that should by now in this talk sound very familiar.

What Jay is adding to the concept of informal learning is that now there's no structure, now there's no organization, now there's no professor. People learn for themselves and they design their own learning. This was demonstrated, and I thought demonstrated very effectively in the EduCamps at the edge of [inaudible 0:53:10] here in Columbia. It's a model that's been replicated elsewhere, where the idea is you bring people together, and you don't have a formal agenda of, "First we'll learn this. Then we'll learn this. Then we'll learn this."

What you have scattered around in a room are different stations. People who have knowledge go to these stations and share that knowledge. People who need knowledge go to these stations and listen to the people who have knowledge.

Except they don't just talk and listen, they actually have whatever it is that they're interested in right in front of them. They can learn to create blogs by creating blogs, learn to record audio by recording audio. The structure is not defined. There is this concept, and this is what EduCamps come out of, this concept of conference that is generally called barter camps.

A barter camp is simply a room, or a series of rooms, and a starting time. You say, "We will have a barter camp at such and such a place at such a time." You might suggest a topic, online learning, audio recording, high definition photography, whatever.

People arrive in the room, and if they have something they would like to share, they write it up on the wall. If people are interested in learning about that, they sign up for it. If you put something up on the wall and nobody signs up for it, that's fine. You go somewhere else, and you learn from someone else.

There is no preset structure there. The idea of running these barter camps is, "Whatever we talked about was the right thing to talk about. Whatever the outcome was, was the right outcome." It's the idea that, when people interact together in this kind of environment, in this learning environment, they are able to self organize.

They are able to prioritize their own learning. It's a very interesting and different educational experience, and it gets you right into the community that you are trying to learn about. The technological equivalent of the barter camp is the personal learning environment.

This is a diagram by Scott Wilson who works in Great Britain. The idea of the personal learning environment is that you treat the entire world as your learning environment. Then you connect to different kinds of resources. You can connect to blogging sites, photo sites, learning management systems, to-do lists, videos, your own website, Facebook, Twitter, whatever you want. The actual technology is RSS or other standards similar to RSS.

The same sort of bringing together of content, that I described earlier, happens in a personal learning environment. Learning as a whole in this model, becomes a network created by hundreds, thousands, millions of individual personal learning environments.

Our learning network is, each one of us connected to our list of friends, our list of learning resources, our list of activities. Connecting to them, making new connections, interacting, creating this new interaction. By this interaction, by a creating these connections.

Into that mix now, comes the idea of open courses. If you think about it. Here's our personal learning environment. Here's a learner, a student, a person who wants to learn. All of these around the student, are open educational resources. If you organize them a little bit, or even just create an environment for them here, and called it a course, now we have an open online course.

The idea here is, that an open online course is composed of. Well, I'll come back to that, whatever a course is composed of, but the important thing is that it is open. That anybody in the

world can access that course. Without paying money, without filling in a form, giving your email address, and your telephone number, and your dog's birthday.

Open courses have a long history. Open courses began to exist in the idea of "OpenCourseWare" created by MIT. Yes, the same place that we got Creative Commons from.

We get a number of initiatives. MIT OpenCourseWare, and then there's the OpenCourseWare Consortium of various universities producing the same thing.

What this is is all materials that you would need in a course, the readings, the curriculum, the problem sets, maybe some videos, etc.

Connections is the same thing. It was created at Rice University. What they did is they created an environment that course authors could enter and use to create their open courses. Pretty innovative. A lot like Blogger, only for courses.

OpenLearn is an initiative of the Open University of Great Britain -- still exists, very important, very widely used -- that has complete course packages.

You remember at the start of this topic, talking about the two models of distance education? One model was the content model. This is the twenty-first century version of that model.

Edith, a self-standing course package, is programmed learning. It takes you step-by-step through the material.

We have the commercial models, we have the publicly supported models. We also have the sharing or open-source models. I mentioned three here, WikiEducator, Curriki, and Wikiversity.

They are all initiative that use a wiki, which is simply a website that anybody can read and anybody can edit. They use these websites to create courses or to create curriculum.

The model they follow is Wikipedia, only they use the Wikipedia model, instead of creating an encyclopedia, they create coursework. Good idea.

David Wylie -- remember him? -- created a wiki for his course in open education, the course that he taught at Utah State University and, later on, at Brigham Young University. The idea that he had was to make the course materials that he was offering his class not just readable, but editable by anybody.

Reinhard Weiner wrote up a whole bunch of his classes for him. Well, I didn't write the whole class, but I wrote bits and pieces and added stuff and gave myself all kinds of credit.

Man 1: Good tip.

Stephen: Alec Couros, who's an instructor in Saskatchewan, Canada, launched open courses and what he did is he opened up his online communications environment. He was using, and still uses, I think, a product called Illuminate. Today it's called Blackbird Collaborate.

What he did is he said, "I'm having my course in Illuminate at such-and-such a time. My class, from here in Saskatchewan, will join me, and anyone else in the world who wants to join me can do so as well.

Now, that was pretty cool. His [indecipherable 1:03:09] and there's people from around the world were sitting in on Alec's classes and interacting and discussing the topic of the day.

If you think about it, it was a way of giving the students in his class a way to become a part of a wider community. They wanted to learn of it, because now, instead of just talking to each other, they started talking to experts around the world.

That also happened in David Wylie's class. Now, instead of just getting content from the professor, they were getting content from anywhere around the world.

What's really cool here, I think, is by opening the content and opening the interaction, we're almost able enough to blend these two major threads of distance learning, the content and the interaction. Opening them both, we can make them both work together just in the same way we did with e-learning, just in the same way we did in things like [indecipherable 1:04:27] and informal learning. Now we're doing this in an institutional environment.

The very first Nice chain to be called massive open online courses. When you first look at them, they're a horrible mess. What they are really is a combination of all of the things that I've been talking about so far in this talk. All of the different pieces of the puzzle come together to form these massive open online courses.

The very first MOOC was hosted by George Simmons and myself. It was called "Connectivism and Connected Knowledge" and we launched it in 2008. This picture is a representation created by one of the students in the class. It was a representation of a class. We didn't do this. We couldn't do this.

The idea here of MOOCs is to take the concept of open content, the concept of open interaction and open community, and the concept of open classes and bring them all together. That's exactly what we did.

We offered it out of the University of Manitoba. It was a credit course and the students who were enrolled in the University of Manitoba needed to do some assignments and we opened it up to anyone in the world and we had nearly 300 people join us and that was a real surprise to us. That's when open online courses became massive open online courses.

How did we design this? Remember, we are creating a network and remember that to learn is to create a network, knowledge is the state of the network. I asked what constitutes successful knowledge, successful networks? That's a good question. We all know about networks that can fail. The power grid is a network. When we have a blackout it fails. A community of people is a network, but if a disease comes through and wipes out half of the population that's a failure.

These things are called cascade phenomenon. What it is is the network is effected by a force that attacks every entity all at once and it leads to segmentation and network fail. A viral idea or a piece of propaganda is a cascade phenomenon. You have an idea. It can be something simple like a tune, like a [indcipherable 1:07:55] tune maybe. They were pretty viral. One person says it and then two people and four people and eight people and eventually everybody's singing a hit song.

An idea like racism. Again, one of these viruses that starts in one place and they can spread through society as a cascade phenomenon. It's an example of network failure. You need to design networks so that they can grow, so that they can adapt, so that they can change, so that they can learn. Just the same way as humans. You need to design humans in the same way except you don't get to design humans. It's hard. You don't really get to design societies, either. They're too large for one person to design.

What you do is you can design the pieces that go together. You can design the properties that, when combined, will lead to more effective network. This is what I call the semantic principle. Sorry about the name. What these are, are my idea of principles of successful networking. I don't pertain that they're necessarily true or that all of these can only lead to work but they are what I see at this point in time from my vantage point.

Autonomy, diversity, openness, and interactivity. Diversity. You think about a network, you think about a successful network. A successful network is made of pieces that are different from each other, not the same. Imagine you had a conversation where everybody said the same thing. Imagine you had a debate where everybody had the same idea. These would not be productive. They would not lead to anything interesting. Networks need diversity.

Networks need individuals with different points of view. One of the things that we really tried to promote when we designed our MOOCs was to promote the idea that people would read

different things and not the same things. We did not have a single assigned text. We had 100. Nobody can read 100 texts but you would pick and choose from those texts and then everybody would have a different perspective and that's how we had interesting conversations.

Openness. We need to be open to new information. Closed systems become stagnant. Closed systems literally choke on their own waste. The system has to have input, has to have output. Raw materials that come in, finished product that goes out. The idea here is for any communication to happen there needs to be an open flow from one entity to the next entity. This is why so often we find openness in conflict with commercialization, because commercialization very often, not always, but very often is based on a model of closing what was previously open.

Autonomy. This is a hard principle for many people to accept, but it's the idea that each individual manages his or her own learning. As John Stuart Mill said, "Each person in a society perceives his own good in his own way." This is essential to produce diversity. This is essential to produce communication and interaction. It is essential to support learning.

If you do not have autonomy then the knowledge of one becomes the knowledge of everyone. If the one is corrupt then everyone is corrupt. Autonomy is what protects the system from cascade phenomena that damage the network as a whole.

Finally, interactivity. This is the idea that I was talking about earlier that knowledge is created by the interaction between the members. It's really important to think of this because in traditional learning, remember the transactional theory of learning where the knowledge is in the head of the professor and then will be put into the head of the student. This model isn't like that. In this model, the knowledge is created by the interactions.

When we interact with each other, we as a group, or maybe not a group, but we as a network will create knowledge that only the networks could create because it's too large for any one individual. Then each individual in the network will look at that knowledge that we created and learn their own thing from it. All of us together form a society. That society is greater than any one of us. Then each of us individually draws an individual meaning, individual knowledge, from that society.

That gives us a story about MOOC pedagogy. That gives us a story about self-directed, informal learning where the process is informal rather than the content, where the emphasis is on selecting these resources, finding these resources, creating them, mashing them up, mixing them, using them to communicate with each other.

The pedagogy of MOOCs is the pedagogy of immersion into a community, of interaction with that community. The technology supporting the MOOC is the technology that has been used to

support these learning object repositories, these social networks and social networking sites, these individual places where you can create content, these RSSs that join content together.

Think about the sort of content repositories you have now. One famous content repository that, all at once, was called the Khan Academy. All the Khan Academy was, originally, was a bunch of individuals. Very badly done, but well enough done that they worked. They weren't produced by a professional corporation. They were produced by some guy who knew a little math and physics and wanted to share. That was our learning object repository.

It's not a horrible institution that created objects anymore. It's a community based model. When it began, Khan Academy was a community based model. Then the Gates Foundation got a hold of him and it's not community anymore. It moved into a different model which will eventually lead, in my mind, to commercialization.

There are different technologies. There are a huge, huge range of technologies today for creating, updating, polling, and sampling these repositories. I mentioned Sword, which is a deposit for polling contributed content to a repository, Core, which is a way to connect repositories, and Saw. This top is too short to allow me to even begin to list these, but, trust me, there is a lot of technology for creating and linking repositories.

Interesting work that is about to begin, that is beginning, is our ability to build personal learning environments and MOOCs that tap into repositories. This is software I built in order to do this task. It's called Grasshopper. The model is really very simple. You get input from community, input from content. You put it into a database. You turn your content into data. You mix it and mash it up and then you send it forward as email letters, as web pages, or as RSS or other feeds that will feed into somebody else's Grasshopper.

This is also a model of the activity that individuals are expected to perform when they take a MOOC. Aggregate, re-mix, re-purpose, feed forward. That is the pedagogical design of a MOOC, at least the MOOCs the way they should be. In this environment, we are working with open content and it works best with open content. As soon as we put a barrier then your aggregation and re-mixing begins to fail.

We also opened not just the content, we opened the instruction itself. We opened the way we organize our courses. We combine our courses in a wiki. We opened up the course sections. The year 2008 we did two sessions a week. We had several hundred people at first join these. It got kind of chaotic but that was fun. Different degrees of openness lead to different types of open educational resources and different kinds of open courses.

James Taylor or Jim Taylor from the University of Southern [indecipherable 1:19:47] has come

up with what he calls a logic model, which is neither logical or a model but I digress. I'm kidding. Talking about different aspects of openness. Accessing open educational resources. Accessing open support via volunteers. This is what I would call accessing the community, interacting with the community.

Open assessment. This is the next stage of these open online courses is open assessment. Then finally, open credentials, open degrees. There are degrees of openness here beyond what we have experienced thus far. We've begun to explore them in the MOOCs that we've begun following up.

In CCK09, our second MOOC, much to our surprise, the students from CCK08 came back and then, even more to our surprise, they started teaching the course. We had competing teachers of the same course. It was all very interesting. Jim Grim's course, DS106, and I can do a whole talk on that, several talks, had an emphasis on projects and creativity. DS stands for digital storytime. It's about how you use different media to tell stories. They explore different types of media in different ways of telling stories.

He opened that up and what he opened up was the list of assignments that he gives students. He said, "I don't want to be the one to decide on the assignments. You," to the world, "you come up with assignments and then the students will do them." people from all around the world suggested different assignments and it became creative channels. It was amazing. It was wonderful.

Another course we did was critical literacies. That focused on the underlying skills because one of the common comments we have is people need to have certain literacies, certain basic abilities, in order to be able to learn for themselves. I gave a talk and asked could we use a MOOC to teach how best to use a MOOC? We use a MOOC to help people learn basic skills.

It still is inclusive, I think, although we learned a lot. I started in 1995 with something called "Stephen's Guide to the Logical Fallacies" as my first open content. This whole idea of critical thinking and critical reasoning has been something interesting over the years. This is the latest phase of that. I think, personally, that we can indeed use distributed, open, online learning in order to foster the skills needed.

You need to think of this as a process where people learn through immersion and they learn good argumentation through immersion. They can learn how to spot good resources through immersion. It's exactly how somebody learns how to make a salad or cook a steak. You put them in a kitchen, you tell them to do things, they begin to do things, they watch the master, and eventually they become it. It's the same with critical thinking. It's the same with critical limits.

After we had been doing MOOCs for three years, commercial MOOCs came on the scene. The first one that was launched was the Stanford AI course last year. It attracted, I don't even know what the real numbers were, but something like 160,000 registrations. I think something like 40,000 people finished the course, I think. I don't know.

Different sources have different numbers. The main message here is the numbers are huge. Then there were commercial spin-offs from this based on models like Khan Academy, based on the traditional elements model. The idea is they would be MOOC companies. They would offer courses that were very similar to the Stanford AI course.

The Stanford AI course was not a MOOC the way we did it.

The Stanford AI course was the course materials and the course sessions open and accessible online. Then assignments were given. What they added, which I thought was really interesting, was automated evaluations of submitted assignments. I find it very interesting that this model of content-focused MOOCs, which is what they are, they're content-focused MOOCs, there is no element of community in them, these models came out of the same places as creative commons, as MIT open source.

They come out of MIT, Stanford, Harvard, the large commercial US universities. There's a certain way, a certain approach, that they have.

Now, we're in a world of MOOCs and certainly in my world, and maybe in your world, when I read about educational technology today everyone is talking about MOOCs. MOOC this, MOOC that. We offered a MOOC on the future of higher education. I was at a website. Here it is again. www.mooc.ca. If you go to that you will find links to hundreds, maybe thousands, of MOOCs.

MOOCs of the connectivist model that we use, we call them CMOOCs, MOOCs of the MIT, Stanford nexus or XMOOCs, MOOCs that are network based like the ones that George and I built, MOOCs that are task based like Jim Grune's DS106 with all the projects and assignments, MOOCs that are content based like Stanford AI. Of course there are other [indecipherable 1:27:17].

The future of MOOCs...I'm really sorry about this diagram. That's me drawing by hand inside the Illuminate environment, but it's a visual representation of the future of MOOCs. At the center, because there is a historical origin of this, are the content based XMOOCs. Around that center is the network, the community of practice, the interaction and participation. All of the elements that went into making the C, the individual creations, the sharing, the aggregation, re-mixing, re-purposing, forwarding. None of that is in the center. All of that happens outside of the center.

In a university context, none of that is in the university. All of that happens outside the university. Outside of the CMOOC are the web services that people use. Twitter, Facebook, RSS, Google Plus. Hi, Google Plus people. Delicious. Outside all of that is open assessment. Open assessment may be priority assessment, it may be open assessment as in Indiragandhi national open university. It may be testing. There's a site called Brain Bench that does online testing. It may be [indecipherable 1:29:03] badges. This is the least well defined, but you can see this ecosystem being formed.

This ecosystem is the future of online learning. So where are we going? I'm almost done with this talk. This is the good part so hang up your phones. What's coming very soon, maybe even tomorrow, who knows, I don't know, but soon, open educational apps. Of course. They're based on the app store model. What is the app store? The app store is an object repository. That's all it is, filled with products because it's commercial.

We're moving to an environment, especially looking at Android, where there are open apps already available. There are a lot of commercial applications. If you're wondering about the future of books, the book becomes the e-book becomes the app. Instead of buying a physics text book you will buy a physics app. That's the content. You still need the community around that.

MOOCs, with access to app repositories, people will use different apps, they're already beginning to use them, to create other apps and to share. That's why you need open apps, so everybody can use them. These, in turn, as they get more and more interesting, educational content will be supported by things like IMSs, learning technology integration. All that is is language that allows one app to launch another app.

Remember back in the 1990s we used to have launchers. Now we have learning technology interaction. The idea is if you have a learning resource and you have access to online MOOCs and that learning resource wants to start a chat you use LTI and starts the chat. If you use the same resource on a different MOOC you use LTI to launch a different chat. It's a bit complicated, well, it's a lot complicated. In essence, it is a way one thing can launch another thing the same way even though it's not the same as the first one. That wasn't clear at all. It's an app launcher. With the app launcher in MOOCs, an open app market will emerge.

Here's the same concept represented visually. You see how bad the text based engine is. You have all these different kinds of systems, your learning management systems that I talked about at the start, MOOCs, and they use something like a launcher, LTI, so launch, eliminate, or big blue button or a PhD application or perhaps a spreadsheet or widget. The idea of LTI is that it is connecting distributed applications to educational worlds.

The next step is we move beyond the idea of stand alone courses at all. This is already beginning

to happen. When it hits it's going to be this huge wave. Right now, the model is a course belongs to a university or a course belongs to a college or a course belongs to a school. What if it didn't? What if the course was just out there? Then the university accessed the course as an external resource?

That's what's happening. That's what the course server model is. They have a very narrow definition of a course, but basically you have a course and then all of these university partners access this course. If you have one course being accessed by a university, why not by two universities? Why not by three universities?

Even better, why not have the people of one university communicate with the people in the other university? Why not have these people communicate with the wider community? You have this idea of the course at the center, it's that same picture we had earlier, the badly drawn picture, the course at the center shared by different universities. It becomes the nexus for a community, the nexus for a community practice, around that particular course.

In the far future, courses will be out there on their own. They'll have their own management, their own structure. Or maybe not. They might just be a self-organizing community that a university taps into. You sign up for physics at MIT and your professor say good, sign up to the global physics community network. That's your course. Interesting. Makes you wonder why you're paying MIT \$35,000 a year. Assessment models are going to change dramatically.

Now already, today, there is commercialized assessment that stands apart from courses. Here is the model. Again, this is part of the courses and part of the university's plan. You sign up for your course at MIT. The professor says, "Here is the worldwide physics community. Go there, learn something, come back to me."

You go there. Now you're in the worldwide physics community. You're interacting with all the people and you're learning from learning objects and watching videos and then you go back to the MIT professor and the MIT professor says, "OK. Now we have an assessment for you." He sends you to the Washington Post Kaplan assessment service. You do your assessment and then Kaplan sends back your assessment results to MIT and MIT gives you a degree and you've just received an MIT education. Only \$34,000.

In the far future, this model would be subverted because people will realize that it is ridiculous. In the far future, the idea of an assessment service will make less and less sense because you have been participating in MOOCs. You have been participating in your community. You have shared your content, your communication with other people. You have made connections. They know you. They know your ideas. You begin to develop a reputation in that community.

That reputation in the community is your assessment. Right now it's very simplistic. We have clouts that counts the number of Twitter followers and says if you have a large number of Twitter followers you must be very intelligent. Pretty stupid. Pretty simplistic. That's what killed my clout. Imagine if you're using big data network analytics so that if you write a post or you create some content a system can track the ripple effect of that content through the network. It can see the influence that you have, can see the push back that is created, which is also good.

You want people not just to agree with you but to disagree with you. The worst thing that can happen is if you are ignored. Seeing who is listening to you, seeing who is arguing with you, seeing where you place in that network. Where you place is a set of coordinates. That set of coordinates is a grade. That's assessment of the future. Almost done.

Sustainability. How on Earth are we going to pay for this? \$34,000 MIT degrees is not going to work. There are many, many people now attempting to defend traditional education with traditional classes and traditional universities and at the top you have MIT and Stanford and all the same people who take these ideas and commercialize them. Then you have your mid-level universities like University of Alberta, University of Toronto, and then you have Frank's Garage College or whatever.

This model won't work. This model will be replaced, must be replaced, by a community based model and the reason for that is in the long term it's the only sustainable model. It's the only way to pay for a system that enables everybody to be educated.

What you're going to see developing over time, what we are already seeing develop over time, is this community infrastructure. This is very often the part that is going to be provided by a social service or a government entity.

Some entity with the resources to create a communications infrastructure and the interest to see it happen. Governments understand the need for communications infrastructure and the need for a certain level of education that is provided for everybody. That's why your government has invested so much in education. That is why my government has invested so much in education.

There is a dramatic relation between education in society and the level of achievement and the standard of living in that society. This is why governments find this so important and why, in my mind, they should find it even more important than they do.

You will have a commercial layer. It would be foolish to think there would not be specialist commercial services and there will always be competition between these services and the government infrastructure. That's just a little bit at the center.

The vast bulk of learning will be these communities that are created. It doesn't show up well on that slide. I should rewrite that slide. The vast bulk of education will be content communities where learning content is created by the learners themselves and then shared with each other.

It's an iterative process. It's a process that actually feeds into the professional domain of activity. I'll give you an example of what I mean. Climate monitoring will be something that is very important to people in the future. What is the air temperature, what is the rainfall, what is the wind? You need to get very good, very precise data from a wide number of locations. It's not just at the airport.

People that are experts in climatology would design this system. Professors will be involved. Designers, instrument designers, will be involved. The guy who goes out and installs the weather station will be involved. Students, as well, will be involved. Individual students will play individual roles.

The way to think of climate monitoring as a profession is to think of it as this large network with the experts very tightly connected and interacting at the center and then loosely connected to professionals and then more loosely connected to technicians and then even more loosely connected to students. But everybody playing a role in the actual work of measuring the climate.

You don't have the artificial climate student center and then the real climate. Everybody's involved in actual climate measuring, actual climate modeling, actual climate predictions. Learning becomes a member of the profession. Being a member of the profession means being a learner in that profession. Everybody learns, everybody teaches, everybody creates, everybody consumes. As a whole, you create an educational system out of this.

At the edges, the very edges, you have commercial media, you have commercial support, you have products that people buy, Internet access, computers, things like that that have to be paid for. At the center you have the government infrastructure, the core that makes the entire system possible. The bulk of learning in this model is the big middle, the donut that is composed of all of society. That isn't an actual model. I just made it up. I just made up that analogy, but that is the model. That is my talk.

Those are flowers. I don't know what they're called, but I thought they were interesting. They were just on the road. Thank you so much for your kind attention and your patience. I know we'll have interesting discussions about these concepts through the day. Thank you very much.

*Bogota, Colombia
March 7, 2013*

Evaluating a MOOC

I was asked (along with Dave Cormier and George Siemens):

How might it be possible to show that cMOOCs are effective for learning, in the sense of providing evidence that institutions might accept so as to support opening up more courses to outside participants (a la ds106, Alec Couros' EC&I 831, etc.)? Or, more generally, providing evidence that participation in and facilitating cMOOCs is worthy of support by institutions... What I'm looking for are criteria one might use to say that a cMOOC is successful. What should participants be getting out of cMOOCs?

I think the best way to understand success in a MOOC is by analogy with, say a book, or a game, or a trip to the city.

The person taking the MOOC is like a person reading a book, playing a game, or taking a trip to the city. It is impossible to talk about 'the objective' of such an activity - some people want to learn something (and others something else), others are doing it for leisure (and others as part of their job), others to make friends (and others to get away from their friends for a while), etc.

If we were a commercial enterprise we could focus on sales. Then we could focus an ad campaign on the actual reasons people take MOOCs - but we wouldn't need to worry about whether they were met, only about whether our advertising enticed people to pay the fee. But I think that's a pretty narrow criterion for success.

I would adopt George's suggestion, and look to the institutional goals for offering MOOCs. But again here we find a wide array of interests: some want to use MOOCs as advertising, to entice people to enrol in other courses; others want to experiment with new methods of delivering learning; others want to support products or services they sell; still others want to serve a social good and provide free learning from the community. Each objective will have its own metric for success.

My own response treats a MOOC for what it is: a network. I then ask whether it satisfied the properties of a successful network. I can do this from two perspectives: first, from a process perspective; and second, from an outcomes perspective.

The process perspective asks whether the MOOC satisfied the criteria for successful networks. Of these, the most important are contained in what I call the Semantic Condition, which ensures that the MOOC remains a living system. The semantic condition contains four parts: autonomy, diversity, openness, and interactivity. The MOOC is assessed against each of these and a degree of compliance may be found.

The outcomes perspective looks at the MOOC as a knowing system. By that what I mean is that the MOOC should exhibit network properties on a macro scale - in other words, that we should

be able to say things about the MOOC without reference to particular individuals in the MOOC. This is to treat the MOOC as an entity which perceives, or which learns, as a whole. These things are emergent properties, for example, emergent knowledge or emergent learning. Did the MOOC as a whole produce some new insight, or recognize some new phenomenon in its area of study?

MOOC success, in other words, is not individual success. We each have our own motivations for participating in a MOOC, and our own rewards, which may be more or less satisfied. But MOOC success emerges as a consequence of individual experiences. It is not a combination or a sum of those experiences - taking a poll won't tell us about them - but rather a result of how those experiences combined or meshed together.

This may not reflect what institutional funders want to hear. But my thinking and hope is that over the long term MOOCs will be self-sustaining, able to draw participants who can see the value of a MOOC for what it is, without needing to support narrow and specific commercial or personal learning objectives.

*Moncton, Canada
March 18, 2013*

The Quality of Massive Open Online Courses

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In this short contribution I would like to address the question of assessing the *quality* of massive open online courses. The assessment of the quality of anything is fraught with difficulties, depending as it does on some commonly understood account of what would count as a *good* example of the thing, what factors constitute *success*, and how that success against that standard is to be *measured*.

With massive open online courses, it is doubly more difficult, because of the lack of a common definition of the MOOC itself, and because of the implication of external factors in the actual perception and performance of the MOOC. Moreover, it is to my mind far from clear that there is agreement regarding the *purpose* of a MOOC to begin with, and without such agreement discussions of quality are moot.

Let me begin, then, with a statement describing what I take a MOOC to be. I will then address what I believe ought to be the purpose of a MOOC, the success factors involved in serving that purpose, the design features that impact success, and finally, questions regarding the measurement of those features.

What is a MOOC?

The term MOOC as is commonly known stands for ‘Massive Open Online Course’. There have been numerous efforts recently to define each of these four terms, sometimes, as I observe here¹⁷², in such a way as to result in an interpretation opposite to the common understanding of the term. Thus in some case a MOOC is being thought of as a smallish closed offline (or hybrid) ongoing activity. This, for example, is what we see in the phenomenon of the “wrapped” MOOC¹⁷³.

To my own mind, we should be relatively rigid in our definition of a MOOC, if for no other reason than to distinguish a MOOC from the myriad other forms of online learning that have

¹⁷² <http://halfanhour.blogspot.ca/2013/04/the-great-rebranding.html>

¹⁷³ <http://mikecaulfield.com/2013/04/04/oers-rule-moocs-drool/>

existed before and since, and hence to identify those aspects of quality that are *unique* to MOOCs. Hence, a MOOC is to my mind, defined along the following four dimensions:

Massive – here I attend not to the success of the MOOC in attracting many people, but in the design elements that make educating many people *possible*. And here we need to keep in mind that to *educate* is to do more than merely deliver content, and more than to merely support interaction, for otherwise the movie theatre and the telephone system are, respectively, MOOCs.

My own *theory* of education is minimal (so minimal it hardly qualifies as a theory, and is almost certainly not my own): “to teach is to model and to demonstrate; to learn is to practice and reflect.” Thus, minimally, we need an environment that supports all four of these on a massive scale. In *practice*, what this means is a system designed so that bottlenecks are not created in any of the four attributes: modeling, demonstration, practice, and reflection.

To offer a simple example: an important part of reflection is the capacity to perform and then discuss performance with others. If each person must perform and discuss the performance with a specific person, such as the teacher, then a bottleneck is created, because there is not enough time to allow a large number of people to perform. Similarly, if each performance and discussion involves the entire class, the same sort of bottleneck is created. Hence, in order for a course to be massive, performance and reflection must be designed in such a way that does *not* require that certain people view all performances.

Open – I have had many arguments with people over the years regarding the meaning of ‘open’, and these arguments have most always (to my perception) involved the other people attempting to define ‘open’ in such a way as to make ‘open’ mean the same as ‘closed’. There is, for example, the famous distinction between free as in ‘*gratis*’, and free as in ‘*libre*’.¹⁷⁴ In education there is in addition a definition of ‘open’ which is neither *gratis* nor *libre*, but instead refers to ‘open admissions’, or the removal of any academic barriers to participation in a course or program.

For my own part, the meaning of ‘open’ has more to do with *access* to a resource, as opposed to having to do with what one can *do* with a resource. The definition of ‘free software’, for example, assumes that the software is already in your possession, and defines ways you can inspect it, run it, and distribute it, without limitations.¹⁷⁵ But this definition is meaningless to a person who, for whatever reason, cannot access the software in the first place. The more common and widely understood meanings of ‘free’ and ‘open’ are broader in nature, more permissive with regard to access, and more restrictive with regard to the imposition of barriers.

¹⁷⁴ <http://www.sparc.arl.org/publications/articles/gratisandlibre.shtml>

¹⁷⁵ <http://www.gnu.org/philosophy/free-sw.html>

In particular, something (a resource, a course, an education) is *free* and *open* if and only if:

- the resource may be read, run, consumed or played without cost or obligation. This addresses not only direct fee-for-subscription, but also *enclosure*, for example, the bundling of ‘free’ resources in such a way that only those who pay tuition may access them
- there are reasonable ways to *share* the resource or to *reuse* the resource, and especially to translate or format-shift the resource (but not necessarily to be able to sell or modify the resource)

Having said that, as George Siemens and I discussed the development of MOOCs in 2008, we were conscious of and communicated the fact that we were engaged in a progression of increasingly open access to aspects of education:

- first, open access to educational resources, such as texts, guides, exercises, and the like
- next, open access to curriculum, including course content and learning design
- third, open access to criteria for success, or rubrics (which could then be used by ourselves or by others to conduct assessments)
- fourth, open assessments (this was something we were not able to provide in our early courses)
- fifth open credentials

It is worth remarking that by ‘open’ we very clearly intended both the aspects of *access* and *sharing* to be included; what this meant in practice was that we expected course participants not only to *use* course resources, curriculum, etc., but also to be involved in the *design* of these. Hence, for example, before we offered CCK08, we placed the course schedule and curriculum on a wiki, where it could be edited by those who were interested in taking the course (this was a strategy adapted from the ‘Bar Camp’ school of conference organization and the EduCamp model as employed by Nancy White and Diego Leal).

It is interesting to contrast our approach to ‘open’ with the “logic model”¹⁷⁶ devised by James C. Taylor¹⁷⁷ and eventually adopted by OERu which preserved the openness of resources and courses, but kept closed access to assessments and credentials. Such courses are *not* to my mind ‘open courses’ as a critical part of the course is held back behind a tuition barrier. Exactly the same comment could be made of ‘free’ courses that entail the purchase of a required textbook. The fact that some part of a course is free or open does not entail that the course as a whole is free or open, and it is a misrepresentation to assert such.

¹⁷⁶ http://wikieducator.org/OER_university/Logic_model

¹⁷⁷ http://www.ascilite.org.au/ajet/e-jist/docs/vol10_no1/papers/full_papers/taylorj.htm

Online – I mentioned above the phenomenon of ‘wrapped’ MOOCs, which postulate the use of a MOOC within the context of a traditional location-based course; the material offered by the MOOC is hence ‘wrapped’ with the trappings of a more traditional education. This is the sort of approach to MOOCs which treats them more as modern-day textbooks, rather than as courses in and of themselves.¹⁷⁸

But insofar as these wrapped MOOCs are *courses*, they are no longer online, and insofar as they are *online*, they are no longer courses. So whatever a ‘wrapped MOOC’ is, it is not a MOOC. It is (at best) a set of resources misleadingly identified as a ‘MOOC’ and then offered (or more typically, sold) as a means to supplement traditional courses.

For a MOOC to be ‘online’ entails that (and I’ll be careful with my wording here) no required element of the course is required to take place at any particular physical location.

The ‘wrapped MOOCs’ are not MOOCs because you cannot attend a wrapped MOOC without attending the in-person course; there will be aspects of the MOOC that are reserved specifically for the people who have (typically) paid tuition and are resident at some college or university, and are physically located at the appropriate campus at the appropriate time. Just as being online is what makes it possible for these courses to be both massive and open, being located at a specific place makes the course small and closed.

But by contrast, this does *not* eliminate MOOCs that include or allow elements of real-world interaction or activity. Our original CCK08 MOOC recommended (but did not require) in-person meet-ups, for example, and these were held at various locations around the world. MOOCs such as ds106 require that a person go out into the world and take photographs (for example). In *any* online course there will be a real-world dimension; what makes it an ‘online’ course is that it does not specify a *particular* real-world dimension.

Course – before we launched our first MOOC both George Siemens and I were involved in various activities related to free and open online learning. George, for example, had staged a very successful online conference on Connectivism the year before. I had, meanwhile, been running my newsletter service for the educational technology community since 2001. Each of these was in its own way massive, open and online, but they were not courses. There is obviously some overlap between ‘course’ and ‘conference’ and ‘community’, and people have since suggested that there could be (or should be) massive open online communities of practice¹⁷⁹ and of course there could – but they are not MOOCs.

¹⁷⁸ <http://hapgood.us/2013/01/28/both-moocs-and-textbooks-will-end-up-courseware/>

¹⁷⁹ <http://moocop.wordpress.com/>

To be clear: I am very supportive of the idea of massive open online communities, but the MOOC is a different entity, with its own properties and role in the environment. And specifically:

- a course is *bounded* by a start date and an end date
- a course is *cohered* by some common theme or domain of discourse
- a course is a *progression* of ordered events related to that domain

Why insist on these? Aside, that is, from the pedantic observation that if you call something a ‘course’ then it ought to have the properties of a course?

My own observation (and I was reluctant at first to create a ‘course’ precisely because of the three limitations just specified above) is that the creation of temporary and bounded events allows for engagement between communities that would not normally associate with each other. Courses are a way of, if you will, stirring the pot. By creating a limited and self-contained event we lower the barriers to participation – you’re not signing up for a lifetime commitment – and hence increasing accessibility.

In a sense, the same reason we organize learning into courses is the reason we organize text into books. Yes, simply ‘reading’ is useful and engaging, and widely recommended, but ‘reading a book’ is defined and contained. A person can commit to ‘reading a book’ more easily than to ‘reading’, especially if by ‘reading’ we mean something that never ends.

Hence, massive open online learning that is *not* bounded, does not cohere around a subject, and is not a progression of ordered events, is *not* a course, and outside the domain of discourse.

The Purpose of MOOCs

The first reaction is to suggest that the purpose of a MOOC is to help someone *learn* – they are, after all, courses. But purposes are never so easily transparent, and education is a domain that defines opacity, and to the combination does not easily yield to a simple statement of purpose.

Addressing the purpose of a MOOC as ‘learning’, for example, does not begin to address why some person, organization or association would *offer* a MOOC, beyond at least those early MOOCs that were offered as much to explore the possibilities of the format as much to attain any educational objective.

The purpose of MOOCs offered by a commercial entity such as Coursera, for example, is to earn revenue (and beyond that, advance the Coursera brand to enable future courses to also make money). Meanwhile, the purpose of an institution offering a MOOC through Coursera may be multifaceted and nuanced. Consider, for example, the statement that “This is truly in the spirit of what we’re supposed to do in higher education, which is providing education and

experimentation,” from Cole Campese at Penn State.¹⁸⁰ Compare with what Keith Devlin says: “What I see is the true democratizing of higher education on a global scale. And in today’s world – global village, Flat World, call it what you will – I think that is exactly what we (i.e., the entire world, not just the highly privileged US) will need.”¹⁸¹

Even a focus on why students subscribe to MOOCs will not be revealing. Consider what the founders of Coursera say about most students who sign up: ““Their intent is to explore, find out something about the content, and move on to something else,” said Ms. Koller. Adding tuition fees changes the dynamic, as does adding credentials at the end of the course. Coursera has learned it can earn money charging for authentication services¹⁸², which satisfies both its need to make money, and a student’s need for a certificate (though at the expense of no longer being free and open).

Doing what he does so well, Curt Bonk has compiled a list of twenty “types, targets and intents” of MOOCs¹⁸³, including the following:

- high scoring or impressive MOOC participants get admissions privileges, job interviews, or points if they later apply for a particular degree program, certificate, internship, or job;
- loss leader - give away one course in every department or program as a means to attract new students to that major, program, or department;
- religious revival MOOC;
- bait and switch MOOC - use it as a means to sell a product or to turn the audience on to something else.

It becomes clear through reflection that MOOCs serve numerous purposes, both to those who offer MOOCs, those who provide services, and those who register for or in some way ‘take’ a MOOC.

The original MOOC offered by George Siemens and myself had a very simple purpose at first: to explain ourselves. The topic of ‘connectivism’ had achieved wide currency, and was the subject of the online conference mentioned earlier, and yet remained the subject of considerable debate. What was it? Was it even a theory? Did it even apply to education? Was it founded on real research, or was it simply made up? We believed we had good answers to those questions, and

¹⁸⁰ http://www.collegian.psu.edu/archive/2013/04/19/Penn_State_expands_to_offer_Coursera_courses.aspx

¹⁸¹ <http://devlinsangle.blogspot.ca/2012/11/mooc-lessons.html>

¹⁸² <http://www.insidehighered.com/news/2013/04/08/coursera-begins-make-money>

¹⁸³ <http://travelinedman.blogspot.ca/2012/06/twenty-thoughts-on-types-targets-and.html>

the curriculum was designed to lead participants (and ourselves!) through a clear and articulate answering of them.

As we began to design the course (and in particular, as I began to use the gRSShopper application¹⁸⁴ I had designed to support my website and newsletter) it became clearer to both of us that the purpose of the course was also to serve as an *example* of connectivism in practice. After several years of describing the theory^{185 186} we began to feel some obligation to demonstrate it in practice. So the course design gradually began to look less and less like a traditional course, with topics and readings arranged in a nice linear order, and more like a network, with a wide range of resources connected to each other and to participants. And the course became much less about acquiring content or skills, and much more about making these connections, and learning from what emerged as a result of them.

The participants in our MOOCs also demonstrated a similarly wide range of motivations. We had several participants who were in the course for the research opportunities it offered (and people like Jenny Mackness¹⁸⁷, Frances Bell¹⁸⁸ and Sui Fai John Mak¹⁸⁹ have become voices in their own right in the field). Others came with the intent to learn about connectivism, to supplement their existing studies in a masters or PhD program. Others joined in to participate in what they saw as an event, others to make connections and extend their social network (or as it came later to be called, their ‘personal learning network’¹⁹⁰). At least one (and maybe others) came with the specific intent of discrediting connectivism (and in passing, to call George and myself “techno-communists”).

Even if we limit our focus to what is putatively the primary function of a course, *to teach*, it becomes difficult to identify the purpose of a MOOC. Much has been made of MOOC completion rates¹⁹¹, with the (generally implicit) suggestion that completion is in some respects tantamount to learning. However, it could be argued that enabling a person to sample a course

¹⁸⁴ <http://grsshopper.downes.ca/>

¹⁸⁵ <http://www.elearnspace.org/Articles/connectivism.htm>

¹⁸⁶ http://www.huffingtonpost.com/stephen-downes/connectivism-and-connecti_b_804653.html

¹⁸⁷ <http://jennymackness.wordpress.com/>

¹⁸⁸ <http://www.irrodl.org/index.php/irrodl/article/view/902/1664>

¹⁸⁹ <http://suifaijohnmak.wordpress.com/>

¹⁹⁰ <http://www.schrockguide.net/creating-your-pln.html>

¹⁹¹ <http://augmentedtrader.wordpress.com/2013/01/06/about-mooc-completion-rates-the-importance-of-investment/>

and withdraw without having lost thousands of dollars of tuition is a *success*. Moreover, different people want to learn different things: some about what connectivism is, some, how best to criticize it, some, whether it even makes sense to their own experience.¹⁹²

And there are different senses of learning. In one sense, to ‘learn’ is to acquire some knowledge or skill, and it is this sense of learning that is most often associated with education, and especially formal education. But there is an equally valid sense of learning, where the objective is to achieve some outcome or complete some task, what Rogers (2006) calls “task-conscious learning”¹⁹³. This sort of task-focused outcome is much more common in informal learning; it is the sort of learning I do, for example, when I dip into Stack Overflow¹⁹⁴ to learn how to set the value of a field before submitting an Ajax form.

It becomes clear that we cannot assess the purpose of a MOOC *qua* MOOC by assessing the reasons and motivations of the people taking them, nor even by assessing the reasons and motivations of those offering them. What makes a hammer a good hammer isn’t whether it fulfills the reasons and motivations of the people using the hammer, because these people use it variously as a screwdriver, bottle opener, doorstop, weapon, wrench, general-purpose machine repair device, and as an implement for driving nails, screws, tables, pegs and other objects into various sized holes. A MOOC, similarly, may be a very good or very poor PR device, may transmit content very well or very poorly, may advance research a lot or not at all, all depending on who is using it, how they are using it, and why.

MOOC Success Factors

The primary criticism of what I will address in this chapter is that success is process-defined rather than outcomes-defined.¹⁹⁵ Without outcomes measurement we cannot measure success, we can’t focus our efforts toward that success, we can’t become more competitive and efficient, we can’t plan for change and improvement, and we can’t define what you want to accomplish as a result. All this is true, and yet there is no measure of outcome or success that can be derived from designer and user motivations, or even from the uses to which MOOCs are put. The only alternative is to identify what a successful MOOC ought to produce as output, without reference to existing (and frankly, very preliminary and very variable) usage.

¹⁹² <http://helistudies.edublogs.org/>

¹⁹³ Cited here: <https://plus.google.com/102352099876644260792/posts/isymGxiZ1Ly>

¹⁹⁴ <http://stackoverflow.com/questions/2405190/jquery-set-ajax-return-value-in-form-field>

¹⁹⁵ http://www.tdcorp.org/pubs/Outcomes_Measurement_Article.pdf

These outcomes are a logical consequence of the design of the MOOC. The same is true of a hammer. This tool is defined as a hand-held third-class lever with a solid flat surface at the business end. Anything that satisfies these criteria will, as an *outcome*, have the capacity to drive a nail into a piece of wood (whether or not any hammer is ever used in this fashion). It has to be under a certain weight to be hand-held, above a certain mass, and of a certain length, to be a lever, and of certain material and design to have a hard flat surface.

When we are evaluating a *tool*, we evaluate it against its design specifications; mathematics and deduction tell us from there that it will produce its intended outcome. It is only when we evaluate the *use* of a tool that we evaluate against the actual outcome. So measuring drop-out rates, counting test scores, and adding up student satisfaction scores will not tell us whether a MOOC was successful, only whether this particular application of this particular MOOC was successful in this particular instance.

The *design* of a MOOC is, in the first instance, as described above: it is a massive open online course, and the design is successful to the extent it satisfies those four criteria, and unsuccessful to the extent that it doesn't. That said, however, there are many ways to create a massive open online course, and within that domain, some may be more successful than others. So we need to look at *why* we designed and developed the MOOC the way we did – *why* we made it massive, open, online and a course, as described above. Why *this* model, say, and not a traditional online instructor-led class, or an open online community, or any of a dozen other combinations?

What I begin with is the observation that each person has a *different* objective or motivation for taking a course, and has different needs and objectives (it's a lot like dating that way – we think that everyone wants the same thing, but we find in practice that everybody wants something slightly different). We looked at what we called 'sifters' and 'filters' to create learning recommendation systems, resulting in work I presented at MADLat based on collaborative filtering. "Collaborative filtering or recommender systems use a database about user preferences to predict additional topics or products a new user might like."¹⁹⁶ There are different ways to approach this problem; I adopted what we called 'resource profiles' to characterize resources and make them accessible within a learning resources network.¹⁹⁷ Since the work of filtering and selecting could now be done by the metadata, I turned to the question of what would constitute a successful *network*, which I addressed in 2005.¹⁹⁸

Partially influenced by earlier work I had done in networks (and especially the work of Francisco Varela) it was clear to me that the objective wasn't to connect everything to everything, but to

¹⁹⁶ <http://www.downes.ca/presentation/90>

¹⁹⁷ <http://www.downes.ca/presentation/85>

¹⁹⁸ <http://www.downes.ca/presentation/32>

achieve an *organization*¹⁹⁹ in such a way as to support cognition. The work of Rumelhart and McClelland suggested ways this organization could be defined in terms of nodes and connections²⁰⁰ and learning mechanisms to achieve what Churchland and others called “plasticity”.²⁰¹ The structural properties I described in 2005 were drawn in large part from documents describing the design principles behind the internet. Finally, remarks by Charles Vest about the American university system led me to formulate what I now call the Semantic Principle, also in 2005²⁰² which crystalized as the ‘Groups and Networks’ presentation in New Zealand.²⁰³

At the risk of repeating myself, let me say here that the Semantic Principle consists of four major elements: autonomy, diversity, openness, and interactivity.

Before discussing each of these briefly, let me describe the outcome a network design embodying the semantic principle will achieve. Such a system is not static; it is dynamic. It is self-organizing, and creates these organizations in response to (and as a reflection of) environmental input. It can be thought of as a highly nuanced perceptual system. Over time, it acquires a state such that it can (if you will) *recognize* entities and events in the environment as *relevantly similar*²⁰⁴ to those it experienced in the past, and respond accordingly. This knowledge is characterized as emergent knowledge²⁰⁵, and is constituted by the organization of the network, rather than the content of any individual node in the network. A person working within such a network, on perceiving, being immersed in, or, again, *recognizing*, knowledge in the network, thereby acquires similar (but personal) knowledge in the self.

Or, to put the same point another way, a MOOC is a way of gathering people and having them interact, each from their own individual perspective or point of view, in such a way that the structure of the interactions produces new knowledge, that is, knowledge that was not present in any of the individual communications, but is produced as a result of the totality of the communications, in such a way that participants can through participation and immersion in this environment develop in their selves new (and typically unexpected) knowledge relevant to the

¹⁹⁹ <http://www.enolagaia.com/Tutorial1.html#Org&Str>

²⁰⁰ <http://www.amazon.com/Parallel-Distributed-Processing-Vol-Foundations/dp/026268053X>

²⁰¹ <http://www.amazon.com/Scientific-Realism-Plasticity-Cambridge-Philosophy/dp/0521338271>

²⁰² <http://www.downes.ca/presentation/109>

²⁰³ http://www.flickr.com/photos/stephen_downes/252157734/

²⁰⁴ <http://www.downes.ca/post/212>

²⁰⁵ http://www.kakihara.org/papers/Kakihara&Sorensen_JGITM.pdf

domain. A MOOC is a vehicle for learning, yes, but it acts this way primarily by being a vehicle for discovery and experience (and not, say, content transmission).

Not every MOOC will produce this outcome, nor will this form of learning be experienced by every participant (particularly those who sample and leave early) but to judge from the commentary the experience of new and unexpected emergent knowledge is common and widespread (^{206 207 208 209} among many others).

Let me now turn to the four success factors that I argue tend to produce this result. My purpose here is not to describe each in any detail – I have done that elsewhere – but rather to consider each as a *success factor*, that is, to consider how each design elements contributes to this result.

Autonomy – this is essentially the assertion that members of the network (in this case, participants employ their own goals and objectives, judgments and assessment of success in the process of interaction with others. This is reflected, for example, in Dave Cormier’s assertion that “you determine what counts as success in a MOOC.”²¹⁰ A collection of people working in a MOOC should be, for example, thought of as *cooperating*, rather than collaborating, because though they will exchange value and support each other, each will be pursuing his or her own objectives and depending on their own means and resources.

In our MOOC it was important that we *not* tell people what they ought to learn or what lessons they should take home from the presentations we made and the conversations we led. People perceive what they are looking for, and often only what they are looking for, and our well-intentioned attempts to guide their cognition could just as easily lead to participants missing the information most important to *them*. Similarly, we did not attempt to define *how* participants should interact with each other, but instead focused on supporting an environment that would be responsive to whatever means they chose for themselves.

Without autonomy, a MOOC is not able to adapt to the environment. Rather than enable each person to allow his or her unique perspective or point of view of the world to influence the course design or organization, they would instead reflect the perspective or world view of some organizer telling them what their objectives should be, what they should learn, what counts as success. It is important that each person respond to the phenomena – the communications of

²⁰⁶ <http://hybridclassroom.com/blog/?p=743>

²⁰⁷ <http://ivarsadventures.wordpress.com/2012/08/25/my-educational-dream-is-coming-true-with-mooc/>

²⁰⁸ <http://edwoodworth.wordpress.com/category/mooc-journeys/>

²⁰⁹ <http://digitalopened.blogspot.ca/2013/04/open-education-open-university-h817open.html>

²¹⁰ <http://www.youtube.com/watch?v=r8avYQ5ZqM0>

others – in their own way, positively or negatively, in order to generate a unique structure or organization.

Diversity – this is a natural consequence of autonomy, and in addition a success factor in its own right. While we typically think of diversity in terms of language, ethnicity or culture, for us diversity applied to a broad range of criteria, including location and time zone, technology of choice, pedagogy, learning style, and more. Participants, for example, *could* experience the course as a series of lectures, and some did, but many skipped the experience. Others treated the course as project-based, creating artifacts and tangible products. Others viewed the course as conversation and community, focused on interaction with other participants.

The major concern with diversity so broadly construed is that some people might be seen as ‘doing it wrong’. We were, for example, criticized for offering lectures, because it did not follow good constructivist pedagogy; our response was that connectivism is not constructivism, and that it was up to those who preferred to learn through constructivist methods to do so, but not appropriate that they would require that all other participants learn in the same way. Additionally, it should be noted that *it did not matter* whether some particular pedagogical choice was in some respects a failure, since the perceptual recognition that *it is* a failure constitutes success in its own right.

Without diversity, it is not possible to contemplate the possibility of a network having different states, or different types of organization. A collection of entities that is not diverse is inert, or worse, overly reactive, in that a change in one becomes a change in all. In a computer, we expect each bit of memory to contain different values of one or zero over time than others, for otherwise, our computer could do nothing more than blink off and on and off again. Any sort of complexity requires diversity, and any sort of learning requires complexity.

Openness – this is the idea that the boundaries of the network are porous and that the contents of the network are fluid. In practical terms, it means that participants of the course are free to enroll or to leave as they wish, and to move in and out of course activities equally freely (I once remarked²¹¹ to ALT that what made my talk a success was defined not by the fact that they were all here, but by the fact that they could all leave (but hadn’t)). Openness also applies to the *content* of the course, and here the idea is that we want to encourage participants not only to share content they received from the course with each other (and outside the course), but also to bring *into* the course content they obtained from elsewhere.

Openness is necessary because – as the saying goes – you cannot see with your eyes closed. An *a priori* condition for the possibility of perception is openness to perceptual input. Learning requires perception, not only of the thing, but also of its opposite. If we were not open to the

²¹¹ <http://www.downes.ca/presentation/113>

perception of evil, we would not be able to define good. If we are not open to the possibility of failure, we are not able to achieve success. We obtain these experiences through openness, by being open to other ideas, other cultures, other technologies, other people. The *free flow* of people and information through a MOOC is as important as the organization of the people therein.

An interesting side-effect of openness is that there is no clear line dividing those who are in the course and those who are not. The course resembles not a solid sphere but rather a cluster of more or less loosely associated participants (and resources, and ideas). In a connectivist course, for example, lurkers are seen as playing as equally important and valuable role as active participants. Off-topic discussions are not distractions but are rather seen as valuable outcomes. As members of the Bar Camp and unconference movement would say, the people who are there are the right people, and the outcome of the event was the right outcome.²¹²

Interactivity – through the years I have used various terms for this fourth element, including ‘connectedness’ and ‘interactivity’ but none of them suits exactly what is meant by this concept. It is not *simply* that members of the network are connected with each other, and that interaction takes place through these connections. It is rather the idea that new learning occurs as a *result* of this connectedness and interactivity, it *emerges* from the network as a whole, rather than being transmitted or distributed by one or a few more powerful members.

Another way to understand this property is to see it as the stipulation that the graph of network interactions or connections is *not* a power law distribution. In a power law distribution, one or a few members receive most of the connections, creating what I’ve called the ‘big spike’²¹³, and the each of the majority has only a few connections, resulting in what many people have called ‘the long tail’²¹⁴. This formation commonly occurs in dynamic networks, the result of what Barabasi²¹⁵ identified as selective attraction: newcomers to the network tend to link to those people who are already popular, resulting in their disproportional growth in popularity.

Networks characterized by a big spike and long tail are not response to their environment, and can over-react to small stimuli, resulting in cascade failure and eventual network death.²¹⁶ A more balanced (and dare I say, egalitarian) distribution of connectivity gives the network

²¹² http://www.openspaceworld.com/brief_history.htm

²¹³ <http://www.downes.ca/presentation/37>

²¹⁴ <http://www.wired.com/wired/archive/12.10/tail.html>

²¹⁵ http://www.amazon.com/Linked-Everything-Connected-Else-Means/dp/0452284392/ref=la_B0011GQIYW_1_1?ie=UTF8&qid=1366838681&sr=1-1

²¹⁶ <http://www.downes.ca/post/53882>

resilience, and the influence from one perspective cannot become disproportional simply because it came from an influential node. Each signal (each idea, each resource) must face not one challenge but many challenges as it is propagated, person to person, through the network.

Measuring Success

To turn, then to the actual measurement of quality in a MOOC: it is necessary in the first instances to point out what ought *not* be taken into account, but because these elements are not important – they are – but because these elements are not relevant to the evaluation of a MOOC *as a MOOC*.

Paramount among these are evaluations consisting of evaluations of the quality of the course materials used in the course, the sort of evaluation that might be provided, say, by a peer review process or learning resources review process, such as might be undertaken by a project such as MERLOT.²¹⁷ These evaluations examine the resources created for the MOOC or (in fewer instances, if any) at the materials shared among each other by participants in the MOOC, and assess such criteria as clarity, accuracy, usability, or engagement.²¹⁸ Similar (or slightly varying) criteria are used to evaluate other aspects of courses, such as the facilities, the instructors, and the students themselves.

Such evaluations miss the point for several reasons:

- an evaluation of the parts isn't the same as an evaluation of the whole. A strong course can be created out of arguably inferior, even defective, materials, if the course is *organized* appropriately (or, as Hemingway might say, the secret to writing is to create a perfect image out of banal and even defective sentences).
- even in cases where the parts are important, it is not often the case where better quality results in better outcomes; even a resource that is only average will suffice when the alternative is nothing at all, or as I once tweeted, what we usually need is not someone who is an expert, just someone who knows.
- similarly, what counts as quality in one context will be perceived as a weakness in others; an explanation that is complete and accurate may be incomprehensible to a beginner.
- and most importantly, the learning that happens in a MOOC is not a consequence of the learning materials, or even the instruction, it is a consequence of an immersion in an interactive community and will result from what emerges from that interaction.

²¹⁷ <http://www.merlot.org/merlot/index.htm>

²¹⁸ <http://www.ascilite.org.au/ajet/ajet24/kay.pdf>

Yes, we can evaluate based on some banal criteria – the website was always down, the text was too scrambled to read, the video was in Farsi – but these, insofar as they render the *MOOC* less successful, can be traced as failures of one or more of the success criteria described in the previous section.

The evaluation of each of the four criteria can be mapped against elements of the course, and then checked off like a counter. For example, we could list the fifty-five resources employed in the course, and count the number of resources that are free and open (in the sense I described above). But this is in a sense misleading; it makes a course that depends on a key closed resource seem to be 98 percent open, while at the same time it makes a course that had one participant post a lot of Amazon links (to books, which you must buy) seem like it was 50 percent closed. Neither estimation would be correct, but numbers know no context.

Properties like autonomy, diversity, openness and interactivity are not properly discerned by counting, but by being *recognized*. In this way they are a lot like other properties, like freedom, love and obscenity. A variety of factors – not just number, but context, placement, relevance and salience – come into play (that is *why* we need neural networks (aka., people) to *perceive* them, and can't simply use machines to count them).

That said, there is a purpose to checklists and rubrics, and that is to ensure that there is nothing omitted from consideration. Even experts depend on checklists, and they are critical in environments such as hospitals and airplanes. As mentioned previously, we see what we expect to see, and checklists remind us what to expect to see.

At this point it would be reasonable to countenance a variety of features of MOOCs, and assess each for autonomy, openness, diversity and interactivity. For example, consider the question as posed to each of the following elements of a MOOC:

- content selected by the instructor (is it open? Is it diverse? etc.)
- the online platform used by participants
- the authoring environment(s) used by participants
- communication of daily news and announcements
- guest speakers and interviews

The difficulty with such a checklist is that it can easily become endless. And while posing these questions can be useful when *selecting* technology or when *designing* the course, they become less useful as an evaluation rubric after the fact.

So, a suggestion: think of the course as a language, and the course design (in all its aspects) therefore as an expression in that language. This can be applied as broadly or as narrowly as one wishes, and for the present purpose, can be used to frame an assessment of the quality of an entire MOOC in a single pass.

In consideration of the use of digital artifacts *as* language (for example, ‘speaking in LOLcats’²¹⁹), we can identify the different *dimensions* of literacy. Based on work in language and linguistics over the last century, I have identified six major dimensions of literacy: syntax, semantics, pragmatics, cognition, context and change.

It is important to understand that these are distinct from different *types* of literacy. For example, there has been a great deal of attention paid recently to ‘digital literacy’²²⁰, along with numerical literacy (or ‘numeracy’²²¹) along with traditional language-based literacy. We can imagine many more types of literacy: performance, simulation, appropriation, and more, for example. There’s emotional literacy, financial literacy, and social literacy. Each of these (according to my account) constitutes in its own way the learning of a *language*. Each of these languages has its own literacy, and literacy in that language may be defined across the six dimensions.

Indeed, I have commented in the past, and it is relevant to point out now, that the act of learning a discipline – a trade, for example, or a science, or a skill – is more like the learning of a language than it is like learning a set of facts. Yes, there is an element of memory, but the bulk of expertise in a language – or a trade, science or skill – isn’t in knowing the parts, but in fluency and recognition, cumulating in the (almost) intuitive understanding (‘expertise’, as Dreyfus and Dreyfus would argue²²²). This sort of fluency is *acquired* by immersion in a language-speaking community (of which a MOOC is a characteristic example) and *described* by the six elements of literacy listed above.

An evaluation of the quality of a MOOC, therefore, after we have passed beyond the gross characteristics of being massive, open, online, and a course, is an assessment of the resulting course *as a network* and *from a linguistic perspective*. Now again, this is a *rubric*, not a checklist. It is not intended to define a MOOC as ‘49% successful’ on the basis of that percentage of boxes being checked. It is an *aid*, used to assist a person who is already fluent in MOOC design (or at least, in the domain or discipline being studied) *recognize* the quality (or lack of quality) of a MOOC.

This rubric thus consists of a set of 24 elements: each of the four success criteria, across each of the six dimensions of literacy. Some of these will be more difficult to comprehend than others, and each will have to be considered at some length before anything like a common

²¹⁹ <http://www.downes.ca/presentation/233>

²²⁰ <http://neverendingthesis.com/doug-belshaw-edd-thesis-final.pdf>

²²¹ http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/cbs_supportnumeracy.pdf

²²² <http://www.sld.demon.co.uk/dreyfus.pdf>

understanding is achieved, but the checklist serves as a starting point, and the hard empirical work can now begin.

So, for example, when I think back of the CCK08 course, and the other MOOCs we designed, one of the questions I could ask (among the 24) is ‘openness-syntax’. Openness is the quality I described above, and the question here is how well it applied to the forms, rules, regularities, patterns and operations in the course. This, in turn, leads to basic questions like: could URLs be shared? Is the login form accessible? Are there hidden or unstated regulations or criteria? This list, clearly, would be different for each course, because each course consists of a *different* set of forms, rules, regularities, patterns and operations. It’s not a question of whether this is the right set of rules or regularities, or whether one set of rules is better than another (that’s like asking whether Spanish or Portuguese is the superior language). It’s a question of *whether the language of the course can be learned*.

So there are 23 other sets of questions, each equally important, and this is neither the place to describe them in detail nor even to attempt to enumerate them (and they are more productively considered as separate and individual cases, rather than as a set).

To conclude, I will add some *caveats*.

The discipline of education is as a rule overly fond of taxonomies and distinctions. The taxonomies and distinctions offered in this discussion are the least important aspect of the discussion. In all cases, the taxonomies have been developed in order to enable inferential work to be performed. It doesn’t matter whether we divide the properties of successful networks into ‘autonomy’, ‘diversity’, etc., whether we focus on learning rules (Hebbian, Back-propagation, Boltzmann) or whatever, what matters is that the design principles of MOOCs are those that reliably result in successful networks, where success itself is a matter of empirical observation, convention and use. The same with respect to the elements of literacy.

And similarly, with respect to this presentation, it is not the *content* of what is asserted here, it is the fact of the assertion and the manner of the investigation, which should be taken to serve as a model or demonstration of thinking about quality in MOOCs, and not a definitive statement of it.

*Moncton, Canada
24 April, 2013*

Assessment in MOOCs

I was asked: "I was wondering how they might work with the Humanities, as I teach Seventeenth-Century Literature, Shakespeare and other related subjects, which require research papers and final examinations. I can see using MOOCs for people who simply have a (non-credit) interest in these subjects, but I can't see myself marking 5,000 term papers, and a similar number of exams. Multiple-choice evaluation, as in science, is easily taken care of electronically, but not in humanities. I am sure this looks like a naive question, but I think MOOCs are a wonderful idea for people who simply wish to enrich their knowledge, and would like to know a little more about them."

First of all, the MOOCs I have worked on have not focused on assessment - they have been courses, yes, with a small number (20 or so) taking them for credit, but the vast majority of participants auditing. So the question of marking term papers never came up. And like you, I would not contemplate multiple-choice exams in humanities and literature courses.

If you really need assessment, a few solutions have been proposed and, to a limited extent, tried out:

- *automated essay assessment* - this is not as far-fetched as it may seem, though it's not necessarily a cure-all. Automated essay assessment needs to be seeded with a large number of already-marked essays; on being given this seed, it extracts the properties of high-quality essays, and then matches new essays to those properties. There's a really good essay describing the process here: <http://mfeldstein.com/si-ways-the-edx-announcement-gets-automated-essay-grading-wrong/>²²³ Here's another article²²⁴: <http://tlt.its.psu.edu/2013/04/12/mooc-moments-essay-grading-software/>
- *task-completion* - another form of automated assessment is based on task-completion or success-based metrics. The best example of this is Codecademy. <http://www.codecademy.com/#!/exercises/0> It's a bit like programmed learning http://www.gsis.kumamoto-u.ac.jp/en/opencourses/pf/3Block/07/07-2_text.html where people can be stepped through the material soliciting active learner responses; "The extent of a learner's understanding is ascertained from what is demonstrated in the responses." In many cases, this can be supported through a form of self-assessment, using simple techniques such as flash cards and more complex techniques such as sample

²²³ <http://mfeldstein.com/si-ways-the-edx-announcement-gets-automated-essay-grading-wrong/>

²²⁴ <http://tlt.its.psu.edu/2013/04/12/mooc-moments-essay-grading-software/>

responses to questions; the participant can determine for themselves whether they passed and can move on.

- *peer assessment* - essays are graded not by professors but by other course participants. This would require that each essay be graded by a largish number of other participants, otherwise, the grading would be no better than random. How large is enough? It might be too large, especially when you account for people who grade without reading, people who grade based on poor criteria, etc. Peer grading can work really well for blog posts and discussion lists, where it can be managed with a simple thumbs-up thumbs-down metric. Here's an example: http://www.nytimes.com/2012/11/20/education/colleges-turn-to-crowd-sourcing-courses.html?_r=0²²⁵ And the fact of being graded by peers often spurs people to greater accomplishment. There's some discussion of peer grading here: ²²⁶<http://degreeoffreedom.org/moocs-and-peer-grading-1/> And here's a critique of the technique: <http://www.insidehighered.com/views/2013/03/05/essays-flaws-peer-grading-moocs>²²⁷
- *network-based grading* - in this model, individuals are not graded by means of grading individual pieces of work, but rather are graded according to network metrics; the idea is that quality work will produce quality network metrics. The model is not unlike that pioneered by Klout²²⁸ <http://klout.com/home> which counts the number of Twitter followers, Facebook likes, and similar indicators, to produce a single Klout score.

The problem with Klout is that it is simplistic and easily gamed. Nonetheless there is potential for a more fine-grained assessment to look at how ideas created by one person propagate through a network, to look at whether a person's reading recommendations have become influential, and similar less obvious measures. These can be pretty fine-grained, based on semantic analysis. Here's a simple example, of a Twitter scanner that looks for instances of bullying (obviously, something that would lower the person's score)²²⁹: <http://phys.org/news/2012-08-machines-scour-twitter-bullying.html> And here are some links to research by my colleagues at NRC on the analysis of sentiments and emotions in online postings: <http://www.umiacs.umd.edu/~saif/>²³⁰

²²⁵ http://www.nytimes.com/2012/11/20/education/colleges-turn-to-crowd-sourcing-courses.html?_r=0

²²⁶ <http://degreeoffreedom.org/moocs-and-peer-grading-1/>

²²⁷ <http://www.insidehighered.com/views/2013/03/05/essays-flaws-peer-grading-moocs>

²²⁸ <http://klout.com/home>

²²⁹ <http://phys.org/news/2012-08-machines-scour-twitter-bullying.html>

²³⁰ <http://www.umiacs.umd.edu/~saif/>

Each of the last two methods run some risks:

- the "blind-leading-the-blind" phenomenon, whereby the collection of participants in a course can elevate myths about the subject matter to the status of fact (I remember instances from my childhood, where the position of "backcatcher" became a baseball position, and "touching iron" became a foul in basketball).
- the "charlatan" phenomenon - Students not already expert in a subject matter may mistakenly believe that one of their member is an expert.

For these reasons, I have always recommended that a MOOC seek to attract not only students and novices in a discipline, but also practitioners and experts in the discipline. Such people will quite rightly gain the greatest 'authority' according to peer or assessment measures, and as a result, their actions (such as relaying an idea, passing on a link, etc.) will gain more weight, shifting the outcome of peer or network based assessment to one based more on credibility.

The difficulty lies in attracting these people, who are often very busy, to a MOOC. This is one of the benefits of scale; a very large MOOC is more likely to attract experts (and the presence of experts is more likely to increase the size of the MOOC). But experts aren't likely to attend a carefully choreographed "Intro to Victorian Literature" course; it's all very old and familiar to them. The *model* of learning needs to be changed to involve the experts.

This is what we attempted, with some success, in our connectivist MOOCs - rather than set it up as a series of lessons, we set it up as a series of discussions. The experts would participate at a high level, often interacting mostly with each other, while participants at other levels observed and were able to emulate this practice. Yes, we did provide scaffolding, to help the novices get into the flow of the discussion, but the scaffolding did not become the course.

Another model of MOOC addresses the issue by sharing the assessment.

The "distributed MOOC" is essentially a MOOC that is shared by a number of institutions (again, this was something we attempted in the earliest connectivist MOOCs). Today this is sometimes being called a 'wrapped MOOC'. The idea is that some of all of the MOOC contents are shared by members of classes from any number of institutions. Participants interact with each other, and follow online events and resources together. Each, though, is subject to individual assessment by their home institution, which may attach whatever rubric to the material they wish.

A final option is to bypass grading entirely, and let a person's outcomes stand on their own as evidence of accomplishment in the course. This is the objective of portfolio-based courses, more common in the arts and writing, but also increasingly popular in the sciences, and especially design, engineering and computing. The idea is essentially that a person presents an artifact that can be studied directly by potential employers. This artifact may or may not be subject to peer grading, which may produce a course score. But the course score is secondary to the artifact

itself. Here's a quick guide to portfolio-bases assessment²³¹
<http://www.unm.edu/~devalenz/handouts/portfolio.html>

One of the advantages of portfolio-based assessment is that it removes the ambiguity inherent in grades that result from tests and assignments. Here, for example, is an article describing how portfolio-bases assessment can help parents see directly how well their children are performing.²³²

http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=495 Portfolio-based assessment is often based on matching production to rubrics; this example²³³

<http://www.ncbi.nlm.nih.gov/pubmed/17457074> demonstrates portfolio-based assessment in medicine.

*Moncton, Canada
May 4, 2013*

²³¹ <http://www.unm.edu/~devalenz/handouts/portfolio.html>

²³² http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=495

²³³ <http://www.ncbi.nlm.nih.gov/pubmed/17457074>

MOOC – The Resurgence of Community in Online Learning

Presented (in French) as *MOOC - La résurgence de la communauté dans l'apprentissage en ligne* at le Réseau d'enseignement francophone à distance du Canada (REFAD) in Edmunston, NB, May 30, 2013. Published (in Italian) as *La rinascita delle comunità di apprendimento in rete* in the Italian Journal of Educational Technology (formerly *Tecnologie Didattiche*) 165-172 Sept 30, 2014.

In this presentation²³⁴ Stephen Downes addresses the question of how massive open online courses (MOOCs) will impact the future of distance education. The presentation considers in some detail the nature and purpose of a MOOC in contrast with traditional distance education. He argues that MOOCs represent the resurgence of community-based learning and will describe how distance education institutions will share MOOCs with each other and will supplement online interaction with community-based resources and services. The phenomenon of 'wrapped MOOCs' will be described, and Downes will outline several examples of local support for global MOOCs. The implications for the French-speaking world of distance education will be considered, and Downes will outline strategies and examples of the use of MOOCs to promote linguistic diversity.

What is a MOOC?

Thank you, it is a pleasure to be able to be here today. [slide 1 – MOOC Wordle]

My objective in this talk is to address how the massive open online course (MOOC) will impact the future of distance education, and in particular, strategies and examples of the use of MOOCs to promote cultural and linguistic diversity.

The proposition I will offer is that MOOCs give us a new way to understand learning, and hence, a new way to understand certain types of learning, such as for example learning that supports diversity in language and culture.

²³⁴ <http://www.downes.ca/presentation/317>

To be clear, my expertise is in the field of open online learning, and not in the field of cultural and linguistic diversity. So my talk can only carry the discussion a certain distance. My hope is to offer a starting point for this discussion.

And I want to be clear that when I talk about a MOOC, I am talking about a different kind of learning. Most of you will be familiar with the traditional online course, which is based on the presentation of content and information, and based on a clear curriculum which is to be learned.

And the MOOCs you may have read about in the newspaper, the online courses offered through American universities such as Harvard and Stanford and MIT, these MOOCs are also examples of traditional online learning, with content and curriculum.

My understanding of the term 'MOOC' is a bit different; it is derived from a theory of learning based on engagement and interaction within a community of practitioners, without predetermined outcomes, and without a body of knowledge that we can simply 'transfer' to the learner.

And my understanding of the term 'MOOC' is based on five years of experience developing and offering MOOCs, from the very first MOOC, "CCK08", created by George Siemens and myself in 2008, and run a total of four times in the years following, to MOOCs in personal learning environments, critical literacies, and more.

So, first I will talk about what I mean by a MOOC and expand a bit on MOOC pedagogy. Then I will talk about the outcomes of a MOOC and the purpose of offering or taking a MOOC. Then I will address the relation between MOOC and community, and finally I will make some observations and offer some examples showing how MOOCs can promote cultural and linguistic diversity.

To begin, then, with the definition: The term MOOC as is commonly known stands for 'Massive Open Online Course'. That gives us four terms: 'massive', 'open', 'online', and 'course'.

There have been numerous efforts recently to define each of these four terms, sometimes in such a way as to result in an interpretation opposite to the common understanding of the term. To some people, a MOOC may be thought of as a small, closed, and offline.

In my opinion, we should be relatively rigid in our definition of a MOOC, if for no other reason than to distinguish a MOOC from the other forms of online learning that have existed before and since, and hence to identify those aspects of quality that are unique to MOOCs. Hence, a MOOC is to my mind, defined along the following four dimensions:

Massive

Here I mean not necessarily the success of the MOOC in attracting many people, but in the design elements that make educating many people possible. And here we need to keep in mind

that to educate is to do more than merely deliver content, and more than to merely support interaction, for otherwise the movie theatre and the telephone system are, respectively, MOOCs.

My own theory of education is minimal. It is so minimal it hardly qualifies as a theory, and is almost certainly not my own: “to teach is to model and to demonstrate; to learn is to practice and reflect.”

Thus, minimally, we need an environment that supports all four of these on a massive scale. In practice, what this means is a system designed so that bottlenecks are not created in any of the four attributes: modeling, demonstration, practice, and reflection.

To offer a simple example: an important part of reflection is the capacity to perform and then discuss performance with others. If each person must perform and discuss the performance with a specific person, such as the teacher, then a bottleneck is created, because there is not enough time to allow a large number of people to perform.

Similarly, if each performance and discussion involves the entire class, the same sort of bottleneck is created. Hence, in order for a course to be massive, performance and reflection must be designed in such a way that does not require that certain people view all performances.

You may ask, why would it be necessary for a course to be massive? Indeed, this seems to run against what we know of teaching and learning, where we want smaller class sizes and personal attention from an instructor. And this is quite true, if we think of ‘massive’ in the sense of ‘mass media’ or ‘mass lectures’. These become ineffective precisely because they become impersonal.

But at the same time, if we depend on individual tutoring to propagate and promote any sort of culture, whether it be the culture of physicists or the culture of francophones, we will find progress in promoting that culture slow and expensive.

What we are attempting to repeat on a massive scale in a MOOC is not the delivery of instruction or the management of learning resources. We are trying to emulate, on a massive scale, these small-scale and personal one-to-one interactions. It is this interaction that is the most significant in learning, but also often the most important, and for a course to be truly massive, it must enable, and even *encourage*, hundreds or even thousands of these small interpersonal interactions.

Open

I have had many arguments with people over the years regarding the meaning of ‘open’, and in my opinion these arguments have most always involved the other people attempting to define ‘open’ in such a way as to make ‘open’ mean the same as ‘closed’.

There are different senses of the word ‘open’ in education. The word ‘open’ is a single word in English that corresponds to three separate words in French:

First, there is the sense of ‘open’ as in *ouvert*. This is the sense of ‘open admissions’ in education, where there are no academic barriers to admission to a course.

Second, there is the sense of ‘open’ as in *gratis*. This is the sense of ‘open access’, where there is no fee or tuition or subscription charge required in order to access a resource.

Third, there is the sense of ‘open’ as in *libre*. This is the sense of ‘open educational resource’, where a resource that one has accessed to may be reused in any way desired, without limitations.

For my own part, the meaning of ‘open’ has more to do with access to a resource, as opposed to having to do with what one can do with a resource. The definition of ‘open source software’, or ‘free software’, for example, assumes that the software is already in your possession, and defines ways you can inspect it, run it, and distribute it, without limitations.

But this definition is meaningless to a person who, for whatever reason, cannot access the software in the first place. The more common and widely understood meanings of ‘free’ and ‘open’ are broader in nature, more permissive with regard to access, and more restrictive with regard to the imposition of barriers.

In particular, something (a resource, a course, an education) is free and open if and only if:

- the resource may be read, run, consumed or played without cost or obligation. This addresses not only direct fee-for-subscription, but also enclosure, for example, the bundling of ‘free’ resources in such a way that only those who pay tuition may access them
- there are reasonable ways to share the resource or to reuse the resource, and especially to translate or format-shift the resource (but not necessarily to be able to sell or modify the resource)

Having said that, as George Siemens and I discussed the development of MOOCs in 2008, we were conscious of and communicated the fact that we were engaged in a progression of increasingly open access to aspects of education:

- first, open access to educational resources, such as texts, guides, exercises, and the like
- next, open access to curriculum, including course content and learning design
- third, open access to criteria for success, or rubrics (which could then be used by ourselves or by others to conduct assessments)
- fourth, open assessments (this was something we were not able to provide in our early courses)
- fifth open credentials

And by the term ‘open’ we very clearly intended both the aspects of access and sharing to be included; what this meant in practice was that we expected course participants not only to use course resources, curriculum, etc., but also to be involved in the design of these.

Hence, for example, before we offered CCK08, we placed the course schedule and curriculum on a wiki, where it could be edited by those who were interested in taking the course (this was a strategy adapted from the ‘Bar Camp’ school of conference organization and the EduCamp model as employed by Nancy White and Diego Leal).

It is interesting to contrast our approach to ‘open’ with the “logic model” devised by James C. Taylor and eventually adopted by OERu which preserved the openness of resources and courses, but kept closed access to assessments and credentials.

Such courses are not to my mind ‘open courses’ as a critical part of the course is held back behind a tuition barrier. Exactly the same comment could be made of ‘free’ courses that entail the purchase of a required textbook. Just because some part of a course is free or open does not entail that the course as a whole is free or open, and it is a misrepresentation to assert such.

Why make our courses open? Think of a course as like a language. If a language is closed, it dies. If people are not allowed to speak it, it dies. To enable people to genuinely participate in the culture of a discipline, whether it be physics or chemistry or political science, the content and the materials of the discipline must be open.

There is the danger that a cultural or linguistic group will retreat into itself in the face of this risk. I look, for example, at the state of publishing in communities like Finland or Sweden, and find that open access is very limited, as the publishers imagine that there is no other place for Finnish or Swedish speakers to turn. But they do turn, as we know, to open online content in English.

Online

I have noticed recently the phenomenon of ‘wrapped’ MOOCs, which postulate the use of a MOOC within the context of a traditional location-based course; the material offered by the MOOC is hence ‘wrapped’ with the trappings of a more traditional education. This is the sort of approach to MOOCs which treats them more as modern-day textbooks, rather than as courses in and of themselves.

But insofar as these wrapped MOOCs are courses, they are no longer online, and insofar as they are online, they are no longer courses. So whatever a ‘wrapped MOOC’ is, it is not a MOOC. It is (at best) a set of resources misleadingly identified as a ‘MOOC’ and then offered (or more typically, sold) as a means to supplement traditional courses.

For a MOOC to be ‘online’ entails that (and I’ll be careful with my wording here) no required element of the course is required to take place at any particular physical location.

The ‘wrapped MOOCs’ are not MOOCs because you cannot attend a wrapped MOOC without attending the in-person course; there will be aspects of the MOOC that are reserved specifically for the people who have (typically) paid tuition and are resident at some college or university, and are physically located at the appropriate campus at the appropriate time.

Just as being online is what makes it possible for these courses to be both massive and open, being located at a specific place makes the course small and closed.

But this does not mean MOOCs cannot include or allow elements of real-world interaction or activity. Indeed, the best use of a MOOC *does* entail some offline real-world activity.

For example, our original CCK08 MOOC recommended, but did not require, in-person meet-ups, for example, and these were held at various locations around the world. MOOCs such as ds106 require that a person go out into the world and take photographs (for example).

In any online course there will be a real-world dimension; what makes it an ‘online’ course is that it does not specify a particular real-world dimension. I will talk much more about this in a few minutes.

Course

Before we launched our first MOOC both George Siemens and I were involved in various activities related to free and open online learning.

George, for example, had staged a very successful online conference on Connectivism the year before. I had, meanwhile, been running my newsletter service for the educational technology community since 2001. Each of these was in its own way massive, open and online, but they were not courses.

There is obviously some overlap between ‘course’ and ‘conference’ and ‘community’, and people have since suggested that there could be (or should be) massive open online communities of practice and of course there could – but they are not MOOCs.

There is also some overlap between the concept of the ‘course’ and the ‘course package’, as in, for example, the self-paced self-study online learning packages first distributed on paper (and with audio tapes) by distance education institutions. Here, the overlap is so great, they are often misleadingly called ‘courses’ instead of ‘course packages’.

To be clear: I am very supportive of the idea of massive open online communities, and I am also supportive of the use of course packages, but the MOOC is a different entity, with its own properties and role in the environment. But a course is an event. A community is not an event. A course package is not an event.

And specifically:

- a course is bounded by a start date and an end date
- a course is cohered by some common theme or domain of discourse
- a course is a progression of ordered events related to that domain

Why insist on these? Aside, that is, from the pedantic observation that if you call something a 'course' then it ought to have the properties of a course?

My own observation is that the creation of temporary and bounded events allows for engagement between communities that would not normally associate with each other. Courses are a way of, if you will, stirring the pot. By creating a limited and self-contained event we lower the barriers to participation – you're not signing up for a lifetime commitment – and hence increasing accessibility.

In a sense, the same reason we organize learning into courses is the reason we organize text into books. Yes, simply 'reading' is useful and engaging, and widely recommended, but 'reading a book' is defined and contained. A person can commit to 'reading a book' more easily than to 'reading', especially if by 'reading' we mean something that never ends.

Hence, massive open online learning that is not bounded, does not cohere around a subject, and is not a progression of ordered events, is not a course, and outside the domain of discourse.

MOOC Pedagogy

The way we set up a MOOC is to define a six or twelve (or even thirty) week course of readings, each on a different topic, progressing through a domain of enquiry. We also hosted online seminars, many of which featured guest experts from outside the course.

But there the similarity with a traditional course ends. We do not require that people study the readings; these are optional. Rather, what we are saying through this structure is that we, the course authors, will be studying these materials. And people are welcome to come along for the ride.

What is important about a connectivist course is not the course content. Yes, there is some content -- you can't have a conversation without it -- but the content isn't the important thing. It serves merely as a catalyst, a mechanism for getting our projects, discussions and interactions off the ground. It may be useful to some people, but it isn't the end product, and we certainly do not want people to memorize it.

Let me explain why we take this approach.

Neurons

Our thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks. Knowledge, therefore, is not acquired, as though it were a thing. It is not transmitted, as though it were some type of communication. You can't 'promote' something simply by assembling course packages and sending them out into the world.

The things we learn and the things we know are literally the connections we form between neurons as a result of experience. The brain is composed of 100 billion neurons, and these form some 100 trillion connections and it is these connections that constitute everything we know, everything we believe, everything we imagine.

And while it is convenient to talk as though knowledge and beliefs are composed of sentences and concepts that we somehow acquire and store, it is more accurate -- and pedagogically more useful -- to treat learning as the formation of connections.

From the perspective of the course, what it means is that the process of taking the course is itself much more important than the content participants may happen to learn in the course. The idea of a connectivist course is that a learner is immersed within a community of practitioners and introduced to ways of doing the sorts of things practitioners do, and through that practice, becomes more similar in act, thought and values to members of that community. To learn physics, in other words, you join a community of physicists, practice physics, and thereby become like a physicist.

Language

It is, indeed, like the learning of a language. It is possible to learn a language in *theory*, by studying books, as though one would study Latin. But to learn a language fully it is essential to immerse oneself in the day-to-day activities and culture of the people who speak it.

Again, it is tempting to say that there are certain things that people learn when they learn a language, that there is some content that is essential to being a speaker of that language. The meaning of words, for example, or the conjugation of verbs. But this is misleading and wrong.

Dictionary meanings and verb conjugations are, at the very best, an abstraction of the much more complex set of practices, attitudes and beliefs common among physicists. Because it is an abstraction, such a description cannot be accurate, and may actually mislead people about what being a physicist actually entails.

A person who merely knew the content supposedly taught and tested for at a language academy would feel grossly out of place in a gathering of physicists. It's like knowing the words but not knowing the tune.

So what a connectivist course becomes is a community of educators attempting to learn how it is that they learn, with the objective of allowing them to be able to help other people learn. We are

all educators, or at least, learning to be educators, creating and promoting the (connective) practice of education by actually practicing it.

In practice connectivist teaching and learning consists of four major sorts of activities (and remember, this is just an abstraction, not a definition; just a starting point, and not 'content' to be remembered):

Aggregation

The point of offering a course at all is to provide a starting point, to provide a variety of things to read, watch or play with. There is a lot of content associated with the course, everything from relatively basic instruction to arguments and discussions to high-level interviews with experts in the field.

The course is composed not only of recommended readings but also articles, videos and recordings made by course facilitators, blog posts, images, videos and other recordings made by course participants, collected tweets from Twitter, bookmarks from Delicious, discussion posts, and whatever else we can think of.

What we have experienced after delivering a half-dozen MOOCs is that we have to tell people at the start of the course to pick and choose what they will read, watch or participate in. Again and again, we have to stress that there is no central content to the course, that each person creates their own perspective on the material by selecting what seems important to them.

Again, if we draw the comparison to learning a language, it is like telling a person to pick and choose from real books, real newspaper articles, and real conversations.

From the perspective of the course provider, what is important at this point is that there actually *be* a rich range of resources, open and freely accessible, that can be used by course participants. In any course, in any discipline, I am looking for a wide range of resources, and encouraging course participants to do the same.

The key here is diversity. This includes diversity of format: we want texts, videos, animations, games, seminars, and anything else, because people prefer to use different media. But it also includes different languages and perspectives. In *any* MOOC – and not simply MOOCs designated as French-language, it would be relevant to include French-language resources.

One of the things I have learned in learning more than one language is that each language views the world differently, represents the world differently.

Remixing

The next step is to draw connections. The idea is to associate the materials (or parts of the materials) with each other, and with materials from elsewhere.

There are different ways to associate materials -- typically we look for some sort of commonality, such as a term, reference, topic or category. Sometimes we look for a fit, as though one thing follows from another. There are no rules to association, and part of learning is to get a feel for what goes with what.

The main point here is to encourage people to keep track of this. We suggest that they keep records on their computers of all the documents they've accessed, perhaps with summaries or evaluations of the material. Or, better yet, they can keep a record online somewhere. That way they will be able to share their content with other people.

In the course we make some specific suggestions:

- Create a blog with Blogger. Go to <http://www.blogger.com> and create a new blog. Or, if you already have a blog, you can use your existing blog. You can also use Wordpress (<http://www.wordpress.com>) or any other blogging service. Each time you access some content, create a blog post.
- Create an account with del.icio.us and create a new entry for each piece of content you access.
- Take part in an online discussion. You can, for example, join a Google group and exchange thoughts with other course participants, or use the discussion forum provided in the course's online environment.
- Tweet about the item in Twitter. If you have a Twitter account, post something about the content you've accessed.
- Anything else: you can use any other service on the internet -- Flickr, Second Life, Yahoo Groups, Facebook, YouTube, anything! Use your existing accounts if you want or create a new one especially for this course. The choice is completely yours.

What we are encouraging here especially is a mixing of diverse cultures. We are not trying to create a blend, but to highlight the distinctive perspective offered by each. You can see here that an ideal MOOC *requires* participation from different societies and different linguistic groups.

People often ask whether there are any French-language MOOCs and French-language learning resources, and this is a fair question. For me, though, the deeper question is whether there is any French-language *culture* attached to existing courses.

We saw this in our connectivist MOOCs through the activities of the Spanish-speaking community, the '*connectivistas*', who would organize their own events, in their own language, online and offline, around our open online course. And their perspective became an important *part* of our online course, and Spanish ideas and culture became a part of the subject matter itself.

Repurposing

We don't want participants to simply repeat what other people have said. Learning is not simply a process of reception and filtering. It is important to create something, to actively participate in the discipline.

This is probably the hardest part of the process, and not everybody will participate at this level (we remind participants, you get out of the course what you put into it; there's no magic here).

But it is important to remember that creativity does not start from scratch. There is this myth that we stare at a blank sheet of paper, and that ideas then spring out of our heads. But it's just a myth. Nobody ever creates something from nothing. That's why we call this section 'repurpose' instead of 'create.'

The materials were aggregated and remixed online are the bricks and mortar that can be used to compose new thoughts and new understandings of the material. What thoughts? What understanding? That is what we are creating in the course.

Repurposing is often a process of *translating* – taking an idea from one culture and representing it in the forms and idioms of another culture. This may be as simple as translating a block of text into a picture, or as difficult as representing a complex idea in another language.

Part of the reason why I am presenting this talk in French is to learn French, and this process (this is now my fourth French-language presentation) has taught me more than years of classes. But the other part of the reason I am presenting this talk in French is to learn more about the subject of the presentation.

If you're thinking that this isn't really very new educational theory, you're right. It is old. It forms the core of the concept we now call 'apprenticeship', and has been formally described most recently as 'constructionism' by the people like Seymour Papert.

What this isn't is a short cut. People learn through practice, and so this practice forms the core of connectivist pedagogy.

Feeding Forward

We want participants to share their work with other people in the course, and with the world at large. Now to be clear: participants don't *have* to share. They can work completely in private, not showing anything to anybody. Sharing is and will always be their choice.

And we know, sharing in public is harder. People can see your mistakes. People can see you try things you're not comfortable with. It's hard, and it's sometimes embarrassing.

But it's better. You'll try harder. You'll think more about what you're doing. And you'll get a greater reward -- people will see what you've created and comment on it. Sometimes they will be critical, but more often they will offer support, help and praise.

But even more importantly, it helps others see the learning process, and not just the polished final result. My ambition to speak in public in French, for example, was prompted by a talk given by Doug McLeod to a national conference on learning networks. I could see that something like this can be an important step in mastering a new skill.

You know this, I don't need to tell you this, but I'll say it anyway: when you speak or write in your own language, in a public domain, about some topic or discipline, what you are saying is "my language encompasses that discipline."

It's not simply that there is a French culture, full stop. It is that French culture encompasses physics, and chemistry, and economy, and even (I'm sorry to say) political science. But more, it is to say that a *part* of the domains of physics and chemistry and political science are formed from, and informed by, French culture.

The philosophers know this well. Can you imagine philosophy without the contributions of Descartes and Pascal and Camus and Sartre and Derrida? Can you imagine philosophy without the influence of the *language* on their contributions?

The Purpose of a MOOC

Let me return to the idea of using massive open online learning to promote French language and culture.

There is a challenge inherent in the idea of saying the purpose of a MOOC is to promote culture or that the purpose of a MOOC is to promote some idea or concept. It ties into the idea that the purpose of a MOOC is to help someone learn. It is, after all, a course. But purposes are never so easily transparent.

Organizations have multiple motives when they offer MOOCs. Thus Coursera, for example, may want to support learning, but it is also a company that wants to make money at the same time. A cultural organization may want to promote an idea, but it will also have financial needs, and will soon search for business models to sustain its online course.

Organizations offer MOOCs in order to serve other objectives. Cole Campese at Penn State talks of "providing education and experimentation." Keith Devlin refers to "the true democratizing of higher education on a global scale."

But people do not take a MOOC in order to satisfy the purposes of the MOOC provider. A person does not enroll in a Coursera course because he wants Coursera to make money. Nor does a student enroll at Penn State in order to give professors a way to experiment on them.

Learning

It is tempting to say a person takes a course to learn something. But even this can be misleading. Consider what the founders of Coursera say about most students who sign up: “Their intent is to explore, find out something about the content, and move on to something else.” So says Daphne Koller.

Adding tuition fees changes the dynamic, as does adding credentials at the end of the course. Coursera has learned it can earn money charging for authentication services, which satisfies both its need to make money, and a student’s need for a certificate (though at the expense of no longer being free and open).

Many students would skip the course entirely, and proceed straight to obtaining credentials, as they do when they buy a degree from a degree mill.

It becomes clear through reflection that MOOCs serve numerous purposes, both to those who offer MOOCs, those who provide services, and those who register for or in some way ‘take’ a MOOC.

Connectivism

The original MOOC offered by George Siemens and myself had a very simple purpose at first: to explain ourselves. The topic of ‘connectivism’ had achieved wide currency, and was the subject of the online conference mentioned earlier, and yet remained the subject of considerable debate. What was it? Was it even a theory? Did it even apply to education? Was it founded on real research, or was it simply made up? We believed we had good answers to those questions, and the curriculum was designed to lead participants (and ourselves!) through a clear and articulate answering of them.

As we began to design the course (and in particular, as I began to use the gRSShopper application I had designed to support my website and newsletter) it became clearer to both of us that the purpose of the course was also to serve as an example of connectivism in practice.

After several years of describing the theory we began to feel some obligation to demonstrate it in practice. So the course design gradually began to look less and less like a traditional course, and more like a network, with a wide range of resources connected to each other and to participants. And the course became much less about acquiring content or skills, and much more about making these connections, and learning from what emerged as a result of them.

Participants

The participants in our MOOCs also demonstrated a similarly wide range of motivations.

We had several participants who were in the course for the research opportunities it offered (and people like Jenny Mackness, Frances Bell and Sui Fai John Mak have become voices in their own right in the field).

Others came with the intent to learn about connectivism, to supplement their existing studies in a masters or PhD program.

Others joined in to participate in what they saw as an event, others to make connections and extend their social network (or as it came later to be called, their ‘personal learning network’).

At least one (and maybe others) came with the specific intent of discrediting connectivism (and in passing, to call George and myself “techno-communists”).

Even if we limit our focus to what is putatively the primary function of a course, to teach, it becomes difficult to identify the purpose of a MOOC.

Much has been made of MOOC completion rates, with the suggestion that completion is in some respects tantamount to learning. However, it could be argued that enabling a person to sample a course and withdraw without having lost thousands of dollars of tuition is a success.

Moreover, different people want to learn different things: some about what connectivism is, some, how best to criticize it, some, whether it even makes sense to their own experience.

Learning, Again

And there are different senses of learning.

In one sense, to ‘learn’ is to acquire some knowledge or skill, and it is this sense of learning that is most often associated with education, and especially formal education.

But there is an equally valid sense of learning, where the objective is to achieve some outcome or complete some task, what Rogers (2006) calls “task-conscious learning”. This sort of task-focused outcome is much more common in informal learning; it is the sort of learning I do, for example, when I dip into Stack Overflow to learn how to set the value of a field before submitting an Ajax form.

It becomes clear that we cannot assess the purpose of a MOOC qua MOOC by assessing the reasons and motivations of the people taking them, nor even by assessing the reasons and motivations of those offering them.

All that can be said is that the purpose is that it is based on the idea of creating a MOOC. It is based on the idea of creating an open online course designed in such a way as to support a large (or even massive) learning community.

That is, it is the *properties* of a MOOC, and not the content *per se*, that make it worth creating.

We do not create a MOOC to *send* a message; the MOOC *is* the message. So we would not, for example, create a MOOC in order to support a culture or a community; a MOOC *is* the culture or community. A MOOC may be a very good or very poor PR device, may transmit content very

well or very poorly, may advance research a lot or not at all, all depending on who is using it, how they are using it, and why.

The MOOC as Community

Just as a language is more than the words and sentences, and a culture is more than clothing and dances, education is not merely the acquisition of new information and skills.

To become educated in a discipline is to learn the habits, patterns, ways of thinking and ways of thinking characteristic of that discipline.

Although we learn what we learn from personal experience, we usually learn what we learn from other people.

Consequently, learning is a social activity, whether we immerse ourselves into what Etienne Wenger called a community of practice (Wenger, *Communities of Practice: Learning, meaning and identity*, 1999), learn what Michael Polanyi called tacit knowledge (Polanyi, 1962), and be able to complete, as Thomas Kuhn famously summarized, the problems at the end of the chapter. (Kuhn, 1962)

Learning is a social activity, and that is why the picture of distance learning wherein each person studies from their own home, supported by a personal computer and desk videophone, is wrong.

To be sure, there is room for home study, but people, and especially children, need community as well. It is because of this that MOOCs in the future will emphasize community much more than is perhaps imagined today.

It is the creation of this community, rather than the curation or transmission of any sort of content, that constitutes the core activity of a MOOC. The content is what we call the ‘McGuffin’ – it is an object of interest, that attracts our attention, but which could be anything.

For our discussion it is relevant to focus on two major types of community of significant importance to MOOCs. Both are relevant to MOOCs, but in very different ways. One is the ‘online community’, while the other is the ‘peer community’.

Online community

The *online community* is what we might call an interest-based communities. They are formed around a topic of interest, a profession, or a domain. They are similar to Etienne Wenger’s ‘communities of practice’, though I think that my own sense of the concept may be wider than Wenger’s.

Interest based communities are collections of people who, although they may be geographically dispersed, share a common location on the internet. This location is created and defined by the shared interest people have with each other.

Now, to be clear: this shared interest may have to do with an offline interest. Indeed, most of them are. So online communities form around offline activities such as hockey or baseball, real-world pursuits such as business or biology, around hobbies and crafts, and even around a town, village or high school.

We see these everywhere. Gardeners hang out at gardenweb. Computer geeks hang out at Wired. Educational technologists have found a home in the Google+ Ed Tech group. Across the internet, thousands of topic-specific communities have been formed, some around websites, some in social networking services, some using tools like WordPress or Skype.

With today's focus on MOOCs and social networking sites (such as Facebook and Google+) the discussion of community *per se* has faded to the background. This perhaps resembles the way corresponding community networks have been swallowed and anonymized by these branded commercial services.

Online educators will find themselves building interest based communities whether they intend to do this or not, because the mechanics necessary for the creation of an online topic based community are present in the structure of almost any online course.

In order to create a online based community, one only needs a topic, a group of geographically dispersed people interested in that topic, and a means of shared communication, such as a discussion list or online chat.

What will change in the future is that online educators will better learn how to foster and nourish online communities. They will want to do this because, the greater the dedication to the community, the greater the dedication to learning, since learning is the shared experience which defines this community.

This is what connectivism brings to the table. This is what MOOCs bring to the table.

Community of Practice

The factors which contribute to a successful online community are to some degree known, though that said much more empirical data needs to be collected. But in general, one of the keys is ownership. By that, what I mean is that the members of the community play a key role in shaping the community. For a community is not a broadcast medium.

It is not a place where the organizer provides material and the members consume it. It is a shared and constructed environment, where the members along with the organizers play roughly equal roles in content creation.

Wenger's characterization is informative. Communities form around a topic of interest – the 'domain'. They engage in community activities – as he says, "members engage in joint activities

and discussions, help each other, and share information.” And they share a practice – a repertoire of resources, a vocabulary, common stories, common methodologies, common ways of approaching a problem. (Wenger, *Communities of practice: a brief introduction*, 2004)

Learning in the community of practice takes the form of what might be called ‘peer-to-peer professional development activities’. Rather than formalized learning, members help each other directly. We discovered this in Alberta when we studied how professional town managers learn: we discovered they call each other up on the telephone. (Stefanick & Lesage Jr., 2005)

In an educational context, what this means is that a lot of the learning - and learning materials - will be those constructed by the students themselves. We begin to see this with the use of discussion lists in online courses, but also in the creation of topic-based web pages (and other resources).

MOOCs – at least the way we create MOOCs – build on this. The MOOC is for us a device created in order to connect these distributed voices together, not to *create* community, not to *create* culture, but to create a place where community and culture can flourish.

Peer Community

The *peer community* by contrast almost by definition cannot be formed over the internet. These are the communities that form in our neighborhoods, at church or schools, or in the community centre, the tavern or the grocery store.

They will exist because people need a pat on the back, a (physical) shoulder to lean on, a drinking buddy, an opponent to play squash, somebody whose physical presence, for one reason or another, matters.

And they need a physical environment, which may include sports facilities, an industrial arts shop, a gym, a golf course, or even just a field with four bases and a baseball or flat sheet of ice and a puck.

They are first created through proximity, being composed of people who live in the same neighborhood or who go to the same school. Over the longer term, we may say, they are just people who meet by happenstance, and find an affinity for each other.

While online communities depend on a topic or area of interest to exist, peer communities can be topic neutral; even if members share an interest in sports or science, it is physical proximity which causes the community to exist.

Playing

While online communities are topic-based, peer communities are activity based. An online community may convene to talk hockey, while a peer community will convene to play hockey. Online community may consist of your friends. Peer community consists of your neighbours.

This creates great variety in membership. One person may be a scientist while another may be an artist. While online communities consist of geographically dispersed members, peer based learning communities exist in some particular geographical location.

A peer learning community will be that group of people attending a particular school or learning centre. People become members of the community because of a shared location, workplace, cultural background, religion, or language, and because of shared experiences in online learning.

While people in a topic based community, for example, will discuss this or that monograph or expert in the topic, people in a peer based learning community will discuss this or that institution, interface software, or community events.

Peer learning communities are vital to learning because they provide a safe environment in which to learn. A person does not feel adrift on the internet when working in a community of people facing similar needs and challenges. Though each may be pursuing a different educational goal, their overall objective and means of travel is the same, and thus they offer mutual support, encouragement, and reassurance.

Learning Communities

At university I may have studied philosophy, but like so many other university students I obtained my real education through social interaction. In my case, it was at the offices of the Gauntlet, the student newspaper, where I spent more time than I ever did in the classroom.

My most direct interaction with peer learning communities as an educator came when I was working in the Canadian north - the learning centre in Fort St. John, in northern British Columbia, or the fishers' retraining centre, a block away from the urban aboriginal training centre, fostered by the New Westminster School Division. The Sunrise Project, based in Slave Lake, Alberta. Or the South West Indian Training centres in Sioux Valley and Waywayseecappo, in rural Manitoba.

It is the sort of success that was replicated across the country with the Community Access Points. This was a project that did more than merely provide internet access, it created a common location for people interesting in technology and computers (and blogs and Facebook).

People talk of 'learning communities' but strictly speaking there is no such thing as a 'learning community' – save, perhaps, the strained and artificial creations of educational institutions that try to cram classes into collectives, creating personal relationships where none naturally exist.

Rather, people learn in communities, and what would make any given community a 'learning' community or otherwise is whether people in the community learn more or less well. A francophone contribution would consist of both support for online community as well as support for peer community.

Growth

It should be a truism today that communities are grown rather than constructed. Sharing and learning cannot be “legislated into existence.” (Dube, Bourhis, & Jacob, 2006) The desire for autonomy comes part and parcel with some of the perceived benefits of learning and growing in a community: safely, security, and privacy.

In the field of learning especially, there is a great deal of attention paid to what it is members have in common that facilitates the creation of a community – whether it be common educational needs, common age or locale, common sets of values, or even more theoretical entities, such as common objects, domains of discourse, or understandings.

The value of a community, however, and especially of a learning community, comes from the diversity in the community. Students gather around an instructor precisely because the instructor has knowledge, beliefs and opinions that the students don’t share.

They gather around each other because they each have unique experiences. Fostering a learning community is as much a matter of drawing on the differences as it is a matter of underlining the similarities.

Threats and Opportunities

There is both risk and opportunity in this model for specific cultural and linguistic groups such as the francophone community.

Provider institutions may be located anywhere. MOOCs serve a global audience. We are seeing this trend develop already. Even today, I see course announcements posted almost daily, on new MOOCs rather from individual universities or via EdX or Coursera. It is now possible to take a course on almost anything from almost anywhere in the world.

The risk is of course the same as is created by any mass media, that the largest culture will come to dominate social and political institutions by weight of number and prevalence on mass media. And this is in fact what we have seen in the area of MOOCs. The language of instruction has been until recent years almost exclusively English.

Francophone Communities

One of the few francophone MOOCs, and probably the best-known, was the MooC ITyPA (Internet : Tout Y est Pour Apprendre) offered predominately through l’École Centrale de

Nantes²³⁵ (<http://www.itypa.mooc.fr/node/29>) and Thot Cursus (www.cursus.edu), a french-speaking website dedicated to education and digital culture.

Another francophone MOOC was the recently completed "ABC Gestion de Projet".²³⁶ <http://www.educavox.fr/innovation/pedagogie/article/quatre-semaines-dans-un-mooc>

The School of Law at the Sorbonne is offering a MOOC called « Sorbonne droit » on the mechanisms of organization and operation of businesses, a six week course starting in September.²³⁷ <http://www.e-cavej.org/5/73/le-cavej-mooc-sorbonne-droit.html>

The only university currently offering MOOC in French through Coursera is the Ecole polytechnique fédérale de Lausanne. The course introduces students to Java programming in French.²³⁸ (www.coursera.org/epfl).

With my colleagues at the University of Moncton, I will be participating in the creation of a French-language MOOC on Open Educational Resources, to be offered in cooperation with the OIF, next fall.

Francophone peer communities active in global MOOCs ensure that even in Anglophone MOOCs, a francophone community and contribution is present. But potential students are now faced with a wide range of open online educational opportunities. My own web site, mooc.ca, lists hundreds, maybe thousands, of open online courses.

It is not enough to offer courses and programs online in French, in my opinion. The French language and culture belongs in all courses and communities, even those that are predominately English.

Mosaic

The MOOCs George Siemens and I have designed and developed were explicitly designed to support participation from a mosaic of cultures. Other, more traditional, MOOCs make it more difficult, but the key to participation in these is to *convert* a static one-language presentation-mode course into a thriving multilingual and multicultural community.

²³⁵ <http://www.itypa.mooc.fr/node/29>

²³⁶ <http://www.educavox.fr/innovation/pedagogie/article/quatre-semaines-dans-un-mooc>

²³⁷ <http://www.e-cavej.org/5/73/le-cavej-mooc-sorbonne-droit.html>

²³⁸ www.coursera.org/epfl

We see this more widely in other online courses through the ‘meet-up’. A good example of this is the Denver Francophone Group.²³⁹ <http://www.meetup.com/The-Denver-Francophone-Group/> Or the Austin French meetup club.²⁴⁰ <http://www.meetup.com/austinfrenchlanguageclub/>

It seems so little. What is being done to support these groups? What resources are available, what online courses in the French language?

Why is this important, particularly in the context of fostering language and culture?

It is worth noting that theorists of both professional and social networks speak of one’s interactions within the community as a process of building, or creating, one’s own identity.

Wenger, for example, writes, “Having a sense of identity is a crucial aspect of learning in organizations. Consider the annual computer drop at a semiconductor company that designs both analog and digital circuits. The computer drop became a ritual by which the analog community asserted its identity. Once a year, their hero would climb the highest building on the company’s campus and drop a computer, to the great satisfaction of his peers in the analog gang. The corporate world is full of these displays of identity, which manifest themselves in the jargon people use, the clothes they wear, and the remarks they make.” (Wenger, 1998)

Identity

And meanwhile, danah boyd, studying the social community, writes, “The dynamics of identity production play out visibly on MySpace. Profiles are digital bodies, public displays of identity where people can explore impression management. Because the digital world requires people to write themselves into being, profiles provide an opportunity to craft the intended expression through language, imagery and media. Explicit reaction to their online presence offers valuable feedback. The goal is to look cool and receive peer validation. Of course, because imagery can be staged, it is often difficult to tell if photos are a representation of behaviors or a representation of them.” (boyd, 2006)

In both of these we are seeing aspects of the same phenomenon. To learn is not to acquire or to accumulate, but rather, to develop or to grow. The process of learning is a process of becoming, a process of developing one’s own self.

We have defined three domains of learning: the individual learner, the online community, and the peer community.

²³⁹ <http://www.meetup.com/The-Denver-Francophone-Group/>

²⁴⁰ <http://www.meetup.com/austinfrenchlanguageclub/>

Recent discussions of MOOCs have focused almost exclusively on the online community, with almost no discussion of the individual learner, and no discussion peer community. But to my mind over time all three elements will be seen to be equally important.

At university, I became not so much a philosopher, though that was my formal education, but rather, a journalist, which is the community I became a part of.

Immersion

MOOCs are communities in which learners can immerse themselves and grow into something new. Previous experience suggests that these will be places where they can create and where they can project – not “serious games” but “modding communities”, not “reading groups” but “fan fiction”, not “educational simulations” but “LAN parties”.

We might also define three key *roles* in online learning: the student, the instructor, and the facilitator. The ‘instructor’ is the person responsible for the online community, while the ‘facilitator’ is the person responsible for the peer community.

Of course, the ‘instructor’ and the ‘facilitator’ are abstracts. We think of them as one person, but in fact these roles are fulfilled by teams of people working together to orchestrate the experience of community.

The talk of ‘star instructors’ without reference to the wider facilitation is as nonsensical as talking about ‘movie stars’ as being the entire film industry, without regard to directors, camera operators, distributors and movie theatre managers.

The ‘star’ is yet another McGuffin – of no great importance, but some candy designed to attract us to the event.

In traditional education, the two communities exist as a single entity. The same institution which produces the online instruction is also the institution attended by the student. For example, if I say I am taking a course from the University of Calgary, what I mean is that the course instruction is being delivered by the University of Calgary, and also that the University of Calgary provides the facilities where I receive that course instruction.

Provider

In the future, host and provider institutions will increasingly be different institutions. One example of this is course brokering, wherein the course I am taking may have been developed by, and even instructed by, a University of Calgary instructor, but is being delivered at Red Deer College. Thus, when I take the course, I use Red Deer's classrooms, computers, and facilities even though the course is a University of Calgary course.

The recent MOOCs offered by companies like Coursera and Udacity have commercialized course brokering. They take a course offered by one university and make it available to other institutions to host in on-campus peer communities.

Of course, this is a model that the K-12 community has employed for any number of years. It is common to see a single course taught from one location and delivered to other locations by means such as video conferencing and interactive environments.

And, one would expect the same phenomenon to extend into the French-language community, to see local support offered in French-language communities for participation in online courses offered in a variety of languages at a variety of locations around the world.

So, things are changing. The francophone world is taking up the potential of MOOCs.²⁴¹ <http://cursus.edu/dossiers-articles/articles/19487/2013-annee-des-moocs-francais/>

We read from people like Mario Asselin a call for open online French-language learning.²⁴² http://quebec.huffingtonpost.ca/mario-asselin/gratuite-universite_b_2475352.html?just_reloaded=1

Discourse

But I would ask, with equal relevance, where is the French-language community itself? Where will I see the French-language contribution to physics and philosophy, botany and political science? It will not be enough simply to author content and offer courses. The place for French is in the middle of these domains, in discourse and discussion on a global stage.

Yes, content and courses are necessary. But what is needed more than anything is French-language participation in the discourse itself, that idea that, for any online course, any online community, the French culture and language has a place there, belongs there, and is necessarily a part of that course and that community.

*Edmunston, Canada
June 3, 2013*

²⁴¹ <http://cursus.edu/dossiers-articles/articles/19487/2013-annee-des-moocs-francais/>

²⁴² http://quebec.huffingtonpost.ca/mario-asselin/gratuite-universite_b_2475352.html?just_reloaded=1

What's Ours

As it was purchasing Tumblr, Yahoo was also quietly making changes to the Flickr photo sharing service. Flickr has been one of Yahoo's few success stories recently, and this was the first major revision to the site in a number of years.

The change came without warning, it dramatically changed the look at feel of the site, it changed the emphasis from sharing and community to photo browsing, and it upset a lot of people.

Like [Jenny Mackness](#)²⁴³, I've been a member of the site since the beginning, have become a 'pro' (ie., 'paid') member, and have thousands upon thousands of photos stored on the site. And my issue with the changes are similar to hers: it's like hanging too many paintings on a wall in an art gallery, and 'Collections' no longer show on the opening Flickr page.

And most importantly, "the worst thing about these changes is that they have decreased and diminished my sense of ownership over my own photos, since I no longer have a choice about how they should be displayed" It's not as bad as Google+, which has been "auto-enhancing" (ie., wrecking) my photos, but it's bad enough.

And she adds, "What Flickr hasn't seemed to recognize is that they have 'meddled' with my identity." This was the part [I thought](#)²⁴⁴ she got exactly right.

But Alan Levine [responds](#)²⁴⁵: "I disagree- Jenny gets a lesson that third party sites are not 'ours'. If they do their job well it has that sensation."

And he has a point, of course. Spaces like Flickr and Facebook and Google+ and Tumblr belong to large corporations who offer us certain services in exchange for the right to monetize our creativity and attention. From time to time they will allow us to pay for extensions to that privilege, which is how I can pay Flickr for 'pro' membership and Google for 100 gig of 'cloud' space.

And of course, these spaces are not ours, which is what in turn motivates things like the [Domain of One's Own](#)²⁴⁶ project, which exists thanks in no small part to Levine's own efforts. In the past

²⁴³ <http://jennymackness.wordpress.com/2013/05/31/whose-flickr-is-it/>

²⁴⁴ <https://twitter.com/Downes/status/341326527134310400>

²⁴⁵ <https://twitter.com/cogdog/status/341335029009506304>

²⁴⁶ <http://academics.umw.edu/dtlt/2012/08/28/documenting-a-domain-of-ones-own/>

I've supported the idea, and I still do, because, as we have just seen, these large corporations that give us a place to put our stuff are fickle.

That said, I have no illusion that hosting my own domain and server and all the rest of it will free from such fecklessness. It simply moves it back a level.

For example, the ISP on which I hosted my own server has been purchased three times since I started with them (which is how I find myself a [SoftLayer](#)²⁴⁷ customer without even trying). Everything about my service (and most importantly, the Linux configuration support, which has long since vanished) has changed.

At home, I found myself viewing advertisements [inserted](#)²⁴⁸ into my web stream by my internet service provider (which also admitted to [traffic-shaping](#)²⁴⁹ and of course bandwidth limits). Though I don't think it does this any more (I'm not sure, because I bolted from the service as soon as I could) I get the same sense of my personal space being violated.

And of course there's the wireless internet access industry, a collection of companies that have proven manifestly [unable to resist](#)²⁵⁰ no-cancellation policies and excessive roaming fees, and the platforms on which smartphones run, which enforce monopolies like the iTunes store or Google Play. Having iTunes [deleting your music](#)²⁵¹ or Google Play [banning updates](#)²⁵² certainly feels like a violation.

Even if I were to construct my own internet backbone and manufacture my own computers, our economy is so interlinked that fickle behaviour on the part of one corporation or another (perhaps the power company, perhaps the government) will intrude on my space. Because, in the end, everything I own, everything I create, everything I *see*, is obtained from, and at the discretion of, corporations and service providers.

This is not sour grapes; it's just a fact. It's no more or no less a fact that that I buy my food from restaurants and grocery stores, my clothing from [Mark's Work Wearhouse](#)²⁵³, my water from the

²⁴⁷ <http://en.wikipedia.org/wiki/SoftLayer>

²⁴⁸ <http://www.michaelgeist.ca/content/view/3679/125/>

²⁴⁹ <http://www.markevanstech.com/2007/04/13/rogers-its-bandwidth-management/>

²⁵⁰ <http://www.michaelgeist.ca/content/view/6862/125/>

²⁵¹ <http://forums.macrumors.com/showthread.php?t=394843>

²⁵² <http://www.dialaphone.co.uk/blog/2013/04/30/apps-banned-from-bypassing-google-play-updates/>

²⁵³ <http://www.marks.com/>

City of Moncton and my gas from [Enbridge](#)²⁵⁴. It would be ridiculous and futile to attempt to provide all these things for myself; it makes much more sense to do what I do well, get paid for it, and purchase these services from others.

But with these purchases and exchanges of services, I have come over time to have certain expectations. Indeed, it is impossible to build a reliable network of goods and services if these expectations are not met. I do *not* expect my food to poison me, I do *not* expect the power or gas to stop functioning for no good reason, and I would consider it an *affront* if the City came along and said it was rezoning my property and neighbourhood to heavy industrial.

No, I don't *own* any of these things, but they all taken together form part and parcel of my life, my livelihood, and yes, even my identity.

So Jenny Mackness is not wrong to complain about sudden and unexpected changes in service delivery, not least in one she pays for, but also one in which she exchanges other value (such as her creativity and attention) for services. There's no reason why web services should be any different in this way from the newspaper or the gas company.

We need to become more clear about this. More and more of our digital world is moving into the cloud. Software we used to buy and install, like Photoshop, [is now a service](#)²⁵⁵. That's fine (if expensive) if we can control our software. But if we start getting upgrades without being asked, and if our computers and other tools suddenly start performing in erratic and unexpected ways, or if we suddenly lose features (like Google Reader, or anything useful in Apple iMovie), then the loss of control we feel is real.

The software and digital content industries as a whole will have to be very careful. They have already tricked people into believing they are purchasing 'licenses' and not actual products, even when those products are shrink-wrapped and stored on DVDs. This resulted in significant push-back as people lost the right to copy, trade or resell their purchased product. But at least if the product changed they could keep the old one.

Now they will not even give us the product itself. They'll change it whenever they want. Terms of service, cost increases, usage caps - we've already seen that the industry will do whatever it wants if it feels it can wring a few extra dollars out of the service. The users - as we well know - are not the customers. The only people corporations answer to are the shareholders.

That's why we need to push back. These services are beginning to play an essential role in our lives. Just as the gas company cannot by law turn off the heat in winter, just as banks by law

²⁵⁴ <http://naturalgasnb.com/CMS/en/home/whatisnaturalgas/theenvironment/environmentalimpact.aspx>

²⁵⁵ <http://lifehacker.com/what-photoshops-move-to-the-cloud-actually-means-for-y-494225482>

cannot charge more than a certain rate of interest, just as telephone companies by law must allow you to keep your number when you switch service, there is a growing need for an understanding that people demand, and must receive, a certain consistency in online environments.

Last week I linked to an article launching a campaign for a "[people's terms of service](#)."²⁵⁶ I commented, "Some of the terms that would be highlighted are laudable - the idea that such agreements could not be arbitrarily changed, that producer data collection practices would be transparent, that companies would respect user copyright, and that industry standard data security measures would be in place."

But I didn't like the mechanism, and I noted that companies will simply ignore these provisions. What might be needed I think is something rather stronger. So, here's the message to Flickr, the new owners of Tumblr, and the other vendors making a lot of money hosting our stuff and providing services online: if you can't behave, people will push back. Because they *do* feel their sense of identity is being infringed upon.

This sort of dissonance is real. How do you think the people who purchase Joe Fresh felt when they saw their favorite shirt among the wreckage of the [Bangladesh sweatshop](#)²⁵⁷? Companies can get away with a lot. But when they start messing with people's sense of self, they are starting to tread dangerous ground. It might be something as simple as the way we are able to display our images online. But I think we know, intuitively, that if we can't even control *that*, then there's a lot more serious stuff behind the scenes we can't sway at all, and it begins to gnaw at us, bit by bit.

*Moncton, Canada
June 3, 2013*

²⁵⁶ <http://cyberlaw.stanford.edu/blog/2013/05/fighting-facebook-campaign-people%E2%80%99s-terms-service>

²⁵⁷ <http://www.cbc.ca/news/business/story/2013/05/02/business-loblaw-mimran.html>

What I Wish I Had Learned in School

School for me was not really a pleasant experience. Oh, sure, it had its moments, but it was a struggle. On the one hand, we had the typical high school curriculum, which was about as exciting as paste, and on the other hand, we had the Darwinian social environment red in metaphorical tooth and claw. I didn't fit in either academically or socially, and when I got out of there, it was like a great weight had been lifted from me.

So it's hard to know exactly how to respond to this request: *"The idea is pretty simple, we think that as the world becomes more complex, the formal education system is having a harder and harder time keeping up. Plenty of people are spending plenty of cycles looking for answers, but what we really want to do is ask a more fundamental question, 'What do you wish you had learned in school?' We think that by collecting people's personal stories, we can start to develop useful insights and perhaps even come to a few conclusions."*

I guess my first, cynical, response to the question would be, "I wish I had learned how to escape."

I read today about things like [Class Afloat](http://www.classafloat.com/)²⁵⁸, which is a high school taught on a tall ship, or the Bronx [High School of Science](http://en.wikipedia.org/wiki/The_Bronx_High_School_of_Science)²⁵⁹, a so-called magnet school dedicated to (not surprisingly) science, or the [Perpich Center](http://www.mcae.k12.mn.us/ahs/ahs.html)²⁶⁰ for Arts Education, and so on and on and on, and I wonder, why couldn't I have been afforded any of those opportunities. But that's not what happens when you grow up in a small farming community in rural Ontario.

Certainly, I tried to make the most of my high school education, doing things like Reach for the Top and model parliament (where I was the leader (and only member) of the Fascism Reform Party) and band and drama and all the rest of it. I reveled in projects I could design for myself; the teachers gave me quite a bit of latitude, and I would write to embassies and government departments and such for raw materials.

What would I have done in an environment where I could program computers and build robots and write blogs and fly quadcopters? Or maybe my school would have been one of those where all this was tantalizingly out of reach, my internet access a small-town trickle of connectivity, the movie-making and the podcasting and robot-fighting something that people at Gloucester and Nepean and Lisgar did, not us out in the country at Osgoode Township (though

²⁵⁸ <http://www.classafloat.com/>

²⁵⁹ http://en.wikipedia.org/wiki/The_Bronx_High_School_of_Science

²⁶⁰ <http://www.mcae.k12.mn.us/ahs/ahs.html>

now Metcalfe is an increasingly-nice suburb of Ottawa, and we might not have been able to afford to live there).

So anyhow, would I have liked to have learned all those things? Well, in the 70s, definitely yes - coming out of high school in 1979 already knowing to program a computer or build a robot would have been a huge advantage. Today, though, it might seem more like vocational education, kind of the 21st century analogue to the courses where the industrial arts kids learned to work on electrical circuits and car motors (you know - the advanced tech of the 1930s).

If I were in school today I'd probably be wanting to learn about carbon fibres and nanotubes and capacitors, genetic creation and manipulation, bioengineering, and all that sort of stuff. I'm not sure - I only know that some of this stuff exists, I'm not sure exactly where it's at and what you can build (or grow) in a high school science lab, but it would be fun to be 15 again and exploring these frontiers. Except that... I hated being 15, and I could wait to get out of there.

I wish we had had a track team at high school. We didn't have individual sports; we had only teams - football, soccer, hockey - and you had to make the team, which meant being able to get in the practice, which didn't work well for people like me, partially because I delivered papers every day and didn't have time for that, and partially because I really didn't like these other people very much (especially in places like soccer fields and locker rooms). But I could run, especially long distances - I once clocked a mile in less than five minutes (4:45 to be precise). But there was only soccer, and I rarely got to play.

Maybe "what I wish I had learned in high school" should have a category for stuff I actually learned, but wish I hadn't. Like the survival skills I needed to get through classes and after-school activities, for example, the reptilian flight-or-flight response that follows me to this day, the alternating thick and thin skin needed to ignore remarks but be keenly aware of when they might escalate into some sort of physical attack.

Maybe what I wish I had learned in high school would be those smooth social skills that the best of us in society display. Watching DARPA's Kathleen Fisher [on video last week](http://www.downes.ca/post/60594)²⁶¹, for example, I was struck by her geniality and the comfortable manner in which she worked the room and traversed some difficult material. I'm sure we all know those people, they are the ones who always seem to be at ease, comfortable with themselves, able to reach out and really communicate with other people. But you don't see that a whole lot in the smaller and less well-off communities; it feels like the sort of thing you have to be in a position of advantage to be able to develop. But maybe I'm wrong about that.

²⁶¹ <http://www.downes.ca/post/60594>

I don't think people understand the difference between growing up on the inside and growing up on the outside; certainly people who are on the inside don't see it at all, and the people on the outside sometimes sense it, but what can they do?

Take smoking, for example. That's another thing I guess I wish I hadn't learned in high school (though to be quite honest, I guess I actually learned it working at the racetrack in grades 11 and 12, serving drinks in the box lounge). Smoking is a poor person's disease. The people on the inside, for whatever reason, grew up in an environment where you just didn't smoke, but all the working people smoked. You pretty much had to. That was in the 70s and 80s, of course; I'm sure that's all changed now. But there are plenty of other examples like that.

I don't regret not being born into a home where I always knew I would be going to Yale and teaching at MIT or maybe Stanford. I would have become a different person. It was enough my parents gave me the expectation that I would go to university, and the tools that would help me succeed. And I've always known since those days that what distinguished me from them was not some aspect of my education, nor my innate intelligence, nor my work ethic nor my compassion and dedication, no, none of that, nothing but simple facts of birth and social standing.

Yes, I sometimes wish I had learned to escape - but if I had ever gotten that wish, I would never have seen life on the outside, and never sensed the urgency of doing something once I got through university and was in a position to do some good in the world. So I guess that's not what I wish for.

I guess I wish I had learned integral calculus. Yeah, that would have made all the difference.

*Moncton, Canada
June 14, 2013*

Connectivism and the Primal Scream

Keith Brennan writes a well-thought-out and evenly expressed criticism of connectivism as it is applied in connectivist MOOCs. It's worth taking the time to read it in full before proceeding with this post: [here it is](#)²⁶².

His argument is based on his experiences in cMOOCs and he says it's best described like this:

To learn in a cMOOC you need to connect.

To connect in a cMOOC you need to learn.

There's a *lot* built into that simple formulation, and I'll take the time to unpack some of it in this post. But to frame my own response, let's consider the analogous state of affairs in traditional education:

To learn in traditional education you need to be able to read.

To be able to read in traditional education you need to learn.

This is why the provision of education, especially adult education, in less well-served regions is such a challenge. It's what I faced personally as a classroom instructor teaching critical thinking in the north. How can you get your students to do *anything* if they can't understand the points the author expresses on a page?

Well, you can't, of course, and consequently I spent a significant proportion of my time in these communities teaching people how to read - not how to pronounce the letters and say sentences aloud, but how to read in the sense of understanding what the author was trying to say and how he or she was supporting, explaining or defining it. It wasn't easy and we spent a lot of time at it.

Now Brennan's argument is about a lot more than this, and we'll move carefully through his observations. But it's important to understand from the outset that connectivism - at least the way I do it - is to a certain degree a response to the same set of problems faced by students in traditional education.

Motivation

From this introduction Brennan moves to a discussion of motivation. This is the real beginning of the argument; everything to this point simply sets the stage.

He writes,

²⁶² http://www.hybridpedagogy.com/Journal/files/Guide_to_the_MOOC_Novice.html

"At the core of what I think Connectivism might be missing is this idea: Motivation is the engine of effort, and the sense of self is the ticking heart of motivation... One of the most important aspects of the learning experience is motivation. And one of the most important aspects of motivation is our sense of our own capability, and our sense that the environment we are learning in will allow us to achieve."

Interestingly - and, given all that I've written on the subject, a bit ironically - he cites Albert Bandura on the relation between motivation and self-efficacy.

"Self-efficacy is one of Bandura's ideas, and is, he says, the greatest predictor of student success in learning. It's something Connectivist theory (but not all Connectivist practitioners) largely ignores. Self-efficacy is our belief that a task is achievable by us, and that the environment in which we are working will allow us to achieve that task. It's that ticking heart that measures out the motivation in us."

Let's take the following points as points of agreement: self-motivation is important to learning, and a sense of self-efficacy is important to learning. In short, in order to learn, you have to *want* to do it, and you have to *think you can* do it. Beyond that, though, I think we can identify some points of departure.

In particular, when Brennan writes about the relation between motivation and learning, he is thinking of a particular sense of 'learning'. Because, all things considered, motivation and self-efficacy are neither necessary nor sufficient in order to support learning. A child, placing his hand in the fire, learns not to do it again, so we have learning without either motivation or self-efficacy. A passenger in a crashing airplane reads a pilot's manual trying to avert disaster; he is certainly motivated, and may even think he can succeed, but here we have a case where both motivation and self-efficacy may not be sufficient.

Why is this important? The sort of learning Bandura's observations apply to is the sort of learning where there is a body of knowledge that is clearly defined and set before the person in a circumstance where, as often as not, the person might be doing something else, or want to be doing something else. When learning isn't something the person isn't naturally or by circumstance driven to do, we need to appeal to motivation.

And in such appeals, one factor - but hardly the sole factor, nor possibly even the most important factor - is self-efficacy. Certainly, thinking you *can* do something plays a major role in your desire to do it, but also, you have to feel that it is *worth* doing. Indeed, if something is *really* worth doing, you might try to do it even if you're not sure you can.

Brennan writes,

Self-efficacy is, in part, the story students tell themselves: I am going to succeed. I am going to fail. This is beyond, beneath, or within me. But as educators, we help shape that

script. We set tasks that are challenging, and achievable, and we create environments that allow achievement to happen.

In connectivism (at least the way I do it) we recognize that the teacher plays a much smaller role in 'shaping the story' than is usually supposed, and much of what the teacher does to 'shape the story' actually defeats the ultimate purpose.

Very rarely does a teacher simply set out a task that the student can simply choose to do or not do. When teachers set tasks, there is almost invariably an element of coercion involved - you need to do such-and-such a task in order to pass, in order to earn a credential, in order to get a job. Teachers create motivation by creating artificial sense of urgency - the contemporary form of teaching people to swim by tossing them into the water. Whether the student *wants* to learn is irrelevant.

Entire structures of courses, programs and schools of study have been built around this basic coercive premise, so much so that we can almost pretend that the student is engaged in the entire enterprise completely voluntarily. We even see the (facile) notion of 'learning contracts' that supposedly express this sense of voluntary participation, but which as contracts are negotiated between two very unequal parties. And the more the teacher sets the task - however well-intentioned - the less self-efficacy the student feels.

In connectivism, participation is presumed from the outset to be voluntary. Students bring their own motivation with them. We don't create conditions of coercion, so we don't have to employ a variety of motivational techniques to compensate for a student's loss of self-efficacy and motivation in an environment of compulsory learning.

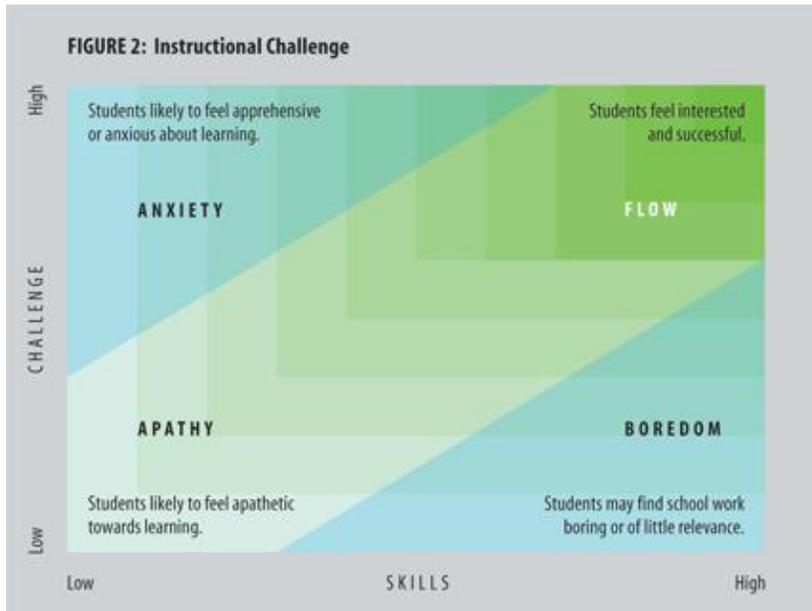
I have often argued, you only need to motivate people when you're trying to get them to do something they don't want to do. Think how much damage is done to the cause of learning when education *begins* with that premise. My attitude is that the objective of an educational system is to help people do what they want to do, for themselves, rather than a mechanism that gets people to do what we want them to do, for us.

Cognitive Load

Brennan gives us the standard definition of cognitive load:

Cognitive load is the amount of information we can take in, process and retain. It's probably fixed, and not that large (between 3 and 9 pieces of information, depending on who you listen to, and how difficult or new the task is).

The concept - at least the way Brennan uses it - is related to the associated concept of [flow](#)²⁶³:



Both concepts have to do with the relation between the difficulty of the task (and in some cases the relevance of the task) and the outcome. Hence we read in Brennan, " [Too high](#) a Cognitive load decreases a student's sense of self-efficacy. Too low triggers a boredom threshold that tends to stimulate disengagement."²⁶⁴

The two concepts are not exactly the same; there are some important differences that don't really come out in Brennan's presentation, and they play out in educational theory differently. But we can let that pass, and focus on the next step, which (Brennan characterizes as) the relationship between prior knowledge and cognitive load.

Novices in an area have high cognitive loads, and, typically low Prior Knowledge (the idea that what we already know has a powerful determining effect on what we can learn, and how quickly). This is key. It is variable amongst students generally. And it must be flexibly designed for, or we risk failure. Cognitive load and Prior Knowledge are why we tend to teach absolute novices using techniques and contexts that are different to the ones we deploy for absolute experts, and why we avoid exposing novices to too much chaos.

In the criticism of connectivism, this argument has two tangible consequences:

²⁶³ <http://usergeneratededucation.wordpress.com/2011/01/12/flow-a-measure-of-student-engagement/>

²⁶⁴ http://cogtech.usc.edu/publications/clark_yin_yang.pdf

First is the suggestion that connectivist courses throw novices into the work at too high a level; there is no scaffolding to help novices learn to follow the information being presented at such complexity and high rates of speed.

Game designers and user experience interface artists know this principles well. One of the major reasons for Google's success is that novices can enter into the system in a very gentle way: they can begin with search, and bit by bit, be drawn into Google's much more extensive ecosystem. *Civilization* (the game) works in the same way - at the 'novice' level you have advisors to help you, and you can succeed without mastering trade routes and religions, but at the higher levels (like 'deity') you have to manage all aspects of the game.

The problem is, if the educators do this, you lose the ability to do it for yourself. There's nothing more frustrating for me as a learner to find that either (a) the educational designer has thought too little of me, and made the learning too slow and dull, or (b) the designer didn't think of me at all, and didn't provide any introductory guides or starter kits. I've encountered both online, and frequently.

At a certain point in a complex world a learner has to be able to set the bar for him or herself, to set the challenges appropriately, and find the relevant resources. The more an instructional designer does it for you, the less able you are to do it for yourself, and ultimately, the less useful the resource would be. That's why it's better to present the learner with a range of resources around a topic, and have them pick the ones most suited to them, rather than to try to pick the best resource (or to arrange the subject matter into tiers, or any of the usual forms of structured instruction provided in traditional learning).

If Google tried to organize the internet into some sort of 'difficulty level' for you, the results would be endlessly frustrating. The presumption that the instructor or the learning designer is more likely to be able to select material and work at the right level is difficulty is probably misplaced. Every minute spent by any person either bored to tears or frustrated to tears in a traditional classroom is evidence of that fact.

The second consequence is that, in a connectivist environment, there are many distractions (such as the need to navigate all the social software) that add to the cognitive load, making it more difficult even to learn simple elements. "In Connectivism, the distributed platforms, the networked nature of learning, the requirements for metacognition, digital literacy, the new tools and techniques add significantly to the novice's cognitive load."

This has less to do with the 'flow' picture of cognitive load, and more with the idea that there is a limited to the amount of information any person can process, and that therefore any information

that is not 'on task' is in a certain sense wasted. This is why we are advised²⁶⁵ (for example) not to add distracting graphics or background music to educational materials. We can think by analogy of how distracting signs and displays on a highway make it harder to focus on driving safely, especially if they begin intruding into our perspective.

But if this thesis were completely true, there would never be any word problems in mathematics, engineering or physics, because the cognitive load involved in reading the text, comprehending the worlds, and translating them into the theorems being learned are extraneous to the theorems themselves, and hence, make them more difficult to learn.

But we know we need word problems, for two reasons: first, theorems in mathematics, engineering or physics do not exist independently of *context*, and a full understanding of them involves understanding them as they are applied; and second, learning a theorem isn't simply a matter of remembering it, it is a matter of *recognizing* when and where it is appropriately applied.

Even the most basic elements of what we learn *exist in a network*, and therefore their placement in a network, for example, in a social network environment, isn't an accidental and incidental feature of their presentation, irrelevant to their being learned, but is rather an *essential feature* of the concept, without which it cannot be fully learned at all.

To put the same point even more bluntly - part of what a concept P means is what *P means on Twitter*, and if you cannot access it on Twitter, then you are unable to fully comprehend what it means. Learning to navigate the social media, the language, the conventions and even the idiosyncrasies of a discipline are all part of what it is to learn a discipline; connectivism recognizes this and explicitly accounts for this, while traditional education barely recognizes the concept of context-sensitivity at all.

The Competent Self

Brennan then turns to four ways educators encourage or undermine self-efficacy. The first two are related:

1. Physical and psychological responses - We reassure students, so that their fears, anxieties and uncertainties are, largely, allayed.
2. Encouragement and persuasion - Good educators provide encouragement, and verbal persuasion, which can increase a student's self-efficacy.

These, writes Brennan, are almost completely ignored in connectivism: "Classic Connectivism disregards the theories involved here (constructivism, behaviourism, cognitivism) as outmoded.

²⁶⁵ <http://cdp.sagepub.com/content/19/3/143.short>

Educators should be absent, or at most facilitators and not teachers. And peer rewards, or the rewards of social engagement, are not considered to be the primary drivers of motivation."

First of all, as I have so often argued, connectivism is not constructivism - there is no obligation for the educator to be absent, and he or she should feel free to 'teach', to 'preach', or make their presence felt in the course as much as they wish, the only limitation being that this presence is *as a participant* and not an authority figure.

But more to the point, if people come to depend in general on educators, and only educators, for reassurance and encouragement, then they will be sorely unprepared for life. One of the ways a connectivist course becomes massive is that it *eliminates the psychological dependence on the instructor* and encourages participants to learn to *depend on each other* for these necessary supports.

The next two points speaks to the role of the educator in the course:

3. Vicarious experience - our sense of our own capability increases when we see people we consider similar to ourselves achieve at a task
4. Mastery experiences - Mastery experiences provide students with the greatest boost to self-efficacy they will encounter in an educational context.

Actually, I think our own sense of capability increases when we see *anyone* complete the task. This first tells the student that it *can* be done, and equally important, offers important clues regarding *how* it can be done.

Traditional educators talk about the value of the [worked example](#)²⁶⁶, and you can see its application here. It's reassurance that the solution isn't found by magic, that an application of knowledge and method can result in success, and that success has a recognizable form.

This is a role of an educator that I have emphasized a lot - the idea that the role of the educator is to *model and demonstrate*. The idea here is that the student experiences vicariously success in the field by watching the expert do it, and eventually to do it themselves.

The danger here, though, writes Brennan, is that what the expert does may be too difficult for the novice to master:

"Participants may self-blame, feel inadequate, or possibly, in extreme cases, undergo aspects of depression. Design for experts, and invite novices, and watch novices get shot

²⁶⁶ http://en.wikipedia.org/wiki/Worked-example_effect

out of the sky. The *burning wreckage*²⁶⁷ you can see trailing off the back as they quit is self-esteem."

Agreed. But if you hide the expert performance entirely, you never see the point of the exercise in the first place. You have to *show the whole spectrum*, from novice performance, to expert performance. It's a lot like a Karate tournament or highland dance competition, where they start with the young children first thing in the morning and continue through the day finishing with the adult championships at a gala in the evening.

But that's *exactly what a connectivist course* looks like, and exactly what a traditional course *does not look like*. In a connectivist course, you can see everyone from beginner to master, and all stages in between. When you perform, you perform for everyone. You don't set yourself up to compare yourself only with expert performances, or only peer performances.

And, most importantly, you don't 'design for experts' or 'design for novices'. You create an environment in which all levels can participate with equal facility, where people at lower levels can learn from those who are more experienced, and where people of almost all experience levels (and not just the instructors and experts) can provide examples, advice and encouragement to those just learning.

Novices and Success

Brennan summarizes:

Connectivism, as a theory, generally does not provide support for, or recognition of, prior knowledge, cognitive load, or novice issues, or recognise particular novice needs, even though individual connectivists sometimes do, or try to. It fails to structure experiences to follow that moving target. Its lens does not focus. Difference is blurred, and opportunity is lost. People fail.

The core idea being expressed here is that novices need support of various sorts, and because connectivism does not provide this, or even acknowledge the need, people fail.

Yes, people fail. But I think connectivism actually does a better job supporting the progression from novice to expert stage than traditional learning.

Here's why: *connectivism does not treat people as novices their entire lives*.

At a certain point, we want people to stop being novices, and to start being self-motivated and self-managing learners. They're going to have to do this in a world where knowledge changes

²⁶⁷ http://cogtech.usc.edu/publications/clark_yin_yang.pdf

rapidly, where it's less and less certain, and where the availability of formal education or support in an environment can't be counted on.

Ideally, they should stop being novices some time before tenth birthday. They should stop being novices somewhere around the time they are able to acquire the ability to read, infer, navigate and socialize.

The idea that we are treating university students and adults as 'novices' is, to my mind, appalling. If a grown adult still requires a teacher to provide encouragement and support, positive role models, to select resources and scaffold learning experiences, then that speaks to the substantial failure of the traditional system of education. To my mind, it is as astonishing a failure as it would be if adults expected their teachers to read the lessons aloud to them.

Failure

This brings us to the final topic, the underlying thread that has permeated this discussion, and yet gone undiscussed: the concept of failure.

Just what *is* it to 'fail' in a connectivist course? Maybe the problem with Brennan's criticism as a whole is that he is defining forms of success and failure that are not inherent to connectivism at all.

Let's look at his examples of failure:

- *The failure to be a node, or the failure to connect* - "All of my peers are nodes! Look at them connect! Everyone else seems to be succeeding! Why am I not?... Some people aren't actually nodes. If I type a 140-character message into Twitter and don't know how to use a hashtag, can anyone really hear me tweet?"

It's hard to imagine how a person sees other people connecting without being connected to them themselves, but let's leave that internal inconsistency aside and treat this as a general problem. And as a general problem, it's faced by every person in the world *whether or not they are learning in a connectivist course*.

We can read²⁶⁸, for example, that one of the best predictors of success at an elite university (after getting in) is one's ability to form and work in study groups. *Connecting is a necessity* in every form of education, but while in traditional education this is learned only tacitly, if at all, in connectivism it is addressed explicitly.

- *Too high cognitive load, and no assurance, or anxiety relieving measures*. "New to Connectivism and social media? Here's 300 tweets, 700 Google+ posts in your inbox, 70

²⁶⁸ <http://entertolearn.byu.edu/content/study-groups-secret-success>

blog posts, and a Java-enabled seminar software environment you'll need to calibrate your laptop to access (on a MAC we call that an adventure!), using totally unfamiliar software! Say hello to the LMS too! First task due yesterday, create a digital artefact using a piece of software you've never encountered!"

When I look out my window I see several hundred trees (and a crow). I can pick out the one dead tree, the one white spruce, the tree closest to me, the tree about to fall down, and the crow. Why is this significant? Well it's not, really, except to point out that an inability to deal with a large number of things is an *artificial and self-inflicted* incapacity (albeit one your traditional teachers may have helped you acquire).

The rational response to so much data is, first, *don't read it all*, and second, *don't think yourself a failure* if you haven't. The idea is to pick and choose, to *focus*. This is the first skill in any discipline - it is what helps us understand what is important and what is just noise. Children learn this, but somehow, by the time we're adult educators, it has been trained out of us.

Every single connectivist course I have ever offered has begin with advice about what to do with so many posts and messages. It's the first thing you read.

It isn't failure if you don't read everything, if you don't do everything. That's a very industrialist consumption-based model of learning (and of the world generally). Success or failure is found in the quality of the experiences you do choose to have, and are reflected in your own assessment of yourself, not against some arbitrary and impossible external standard.

- Decentralise the learning process to a degree where clarity and structure require skills you don't have to access the information you need. "Four different platforms! The information is out there! Somewhere! Choose your own path to it! In Connectivism, no one can hear you scream! (If you don't tweet it with #helpImdrowninginthefreedom)"

Cities have the same problem. The people are located in different buildings, all over the place, and you can't buy gas and engine oil in the same place you buy perfume (well, except at Wal*Mart).

The more pressing question is why your desire for 'clarity and structure' require that things be more or less centralized, and already organized for you. the *very first* lesson of Taoism is that all such organization is artificial and contrived, so you may as well learn to seek and master organizing the world for yourself.

Four different platforms? At least they're all in a computer - can you imagine if you had to navigate the intricacies of a cafeteria, a gymnasium, a scientific laboratory and a theatre all in the same day! Oh, wait...

More seriously - an inability to navigate across different websites is a form of literacy, analogous to being able to live in a city, go from classroom to classroom in a school, or read English as

written by four different authors. Except that - you don't *have* to navigate four platforms. Connectivism is about *choice*. If it really bothers you, pick one platform and stick with it.

The presumption here is that there is some McGuffin, 'the information', that is Out There Somewhere. But that presumption is mistaken. Each person is expected to have a different experience, which may be as broad or as narrow as they choose, and whatever 'structure and clarity' they achieve is based on that experience - and not somehow 'wrong' if it doesn't encompass all perspectives on all platforms.

- Tasks that are too complex with no guidance in how to achieve them. “Everyones a node! Connect to learn! Setup your blog, crosspost to Google+ and socially curate to Diigo while using Audacity to post a podcast to Tumblr! That’s updated on Twitter! I’ve done my bit. Now learn!”

This may resemble Jim Groom's ds106 course, but not a connectivist course.

The problem here is one of mistaking a *menu* for an *obligation*. Sure, in traditional education, we've acquired this sense that anything set before us by an instructor is a requirement (and will be on the test, otherwise, why would it be presented?) but in a connectivist course such items are, at best, *suggestions*.

Brennan says, "if we unlearn the hard fought lessons of the past we fail our learner." But it would be easier all around, *especially* for the learners, if the learners would unlearn the 'lessons' inflicted on them by teachers who through they were doing good, but who were leaving their students woefully unable to cope with a 21st century world.

Connectivist Literacy

Brennan to the contrary notwithstanding, we *have* thought about these things, written about them, even offered a course (Critical Literacies) in them, to explore how connectivist literacies can be developed employing connectivist methodologies.

"Connectivism’s assumptions -- we are all digitally literate nodes, knowledge is in the network, we are all motivated, have good learning strategies, and information sifting abilities, and can cope with multi-platform information streams, in an environment where instruction is at most facilitative, but probably absent -- mean that the sensitive design of experience that engages prior knowledge, motivation, confidence level, and student need is absent, and not possible."

These aren't assumptions. They are literacies. They are to connectivism what reading and writing and 'rithmetic are to a traditional content-based education.

And - in my view at least - a connectivist approach is uniquely able to develop them in people *as* literacies.

The key is to stop thinking of these as *content to be mastered*, and to start thinking them as *skills to be practiced*. There isn't some point of success or failure in any of these, you just do them - like talking to your friends, like walking from class to class - until it becomes second nature.

Indeed, so long as you think of knowledge and learning as something to be *acquired* and *measured* and *tested* - instead of practiced and lived and experienced - you will be dissatisfied with connectivist learning. And - for that matter - there's probably a limit to how far you can advance in traditional education as well, because (to my experience) *everybody* who achieves a high degree of expertise in a field has advanced well beyond the idea that it's just information and skills and things to learn. Kind of like Dreyfus and Dreyfus said.

Anyhow, that's all for today.

*Moncton, Canada
July 25, 2013*

The Role of Open Educational Resources in Personal Learning

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Abstract

In this paper two perspectives of open educational resource are considered, one from the perspective of a person who owns or produces the resource, and the other from the perspective of the person who requires access to the resource. The former model, it is argued, does not take into account the various dimensions of openness, and is vulnerable to various ways of closing access to resources.

In an effort to address the barriers to open education, a new form of online learning, the ‘Massive Open Online Course’, was developed by the author and his colleagues. The MOOC is designed according to the principles of self-organizing networks of entities. A series of MOOC-based courses have been offered since 2008. An observation of these courses shows widespread production and use of open educational resources within these courses.

It is suggested that by understanding the use of open educational resources as ‘words’ in a language used by participants in a MOOC to communicate with each other we can explain the role of OERs in personal learning. A course offered as a MOOC instantiates the properties of a self-organizing network and as a result is resistant to the forces that limit the effectiveness of traditional OERs.

The Idea of Openness

The central argument of this paper can be summarized as follows: learning and cognition take place in a network, and networks need to be open in order to function, therefore, learning and cognition need to be open.

To the former point we address the major tenets of the pedagogical theory known as connectivism (Siemens, 2004). “Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories... The starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning

to individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed.”

As Siemens writes, “A network can simply be defined as connections between entities. Computer networks, power grids, and social networks all function on the simple principle that people, groups, systems, nodes, entities can be connected to create an integrated whole.” Connectivism as it is typically presented encompasses the description of learning as it occurs in two major types of network. First, it describes the conditions conducive to learning in a synaptic network, as is characteristic of the human brain. (LeDoux, 2002) Second, it describes the conditions conducive to learning in a social network, as is characteristic of a learning community. (Watts, 2003)

To the latter point we address the need of entities in the network to be able to communicate in order for the network to function. A network is not simply a system in which the entities are joined or related in some way. For a connection to exist, it must be possible for a change of state in one entity to result in, or have as a consequence, a change of state in another entity. In a simple case, for example a Hopfield net, one entity in the network may exhibit an excitatory or inhibitory effect on the other. (Hopfield & Tank, 1986)

Openness, then, is in the first instance the capacity of one entity in a network to change or influence the state of another entity in the network. However, in the fields of content management and online learning, the concepts of ‘open’ and ‘open educational resources’ have had a much wider connotation.

Much of what is written with respect to open content and open systems is derived from Richard M. Stallman’s original definition of what he called “free software” as four elements (Stallman, 1994):

- Freedom to run the software
- Freedom to study the software
- Freedom to distribute the software
- Freedom to modify the software.

This is a definition that has carried over into the open educational resources (OER) movement. David Wiley’s original open content license, for example, as based on “the premise that non-software content – specifically educational content – should be developed and shared in a spirit similar to that of free and open software.” (Wiley, 2003)

Definitions based on Stallman’s four freedoms, however, may be open to challenge. When people talk about open source software they talk about openness and freedom from the perspective of the person who already has the software, who already has it in their hands and wants to do things with it, like read it, share it, or modify it. And anything that restricts what they

do with it is considered an infringement on the freedom. It gives the user the flexibility to do what they need in order to get work done.” (The Debian Foundation, 1997)

The difference between these two models comes to a head with respect to commercial use. According to some, a license that prohibits the sale of software is a limitation on its freedom. The Debian Foundation, for example, argues, “There is no restriction on distributing, or even selling, the software. This last point, which allows the software to be sold for money seems to go against the whole idea of free software. It is actually one of its strengths. Since the license allows free redistribution, once one person gets a copy they can distribute it themselves. They can even try to sell it.” (The Debian Foundation, 1997)

But what of people who do not have the software, and need the software? The four-freedoms definition of freedom begins to change because, from the perspective of someone who does not have the software, freedom would be open access *to* the software with no restrictions. Anything that infringes on that open access is a restriction on their freedom.

In my contribution to an Open Educational Resources debate hosted by UNESCO I described an alternative approach to open licensing. (Downes, 2011) I described my own content license, which was in turn derived from the licensing practices of George Reese, the creator of the Nightmare MUD Library. The licensing arrangements for MudLibs were created, not with coders and programmers in mind, but with MUD players. As George Reese writes,

“Since all drivers except DGD were derived from LPMud 3.0, they all require a copyright at least as strict as that one, which basically states that you can use the server as you like, so long as you do not make a profit off of its use. Most current servers have much more strict and explicitly copyrights. On top of that, many of the mudlibs which exist also have similar copyrights. To require money of your players is therefore a violation of international copyright laws. DGD requires licensing through a third party company.” (Reese, 1998)

As I noted in the UNESCO debate, Lars Pensjö, who wrote the original LPMud (Bartle, 2003, p. 11) in 1989, wanted to ensure free access to MUDs for the players. As the original MUDOS license stated, “Permission is granted to extend and modify the source code provided subject to the restriction that the source code may not be used in any way whatsoever for monetary gain.” (mwiley, 1999) As the discussion makes clear, this is not a prohibition against the recovery of reasonable expenses. It is intended mostly as a prohibition against one person using another person’s work for profit.

The importance of this has become clearer 20 years later with when we look at what has become of the online multi-player role-playing environment. The license conditions weren’t respected. As Richard Tew (Donky) writes, “That’s the thing with releasing mudlibs, people make a few trivial changes and then decide that it has changed so much that it is effectively something completely new.” (Tew, 2010) After appropriating the idea and (often) the source code, the

commercial sector came to dominate the world of multi-player role-playing games. Today, if you want to play, you pay.

It is not necessary to establish that one or the other of these interpretations is ‘correct’ in order to establish that there are different meanings of the term “open” depending on one’s perspective. So the question is, what is the correct perspective to be looking at, or looking at the issue from, in the context of learning, and online learning in particular?

The Challenge: Making Things Unfree

As noted above, it may be argued that the non-commercial condition attached to an open license means that the content isn’t really free. But from another perspective, it can be argued that if someone is charging money for access, then the content is not free, neither free in the sense that it does not have to be paid for, nor free in the sense of being able to use it as one wishes.

A common response from the defenders of commercial use has always been that the content is always available for free somewhere. For example, D’Arcy Norman can be found arguing that commercial use “does nothing to push content into commercial exclusivity, and I would argue gives a relief valve against it – the original content is always available for use, re-use, etc... without having to give a penny to the opportunistic monetizer(s).” (Norman, 2010) So it doesn’t matter if, say, Penguin sells a copy of *Beowulf* because *Beowulf* is in the public domain and readers can always get it for free somewhere else.

Against this response it may be observed that when there is commercial use of free resources there is significant motivation to prohibit or prevent the free use of these resources. So even if theoretically it is the case that there could be free copies of *Beowulf*, the commercial publishers of *Beowulf* may devise mechanisms to prevent or discourage access to the free version. As a result, an entire infrastructure has been created, drawing on community support to foster the creation of open content, and then leveraging market mechanisms to commercialize this content.

For example, my own study of models of sustainable open educational resources and what I found was that most of the projects that produce open educational resources are publishing projects. (Downes, 2007) The resources are coming out of either commercial publishing houses, or universities that traditionally feed materials into commercial publishing houses, or foundations. And the different models for the sustainability of open educational resources were all based around that paradigm.

So for example there is the endowment model. This model is used by the Stanford Encyclopedia of Philosophy. A sum of money is invested and draws interest, and the earning from interest are used to publish the resource. (Loy, 2009) Another is the membership model, where fees for membership in a consortium are charged, and members participate in the creation of the resource.

Another model is the donation model. We see Wikipedia using the donation model. National Public Radio uses the donation model. And again, it's based on this idea that there will be some organization that does some publishing.

But even if you have these free resources hanging around commercial publishers still manage to get you to pay for them. And there's a variety of ways they do this:

But when people pay for memberships they usually expect privileges, and that typically means some sort of privileged access.

- *Lock-in* - If a user is locked into a certain technology, such as, say, iTunes, or the Kindle, then the material which would normally be available for free is, within that environment, only available at a price.
- *High bar* - Stringent but unnecessary conditions make free distribution unaffordable. For example, a service might require that learning object metadata, which has 87 or so fields, *must* be filled in for it to be registered. The commercial publisher can afford to hire someone to sit there and fill metadata fields, but free content providers don't have that kind of resource..
- *Flooding* - Another way of making users access the commercial content rather than the free content is 'flooding'. This can be observed by doing a search at Google for information on popular topics of learning – language learning, for example. The listings are flooded with search-engine optimized commercial resources, to the point that any free resources have been pushed far down the list.
- *Conversion* – Providers give users a free resource, and then convert it to a commercial resource, and then get them to pay for it, because they've become dependent on the free resource and can't bear to be without it.

There can be disagreement with the details of this characterization, but it becomes evident from the proliferation of such practices that there is an entire economy of free, of commercial, of publishing, of subscriptions, a whole infrastructure which is surrounding the idea of putatively open educational content. It's open educational content "to a degree, with restrictions, if circumstances permit, using certain technologies." Otherwise we're strangled in the whole – well, as the picture goes, the interests of industrialization, work, images, etc.

And that's the story of open educational resources. Understanding the numerous other dimensions of openness also helps us understand additional ways the resources can be unfree.

Dimensions of Openness

In our work in connectivist courses, George Siemens and I have depicted the progression of openness in three major stages:

- First of all, openness in educational resources
- Secondly, open courses, and then
- Third, an as yet unrealized openness, openness in assessment. (Downes, Notes on open government, open data and open pedagogies , 2011)

This is similar to the five stage ‘logic model’ proposed by James C. Taylor (Taylor, Open Courseware Futures: Creating a Parallel Universe, 2007) and later adopted by the Open Educational Resources University (OERu) (Day, Kerr, Mackintosh, McGreal, Stacey, & Taylor, 2011):

- Learners access courses based on OER
- Open academic support by ‘Academic Volunteers International’
- Open assessment by participating institutions
- Participating members grant credit for courses
- Students awarded credible degree or credential

In these two models we see three distinct forms of openness: of access to learning resources, of instruction, and of assessment and credentialing. Sir John Daniel, the former president of the United Kingdom’s Open University, describing ‘dimensions’ of openness, refers to the openness as related to openness of access or admission to a university program, open resources, and then openness in being able to determine your own educational progression, your own course of studies. (Daniel, 2011)

Additional literature brings to bear discussion of additional forms of openness. In order to understand the importance of openness to networks in education, we may identify these systematically.

Open Curriculum – The list of topics to be studied, or competencies to be acquired, or methodology by which learning is to be achieved, may be a more or less open resource. Arguably, MIT’s OpenCourseWare was as much an advance in open curriculum as it was open courseware, as it now became evident to all just what MIT students studied in order to obtain MIT degrees. The South African Curriculum Wiki, no longer extant, was an early example of this. (Richardson, 2005)

Open Admission – Open admission, as documented above, is a process whereby a person is not required to offer evidence of previous academic standing in order to qualify for access to a learning opportunity.

Open Standards – In education there’s a variety of standards intended to facilitate how we describe, how we discover, and how we reuse educational resources. The central of these is called learning object metadata, or LOM, created originally by the Aviation Industry Computer-Based Training Committee (AICC), and then passed on by Instructional Management Systems,

or IMS, and then standardized under IEEE, and then really standardized under the ISO standards organizations.

But there are other standards as well: Learning Design, Common Cartridge, and Learning Tools Interoperability. The United States military, under the auspices of Advanced Distributed Learning (ADL) came out with the Sharable Courseware Object Reference Model (SCORM), which is the standard in commercial online learning.

In some cases these standards are what typically be called ‘open’, while in others they are more proprietary. IMS, for example, supports itself with a membership system. Members that pay fees have access to the standards ahead of their formal release. IEEE by contrast posted the Learning Object Metadata standard openly while it was still being discussed and decided upon, but charges a fee for the finished product.

Open Source Software – Open Source Software has had a significant impact on online learning. Widely known is Moodle, a PHP-based open source learning management system created originally by Martin Dougiamas with the support of thousands of volunteer programmers. Moodle is small, portable, and useful for colleges and schools. By contrast, the open source Sakai was built by a consortium of universities as part of MIT’s Open Knowledge Initiative and is a large suite of enterprise software.

Other open source education projects include Elgg, which is an open source social network software for learning, Atutor, LAMS (Learning Activity Management System), School Tools, and more types of software are available at Schoolforge or Eduforge

Open source software is released under one or another type of open source license. To overgeneralize, one sort of open source license, such as the Berkeley Software Distribution, allows open source software to be integrated into commercial while the other, such as the GNU General Public License, does not. In practice, open source software licensing is a thicket of options and permutations.

Open Educational Resources – More specific to most of the papers in this volume are the open educational resource projects themselves. Here we list just a few of them. One of the earlier ones, and certainly the most famous, most heavily promoted, is MIT’s Open Courseware project (OCW). Something that’s also received a lot of attention recently (because he appeared on the TED videos) is the Khan Academy, which is a whole series of YouTube videos on mathematics, physics, and similar science and technology subjects. MERLOT is a project that was created by a consortium of North American educational institutions.

These are just a few of dozens of projects that have been set up specifically to create educational materials for distribution for free (or some version of free) to people around the world.

The licensing of these resources, in order to make them available for use and reuse, was based on the GNU Free Documentation License (GFDL), which covered documentation associated with open source software. The GFDL did not allow for some types of restrictions, most notably, the ‘non-commercial’ restriction.

More recently we’ve had Creative Commons, and Creative Commons is now arguably the dominant mechanism for licensing open educational resources, and indeed, for licensing open content of any sort. Devised by lawyer Lawrence Lessig, Creative Commons provides the licensor – the person who owns the material – with a series of choices allowing the author “some rights reserved. These include the non-commercial clause, an attribution requirement, share-alike, and a no-derivatives clause.

By far the most popular form of Creative Commons license is the one that I use, “Creative Commons By Non-Commercial Share-Alike,” which means that I want to be attributed, I don’t want the content to be used commercially, and I want it to be shared under the same license that it was obtained under.

Open Teaching or Tutoring – Open teaching is the provision of live access to teaching activities or resources. As access to a TED video, for example, might be access to the resource, being able to watch a TED talk live – whether in person or online – is access to open teaching (though, of course, TED learning opportunities are manifestly *not* open). Open tutoring extends this idea to include openness of *interactivity* with the instructor or tutor.

MOOC Design Principles

It is evident from the discussion thus far that though much of the attention focused around open learning has been on the publication of open educational resources, there are different perspectives and a range of types of openness to consider.

The concept of the Massive Open Online Course, or MOOC, was designed with these wider considerations in mind. It therefore focused not on the narrow question of licensing and distribution of course materials, but on the wider question of promoting and preserving openness across all dimensions.

In order to best accomplish, the MOOC is designed as a *network*, rather than as a linear progression of subject materials or curriculum. In this way, all aspects of the course are distributed across all participants, rather than centralized into a single location.

A network is composed of a set of *entities* (also sometimes called ‘nodes’ or ‘vertices’). Entities form *connections* (also called ‘edges’) with each other. The internet, for example, is a network, and network course design parallels that of the internet. (Spinelli & Figueiredo, 2010) The ‘vertice’ and ‘edge’ terminology is from graph theory, from which the course design is also derived. (Diestel, 2010, p. 2) Networks of connected entities can arguably perform cognitive

functions, and correspondingly ‘connectionist’ computer systems are intended to emulate the functioning of a ‘neural network’ such as the human brain. (Stufflebeam, 2011)

These principles have been described in previous work (Downes, Learning Networks: Theory and Practice, 2005) and may be summarized here as follows:

- *decentralization* – connections are organized into the form of a mesh, rather than the hub and spokes more characteristic of a hierarchy
- *distribution* – the representation of concepts or ideas is not contained within a single node, but is distributed across a number of nodes
- *disintermediation* – direct communication from node to node is possible and encouraged
- *disaggregation* – nodes should be defined as the smallest reasonable component, rather than being bundled or packaged
- *dis-integration* – nodes in a network are not ‘components’ of one another, and are not depicted as being organized as components of a ‘system’
- *democratization* – nodes are autonomous, and a diversity of node type and state is expected and encouraged, membership and communications in the network are open, and meaning is generated interactively
- *dynamism* – the network is a fluid, changing entity and demonstrated *plasticity* - the ability to create new nodes and connections
- *desegregation* – though the network may exhibit clustering, there is nonetheless a continuity across the network, as opposed to a strictly modular design

Employing these principles an organization was developed that created several types of entities: persons (i.e., people registered for the course), authors (i.e., creators of learning resources), posts (entities created by course authors), links (entities created by persons and authors), files (audio, video or slide multimedia) and events.

The course proceeds by means of seeding the network gradually through time with posts, encouraging persons to connect with these resources and with each other through the creation of posts and links, connecting participants in real time *via* hosted events, such as online lectures by guest speakers, and the creation and capturing of multimedia files.

That the MOOC, as described, constitutes a network structure becomes evidence through analysis of the structure of the MOOC. Illustrated below, for example, is the structure of the initial seeding provided by course facilitators:

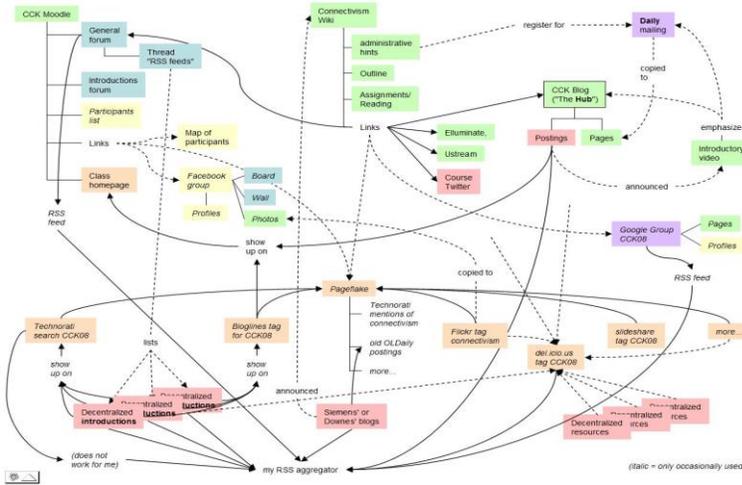


Figure 1. Network structure of a MOOC. X28's New Blog, 6 September, 2008. (Melcher, 2008)

The deployment of a MOOC as a learning environment has been documented in numerous places elsewhere (Kop, Fournier, & Mak, 2011); what is important in this enquiry is the role being played by open educational resources in the course structure to produce the dimensions of openness described above.

Evidence of OER Production and Use

There is significant evidence extant that one of the primary activities of participation in a MOOC is the use, reuse, and production of open educational resources, so much so that the pedagogy of the MOOC is also referred to as the “pedagogy of abundance.” (Kop, Fournier, & Mak, 2011)

As demonstrated in Kop and Fournier’s analysis of a recent MOOC, ‘Personal Learning Environments, Knowledge and Networks (PLENK) 2010’, participants submitted numerous blog posts, and their discussions around these posts took the form of a network, as may be seen here:

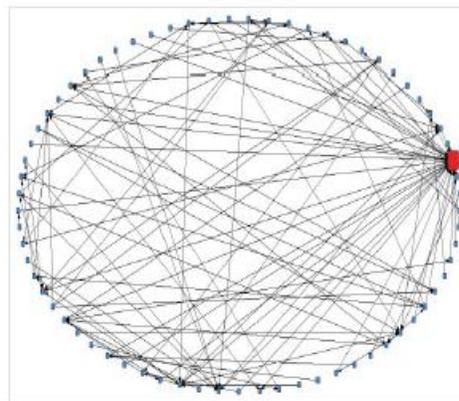
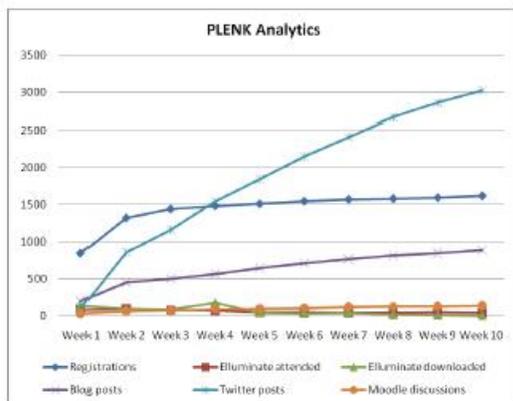


Figure 2. PLENK participation rates. Figure 3. Connections between participants in a discussion. (Kop & Fournier, 2010)

In the more recent #Change11 MOOC (<http://change.mooc.ca>) we see even greater levels of creating and communicative activity. The chart below measures cumulatively the number of feeds, the number of blog posts, and the number of Twitter posts made by course participants, as well as the level of participation by sign-ups and newsletter subscriptions:

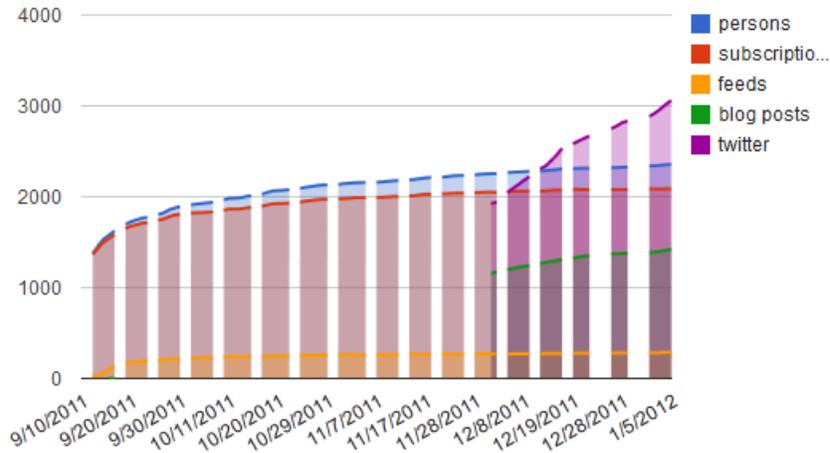


Figure 4. #Change11 participation rates. See https://docs.google.com/spreadsheet/ccc?key=0Aoxh9wWYk71HdGtEYXFfXzdON3Fvb3h2WHFJbTBxMkE&hl=en_US#gid=3

Note that day-by-day counting of blog and Twitter posts started in early December, and by that time had already numbered in the thousands, including 1422 blog posts. As the course progressed through to January, the numbers of each steadily increased, showing a continued engagement and production of course artifacts.

Preliminary analysis of the #Change11 suggests that, as in the case of previous MOOCs, a substantial number of external learning resources are being referenced and linked. Half way through the #Change11 course, for example, the participants in their 286 feeds had linked to 5,150 media artifacts, as evidenced from this course environment printout:



Figure 5. #Change11 media artifacts.

Participants are reading each other's blog posts, both directly and through the email newsletter distribution. Through the newsletter, we can count the number of times readers followed through to the blog post itself, and as of the half-way point we note more than 30 posts having more than 100 click-throughs each (see <http://change.mooc.ca/popular.htm>).

It is important to take note of two salient features of this activity. First, *none* of it is assigned reading, nor does any of it appear in the course syllabus. Contents in the MOOC software are, as noted above, separated between what administrators provide to seed the course, and what participants contribute themselves. And second, *all* of it is hosted, and obtained from, sources external to the MOOC environment, which – because it is openly accessible – makes it all open educational resources.

Adding up these numbers (noting that they do not include comments on blog posts or material referenced in those comments, nor materials read or referenced in venues outside the course environment) and not including Twitter posts gives us 6472 open educational resources implicated in the course thus far. Granted, a significant number of these (and especially of the media resources) will be trivial. The picture is nonetheless one of significant dynamic creation and exchange of open educational resources.

The PLENK course and #Change11 course are not anomalies. Other MOOC courses also result in the creation and exchange of artifacts in this way. It will be the subject of further research to identify factors impacting the nature and rate of artifact creation and exchange. But it's clear it can be significant.

Jim Groom's 'Distributed Storytelling 106' course uses the tag '#ds106', and a Google search on '#ds106' (as of this writing) yields more than 200,000 results. The 'assignments' page, where students' work is aggregated from external sites where it has been posted, contains almost 7,000 items (699 pages of ten items each as of this writing; <http://ds106.us/page/699/>)

It is clear from these examples that when a course is designed according to network principles, and hence as a MOOC, the role of open educational resources changes dramatically. Far from

being published materials created by academics and authors and merely consumed by course participants, they begin to become the way in which these course participants *communicate with each other*, and as a consequence, their use and exchange numbers not in the single digits, but rather in the hundreds or thousands.

The (Open) Language of Learning

And this very point, this very distinction is the distinction between what we might say are old and new depictions of open educational resources, or educational resources generally.

The picture presented above of open educational resources as things that are published, things that are presented by publishers in a very formal manner, probably charged-for and commercial, is the old static coherent linear picture of the world. It's not the model that we want to use for open educational resources, because it's not applicable in a network learning environment.

And that brings us back to what we want to think about in open educational resources. Open Educational Resources are a network of words that we use in whatever vocabulary we're using to conduct whatever activity it is that we're doing or that we're undertaking. They are the signals that we send to each other in our network.

If that is so, then what openness means in the context of open educational resources is whatever is meant by openness in a network, where we think of openness in a network as the sending of these signals back and forth, the sending of these resources back and forth.

We need to think about open educational resources not as content but as language. We need to stop treating open educational resources or online resources generally as though they were content like books, magazines, articles, etc., because the people who actually use them – the students and very often the creators – have moved far beyond that. Each one of these things is a word, if you will, in this very large post-linguistic vocabulary. They are now language. They are not composed of language, they *are* language.

And that's why they need to be open.

Suppose that everyday words that people wanted to use like, say, 'cat' – to pick a word at random – were *owned* by, say, Coca-Cola. Now we have allowed a certain limited ownership of words in our society, but by and large we can't own words. We can't own the use of words to create expression. And even more particularly, imagine if we had to pay royalties to use certain letters. So you could only use the letter 'o' if you paid money to Ford. You could only use the letter 'i' if you paid money to Apple. The effectiveness of language would be significantly impaired.

And the thesis here is that the effectiveness of language would be impaired in exactly the same way the effectiveness of communication would be impaired, in exactly the same way the effectiveness of a network is impaired if you break down or block the links between entities.

The use of open resources in a MOOC is clearly that of a language, where the resources are the ‘words’ sent back and forth between participants in a dense network of communication. It becomes clear that measures that would impair the flow of these ‘words’ would damage this communication, and render mute the MOOC itself.

We can, indeed, map the openness of a MOOC – which is open by design – to the various dimensions of openness mapped above.

In a MOOC, the curriculum is the construction of the MOOC itself – the lists of links to individual feeds, posts and links, and other resources shared in the course. Opening these lists makes the structure of the MOOC transparent, and also allows people to participate in the MOOC without ever actually registering in the MOOC (this is a dimension of MOOC participation that has yet to be explored) and creates what amounts to open admission.

The MOOC is built using open standards to facilitate communication and content sharing. Because there is a great diversity of platforms and languages in a MOOC, common aggregation formats are used, and the deployment of open source software (gRSShopper for PLENK and #Change11, WordPress for DS106) allows new standards or extensions to be implemented as needed. They also allow participants to create their own MOOC applications or interfaces.

The most obvious dimension of openness in a MOOC is the sharing of open educational resources, but it’s important to recognize that the facilitators, by participating in this network of interactions, open their instruction as well. They do this by interacting bilaterally or with a group with participants in the MOOC, and by creating recordings or broadcasts of these interactions so they may be shared with other participants.

Finally, by virtue of its structure and its sharing of resources in a network environment, a MOOC is resistant to the sort of enclosure that afflicts traditional OER publishing.

Because there is no single environment, and because the MOOC consists essentially of a network of connections between autonomous entities, there is no mechanism for creating lock-in. Any technology employed by a person engaged in a MOOC could be easily exchanged for another supporting the same standards; any content provided by a participant could be exchanged for another.

The network structure of a MOOC also resists the privileging of certain content with high-bar qualifications needed to enter the network. Any participant in the network may contribute content, and as communications may be direct from person to person, there is no intermediating structure to impose a high bar.

Similarly, the flooding of search results and other centralized points of access is no longer an effective strategy for commercial media. Communications are exchanges of content *between the participants*, and not passive access of media from a centralized repository or store. Hence, there

is no list to be flooded, and no mechanism to impose undesired content into the perspective or point of view of the participant.

Finally, the means for conversion are minimal. A MOOC isn't a single entity on which one can become dependent, it isn't located in a single place and doesn't require a key piece of technology. Consequently, there is no means to force a person to pay for access to a MOOC, or any component of a MOOC.

Understanding open educational resources as though they were words in a language used to facilitate communications between participants in a network should revise our understanding of what it means to be open, and what it means to support open educational resources. It is clear, from this perspective at least, that openness is not a question of production, but rather, a question of access.

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Moncton, Canada

Aug 11, 2013

‘Completely Wrong’ But Not in Error

David Wiley writes²⁶⁹,

A careful reading of the post he links to, however, shows that this is completely wrong. The problems described in the post are the result of two issues: (1) Reusers of CC BY licensed research articles are not obeying the terms of the open license, and (2) There is some confusion regarding who should pursue legal action against those who are not obeying the terms of the license.

I'm not addressing (2) at all, save to observe that if it is a person pursuing legal action, they will most likely be crushed by a corporation. I don't think there's any dispute there.

With respect to (1) Wiley does not state exactly what "terms of the open license" are being violated. I argue "none" - which of course is my point, and leads to the "I told you so". But what terms does he think might be being violated? Reading the original post offers several possibilities:

- the suggestion that 'By' requires that the publisher be named (which in this case might be PLOS or whatever). But if you read <https://creativecommons.org/licenses/by/3.0/legalcode>²⁷⁰ section 4.b you see the wording of 'and/or' is being used, which has the logical status of 'OR' (as opposed to XOR, or exclusive OR). That means the condition is satisfied if ANY ONE of the disjuncts is satisfied. The author is named, and hence the disjunct is satisfied. So it's not this.

- the suggestion that the reprinter should have published the CC license URL, as indicated in section 4.a of the same license, where it says, "You must include a copy of, or the Uniform Resource Identifier (URI) for, this License with every copy of the Work You Distribute or Publicly Perform." This one is a bit trickier. CC-by is not viral; there is no 'share alike' clause attached. So presumably there is no requirement to license the reprinted version as CC-By. The wording of 4.a seems to suggest that the CC-by license *is* viral, "You may not offer or impose any terms on the Work that restrict the terms of this License or the ability of the recipient of the Work to exercise the rights granted to that recipient under the terms of the License."

Now if he wants the basis of his response to me to be that CC-by is viral, or that CC-by is the same as CC-by-SA that's fine, but I think the statement of that argument should be clearer (minimally, the statement of that argument should exist).

²⁶⁹ <http://opencontent.org/blog/archives/2917>

²⁷⁰ <https://creativecommons.org/licenses/by/3.0/legalcode>

- the suggestion that the use violates some additional license terms imposed by PLOS. But the document cited <http://www.plos.org/about/open-access/license/>²⁷¹ is not actually a 'PLOS license', it is a page that is 'about' the CC-by license, and could hardly be taken to define it. The BioMed Central license <https://www.biomedcentral.com/authors/license>²⁷² isn't a CC license and thus outside the domain of this discussion.

Given all this, it is reasonable to believe that the reprinters thought they were working within the limitations of the CC-by license, that they were IN FACT working within the bounds of that license, and that therefore they were not, as he suggests, "not obeying the terms of the open license."

Maybe he meant something different, but it would be necessary for him to at least state what it was in order for me to evaluate the claim.

The second part of the post (presumably still showing I am 'completely wrong') asks, "How does adding the NC or SA clauses magically either (1) correct user behavior or (2) identify who should pursue legal remedies against those misbehaving users?"

I do not suggest that adding the 'NC' clause serves to identify who should pursue legal action, so any discussion of (2) is irrelevant. The NC clause does not suggest who should take legal action (though common sense would suggest that it is the copyright owner who should take legal action).

With respect to (1), I actually *did* offer an argument, but it is not restated nor refuted here. I argued (and maintain here) that the addition of the 'NC' clause creates risk. True, it doesn't prevent bad behaviour on the part of publishers. But it creates the greater possibility of a lawsuit if the publisher reuses the material, because the publisher is more clearly violating the license by offering the previously free material available for commercial sale for material gain.

This argument may not be persuasive to Wiley; I recognize that. But when I am called 'completely wrong' I think minimally there's an onus to acknowledge that I at least made the argument, and offer some sort of token refutation.

*Moncton, Canada
September 4, 2013*

²⁷¹ <http://www.plos.org/about/open-access/license/>

²⁷² <https://www.biomedcentral.com/authors/license>

Two Comments on Open

Response to David Wiley

His post²⁷³

Which initiatives that use “open” properly would you suggest the whole world read about instead of the Fauxpen Education Alliance?²⁷⁴

I don't want to be a self-promoter, but...

I have planned and run all my MOOCs openly since 2008. Moreover, they have all been run using open source software (Perl Artistic/GPL) which has been available on my website and on Sourceforge since then.²⁷⁵

But everyone - *everyone* - has jumped on the Coursera / Udacity / EdX bandwagon, not because they're open, not even because they're better, but because they're part of that Stanford / Harvard / MIT nexus. The willingness of people (and media, and funders, etc etc) to run toward these initiatives, simply because they're from elite US universities, is what leads to these new versions of open.

Meanwhile I get flack from the Creative Commons community because the CC license on some of my writing is 'not open enough', because I don't (and couldn't if I wanted to) allow my work to be scraped and sold by content-farms. You can take my work and do whatever what you want with it (but you can't lock it behind a wall forcing people to pay thousands to see your annotated version of it).

So I think that the promoters of open need to look closely at what motivates them and what projects they support, and perhaps be less willing to jump on the next media meme because it pushes pageviews and signups, and examine the sort of software and content environment they want 'open' to really be.

To me, open isn't about the money (and it's precisely when it *does* become about the money that it becomes converted and corrupted). Open is about creating and sharing. Open isn't about elite universities and "the best professors in the world". It's about everybody being able to be a learner, and a teacher, and a member of the community.

²⁷³ <http://opencontent.org/blog/archives/2922>

²⁷⁴ <http://blog.udacity.com/2013/09/announcing-launch-of-open-education.html>

²⁷⁵ <http://grsshopper.downes.ca/>

I'm just saying. I'm not bitter, I don't even care - I'm just observing that people get the 'open' they deserve.

Responses to a discussion forum on the future of OERu.

The discussion²⁷⁶

- What is the OERu point of difference and does it need one?

The primary (and perhaps the sole) point of difference between OERu and the other initiatives is the manner of course construction, using the wiki and (mostly) volunteer labour. Perhaps secondarily, the fact that OERu materials can be reused, though reuse permissions vary through the open online learning community.

- What differentiates the OERu collaboration from xMOOCs?

Strictly the reuse permissions. The 'logic model'²⁷⁷ employed by OERu is (more cynically) also employed by, say, Coursera.

It may be that there is an argument to be made for the greater quality or usefulness of learning materials created collaboratively in a wiki environment, but as OERu has focused more and more on its university "founding partners" it becomes more like Coursera, and less like Wikipedia. In my view.

*- What has contributed to the uptake and global interest in the cMOOCs and xMOOCs?
Marketing.*

CMOOCs were around for a while without making a huge impact (though they were influential pedagogically). It is with Stanford's AI course - and the support of the Stanford media machine - in 2011 that the format became popular. The marketing was so influential that they were actually given credit for inventing the form, though we know that both MOOCs and OERu were around before Coursera.

- What does this mean for OERu?

It's running behind in a race against well-funded marketing machines. No doubt board members on OERu "founding partners" have wondered why they weren't "involved in a MOOC". OERu is not sufficiently 'more open' to attract notice from the supporters of xMOOCs, at least, not in the

²⁷⁶ <http://scope.bccampus.ca/mod/forum/discuss.php?d=16804>

²⁷⁷ http://wikieducator.org/OER_university/Logic_model

popular media and public opinion. Initiatives like Wikiversity and Currici find themselves in the same position.

I don't think 'being a wiki' open education initiative will be sufficient to attract long-term interest (though this should not deter OERu and WikiEducator members from continuing to create and contribute valuable online learning materials). It will probably create funding pressures for OERu, as "founding members" look elsewhere to join the MOOC bandwagon.

Should OERu brand itself as a MOOC initiative? I don't think so - it would be like trying to retroactively give itself credit for being a part of a movement it wasn't a part of (like the way Alison is saying it created the first 'MOOCs' in 2007 because it released some 'openish' learning content).

But I think OERu can draw on its superior pedagogical knowledge and offer a more substantial learning experience than the Video+quiz format of the xMOOCs. Maybe cMOOC people and OERu people should talk more.

- Are there other contemporary developments which the OERu network should take into account?

Well, yeah. Can it get past the concept of a 'class' and 'university credit' (ie., the old-fashioned and not very open logic model) and embrace a model of learner-driven education? Can it nurture (and support existing) domain-specific communities with the sharing of resources, practices, war stories, activities, etc?

Before MOOCs became large the same community was talking about the concept of personal learning. The institution-based OERu model is a step away from that (as are the institution and course-centric MOOCs, both 'c' and 'x'). Can OERu find a way to merge collaborative (cooperative) community with personal learning?

- What questions should the OERu network be asking to inform its future?

To me, the central (and existential) question always facing OERu (and WikiEducator) is: who does OERu and WE serve? Who is intended to be the ultimate beneficiary of these initiatives? When a person contributes content to WE, who are they trying to help?

As the emphasis of WE has shifted over time from open learning to founding partners, the answer to this question has become murkier. When we see initiatives like Coursera and Udacity launch, it becomes relevant to ask how different OERu is from either of these. I'm not saying they are the same. But the difference is far less clear after the 'logic model' than it was before.

*Moncton, Canada
September 18, 2013*

On the Three or Four Problems of Connectivism

Marc Clarà and Elena Barberà have advanced at least two articles now where they argue that there are three problems with connectivism. One of these is [Learning online](#)²⁷⁸: massive open online courses (MOOCs), connectivism, and cultural psychology (Distance Education, 34:1, 129-136). The other, behind a paywall, is [Three problems with the connectivist conception of learning](#)²⁷⁹ (Journal of Computer Assisted Learning. DOI: 10.1111/jcal.12040).

[Matthias Melcher](#)²⁸⁰ was good enough to point out some of the problems with the latter article, including some noteworthy misquotations. In this post I would like to respond to the substantive criticisms, of which there are four:

- connectivist ideas have been widely and rapidly disseminated, but without the academic control procedures which the development of a learning theory needs to ensure rigour and systematicity in its postulates
- the 'learning paradox.' This paradox, first posed by Socrates (Plato, 2002), can be applied to connectivism as follows: How do you recognize a pattern if you do not already know that a specific configuration of connections is a pattern?
- connectivism underconceptualizes interaction and dialogue, by understanding it as a learner's connection to a human node in the network.
- connectivism is unable to explain concept development... if a concept consists of a specific pattern of associations, how can it be explained that the concept develops but the pattern of associations remains the same?

To address the first issue, it seems to me there are two ways to respond to such a criticism: first, to embrace the requirement, but then to point out that it has been met; and second, to reject the requirement. I would like to do both.

Specifically, I would argue that literature related to connectivism *has* undergone peer review. According to [Google Scholar](#)²⁸¹ I have an H-index of 22 and i10-index of 31. This listing does

²⁷⁸ http://unescochair-elearning.uoc.edu/blog/wp-content/uploads/2013/07/Clara-Barbera_2013_learningOnline_DE.pdf

²⁷⁹ <http://onlinelibrary.wiley.com/doi/10.1111/jcal.12040/abstract>

²⁸⁰ <http://x28newblog.wordpress.com/2013/10/03/connectivism-must-abandon-its-ideas/>

²⁸¹ <http://scholar.google.com/citations?user=Uz8GKA0AAAAJ&hl=en&oi=sra>

not include my work published in academic books (for example, 'The Role of Open Educational Resources in Personal Learning', in [Open Educational Resources: Innovation, Research and Practice](#)²⁸², published this year by Athabasca University Press). It's true that I mistreat my publications terribly, and that I should maintain my [publications page](#)²⁸³ a lot more carefully, but it's false to say that my work has not been subject to academic scrutiny.

But I would also argue that the requirement that this work be subject to (the traditional) peer review process is misplaced. It is arguable that this process could be replaced with a much more effective process of *post-publication* review. The idea is that academic and other works are published openly, and then weighed not by an anonymous panel of two or three referees, but by the whole academic community. As [Jane Hunter writes](#)²⁸⁴, "Open, post-publication refereeing removes barriers for readers and authors alike, and it refocuses the role of peer review from, at its worst, a behind-the-scenes variety of censorship to, at its best, the process of expert criticism and advice."

Finally, there is the undercurrent to the authors' remarks to the effect that connectivism would be in some important way *different* if it were subject to the peer review process, to the effect that it would ensure rigour and systematicity in its postulates. This is precisely one of the reasons I am cautious (if not to say outright sceptical) of the process of review and revision in academic journals. While I seek clarity and precision in all I write, I do not see connectivism (or any other theory) as a set of postulates, entailments and confirmations. Systematicity is for robots.

Now let us address the second issue, specifically, the suggestion that you cannot recognize a pattern if you do not already know that a specific configuration of connections is a pattern. In 'Learning Online' Clarà and Barberà tie it to a serious issue specific to connectivism: "This theoretical problem causes an important learning problem in cMOOCs: Many learners, especially those who do not have high self-regulation skills, feel lost and without any direction and support.

The argument as originally posed in [Meno](#)²⁸⁵ and elsewhere in Plato's writings does not attach to patterns specifically but to the forms of matter (such as, say, a triangle), colours, and even intangible properties such as justice and virtue. How could we recognize them, if we are not taught? But if they are not taught, do they cease to exist? Obviously not, therefore, the forms,

²⁸² http://www.col.org/PublicationDocuments/pub_PS_OER-IRP_web.pdf

²⁸³ <http://www.downes.ca/me/publications.htm>

²⁸⁴ http://www.frontiersin.org/Computational_Neuroscience/10.3389/fncom.2012.00063/full

²⁸⁵ <http://www.gutenberg.org/files/1643/1643-h/1643-h.htm>

colours, justice, virtue, and everything else we perceive must exist in what we have come to call a 'platonic' or ideal state.

In the 'Three Problems' paper Clarà and Barberà argue there are "two basic solutions to the paradox":

- Either, first, to follow Kant, and accept that we have access to these concepts innately, as argued recent theorists such as Jerry Fodor and Jean Piaget.
- Or second, to follow Hegel, and "accept that a representational means can be shared by two or more people, so they can use it together." Thus we reach Vygotsky's zone of proximal development, based on the idea that "while one of the participants in the agency may not be able to use the means on their own, they are able to use it in the joint activity, in collaboration."

This statement of the dilemma may appear intuitive, because it seems to suggest that we must learn of a concept internally or externally. That does seem to cover all the options.

Philosophy, though, does not reduce to a choice between Kant and Hegel (thank goodness). The two options provided by Clarà and Barberà can be supplemented with many more possibilities. I will adduce two, one internal, and one external.

- Internally, we can appear to examples of *self-organization*. Simple systems composed of interacting entities can form and reform into patterns. Consider, for example, the computational model called '[the game of life](#)'²⁸⁶, which shows how complexity can develop out of simple rules.
- Externally, we can learn through direct perception or recognition. For example, consider [J.J. Gibson's theory](#)²⁸⁷ of direct perception." The neural inputs of a perceptual system are already organized and therefore do not have to have an organization imposed upon them."

The point here is that there are many ways for concepts to arise in the mind; they don't need to be delivered fully formed either by innate knowledge or through shared representations. This is a good thing, for if we learned of concepts only through the two mechanisms proposed by Clarà and Barberà, then we would be faced with a problem of infinite regression, for there would be no means through which these concepts could be *discovered* in the first place.

²⁸⁶ <http://www.youtube.com/watch?v=XcuBvj0pw-E>

²⁸⁷ <http://www.igs.net/~pballan/Gibson%28chapt13,1966%29.htm>

In connectivism we talk quite a bit about how (what Clarà and Barberà call 'concepts') arise in the mind (and in networks generally). Learning theories, ranging from simple [Hebbian](#)²⁸⁸ mechanism to complex [Boltzmann engines](#)²⁸⁹, create and modify connections between entities. There is a vast literature devoted to [learning rules](#)²⁹⁰. I think we can regard 'the learning paradox' as definitively solved.

The *claim* made by connectivism in this regard is that learning is a process of pattern recognition, nothing more or less. The *warning* inherent in connectivist theory is that there is no *apriori* privileged set or type of pattern that may be learned: so while you may *think* that you are presenting shapes to learners, they may be learning to recognize colours. And that *any* pattern inherent in your teaching - including bad habits, prejudice, whatever - will *also* be learned by the people watching you.

Finally - to be clear - talk about "recognizing" a pattern does not involve some homunculus inside our head doing some conceptual work. The phenomenon of pattern recognition is a [well-known property](#)²⁹¹ of neural networks. The point I make is epistemological: what makes something a 'pattern' is the fact that it *is* recognized by neural nets. There is no *apriori* set of entities, 'patterns' (or 'concepts', or whatever) that must somehow be acquired and placed in the mind.

The third issue raised is based on the contention that connectivism underconceptualizes interaction and dialogue.

To set up this discussion, Clarà and Barberà first offer a simplified action in a network, then offer the following critique (as quoted from the Three Problems paper):

- [first] the connectivist scheme of the network does not permit any (human) node to which the learner connects to be conceptualized as part of learning but not part of the connective pattern of which knowledge consists,
- [second] a binomial conceptualization is too simple to characterize the complexity of connection states in a network, especially if human nodes (interactions) are involved, [and]

²⁸⁸ <http://psychclassics.yorku.ca/Hebb/>

²⁸⁹ http://www.scholarpedia.org/article/Boltzmann_machine

²⁹⁰ <http://www.uotechnology.edu.iq/dep-eee/lectures/4th/Electronic/Software%20&%20intelligent%20system/1.pdf>

²⁹¹ http://www.engineering.upm.ro/master-ie/sacpi/mat_did/info068/docum/Neural%20Networks%20for%20Pattern%20Recognition.pdf

- [third] the problem is not only the simplicity involved in characterizing the state of interaction, but the very fact that interaction is thought of as a state.

In all of these it is apparent that Clarà and Barberà are confusing the concept of a *connection* with the concept of an *interaction*. The two are very different.

A *connection* is a state. Roughly speaking, it is a communications channel that exists between two entities such that a change in the state of one entity can result in a change in the state of the other entity. Usually, we depict these channels as physical, for example, the axons of a neuron, or a telephone wire carrying signals.

Connections can be extremely complex; there is no requirement whatsoever that they be two-state on-off types of things. Connection strength can vary, the frequency of signals can vary, the nature of signals can vary, there may be multiple strands and different types of connection between two nodes (hence, I can send George an email *and* a Tweet). The nature of the states of the nodes can be variable as well. A signal from one node to another may have a cumulative effect, triggering a reaction only after a tipping point is reached, for example.

An *interaction* is the actual event where a change of state in one entity takes place with the result that a change of state in the second entity takes place. We may also think of an interaction as a mass noun, referring to a set or a series of such changes of states. Again, we usually think of an interaction as something physical, for example, a signal sent down a communications channel.

So there's no sense in which connections and interactions are *simple*, but that does not address the problem posed by Clarà and Barberà, because there is something else they're after. We have to tease it out a bit.

When we look at the first objection, "as part of learning but not part of the connective pattern of which knowledge consists," what they *appear* to be appealing to is the lack in connectivist theories of learning of a sense of *aboutness*. When one person teaches another person about France, we interact only with the other person, and not with France. But in learning, we are not learning about the other person, but *about France*.

So the criticism is essentially that connectivism doesn't have a built-in semiotics. It doesn't have a sense in which a communication between two entities is about a third entity. And it's true that representation in communication doesn't work this way in connectivism. Rather, connectivism works according to two principles: direct representation, and distributed representation.

- *Direct representation* is the idea that the signal is its own message (think of it as a corollary to Gibson's direct perception). We can think of this along the lines of the

concept of [content addressable memory](#)²⁹² in computer science. The message is its own content. True, we as a sender may *intend* the message to refer to or represent some object or entity, but what is in fact *received* is only the sentence itself, which must carry all its representational content with it.

- *Distributed representation* is concepts (for lack of a better work) are stored not as single entities in the mind, but as sets of connections between entities, so they exist not just in one place, but in many places. What's significant here is that *the same set of connections* is used to store not one but *many* concepts (indeed, *all* concepts). So when the set of connections defining one concept is changed, so also is the set of connections defining many other concepts.

The combination of direct representation and distributed representation together do the same job that semiotics does: it explains how we can learn one thing through reference to another. A person says the word 'Paris' to me; the sound of this word stimulates a part of my neural net, initially, that part associated with the word 'Paris' but ultimately, that part associated with a variety of other concepts ('City', 'France', etc.) all of which are composed (partially) of the *same* connections.

Communication and interactivity are useful in learning because they enable us to make connections between entities we might not have made through direct experience. A person may never visit Paris in a lifetime, and no that the Louvre is located in Paris only through the repeated association of 'Louvre' and 'Paris' in sentences uttered by others.

The *claim* made by connectivism is that communication is non-semantic. Or as [McLuhan would say](#)²⁹³: the medium is the message. It doesn't 'stand for' something else; it *is* what is being communicated. The *warning* in connectivism is this: we cannot assume that the person receiving the message embodies the same intent (the same mental world of objects and concepts and ideas) as the person sending it. Communication *is* a complex process because, in order for *anything* to (if you will) 'mean' anything, a great deal of background needs to be in place. So much so, in fact, that it's doubtful that any two people ever mean exactly the same thing by any two instances of the same word.

We won't say the question of meaning and messaging are definitely solved. But there is certainly a story here; connectivism is not silent on the issue, as Clarà and Barberà suggest, but makes some assertions that can (and should) be investigated and empirically tested.

²⁹² http://en.wikipedia.org/wiki/Content_addressable_network

²⁹³ <http://www.youtube.com/watch?v=ImaH51F4HBw>

Let me now turn to the fourth issues, which is essentially, that connectivism cannot explain concept development. "If a concept consists of a specific pattern of associations, how can it be explained that the concept develops but the pattern of associations remains the same?"

For example, write Clarà and Barberà, consider "Piaget's work on the matter in question, in which he established four basic stages, the sensorimotor stage, the preoperational stage, the concrete operational stage and the formal operational stage."

In the first instance, I would respond that Clarà and Barberà have confused naming with identity. Their question is analogous to asking, "how can you explain how a river develops, and is yet the same river?" For example, they might expand, "we can identify the tributary stage, the feeder stage, the meandering stage, and the delta stage."

Looking more intently at their objection, we can see the problem built into the formulation: when they state that "a concept consists of a specific pattern of associations" they suggest that it can never change. It is as though a 'river' were defined as the water in it at any given point in time, which while strictly true (for it would not be a river without the water) is nonetheless a definition of 'river' that would be unworkable.

But there is nothing in connectivism that asserts that a concept consists of a *specific* pattern of associations. Quite the opposite. What we consider a 'concept' is instantiated in one person by means of a completely different set of associations than in another person, and in that person the same concept may be instantiated by changing associations over time. What makes a set of associations, say, the concept 'Paris' is simply (and only) the fact that it is *this* set of connections that is activated when the person hears or reads the word 'Paris' (or visits the city, etc).

So how *does* our understanding of the world evolve over time? In the 'Three Problems' paper, Clarà and Barberà offer three alternatives (and again I quote): either

- concept development occurs because of the biological maturation of computational structures, [or]
- some processes are maturational, such as decentering, and others are educational, such as equilibration, [or]
- learning drives or causes development, so that learning in a ZPD becomes development when psychological functions become autonomous.

And they write, "If a concept is a set of associative connections, how can it be explained that the psychological nature of the concept changes but the pattern of the associative connections of which the concept consists does not?"

The simple explanation for concept change is *plasticity*²⁹⁴. This is the phenomenon whereby the nature and number of neural connections changes over time as a consequence of experience. But while explaining conceptual change, plasticity by itself doesn't explain what Clarà and Barberà are trying to describe.

Their concern is more metacognitive. It has to do with the attitudes and perspectives surrounding a concept, rather than the concept itself. This comes out when they describe a person's relation to their family. "the concept is not the same when I am 4 as it is when I am 20; psychologically, it functions in a very different way." Note that this isn't simply a case of the family changing; the family may grow by several more children and still be the same family, but that's not the problem. Rather, it has to do with the *role* the concept plays in the person's life, and consequently, their varying *attitude* toward it.

Having made this observation, it becomes evident that the three alternatives offered by Clarà and Barberà are all unattractive. What are the causal mechanisms that lead one to regard a family from a sensorimotor perspective when young, and from an operational perspective when older? Indeed, what does that even *mean*?

But connectivism *does* explain these things, and it does so in a manner that does not leave us wondering about the underlying causal structures. Concepts evolve because concepts do not exist in isolation in the mind; they are interwoven with other concepts. The concept itself may be entwined with one set of associations at a younger age, and a very different set of associations at an older age, so the concept's *role* changes - it is implicated in different thoughts, different ideas, different actions.

The *claim* made by connectivism is that concepts are plastic; that the associations implicated in a concept at one time will be different from those at another time, as the entire network of connections grows and changes. The *warning* offered by connectivism is that these changes inform our own understanding as well as our students, so that (for example) what is intuitive and obvious to us, is murky and mysterious to another, or what is important and urgent to them may be seen as trivial and irrelevant to us. And further, that while this represents *change*, it does not necessarily represent *progress* or *development*.

To wrap up, Clarà and Barberà conclude their paper with some surprising assertions. These are worth commenting on briefly.

First, they write, the problems "should warn scholars and educators against uncritically assuming the theoretical postulates of connectivism, and encourages the search for a stronger theory of

²⁹⁴ <http://en.wikipedia.org/wiki/Neuroplasticity>

learning (which does not necessarily mean a completely new theory) to explain and foster network based learning."

Nowhere is it asserted that anyone should uncritically "assume the theoretical postulates of connectivism." Quite the opposite; it is iterated on numerous occasions that these are offered tentatively, that they are subject to empirical verification, and that they should be questioned and challenged. Connectivism is not a religion; it requires neither faith nor belief.

If by "stronger" they mean "better", then if such a theory is found, then by all means people should embrace it. But researchers should be cautioned against embracing a theory simply because it makes wider or more sweeping explanatory claims. "The devil made me do it" is a theory that is much stronger than connectivity, explaining as it does all evil in the world, but it would serve poorly as a basis for learning research. The [parameters for explanatory success](#)²⁹⁵ are well-known, and the [maximization of parsimony](#)²⁹⁶ is only one such.

Second, they write, "Downes's four defining characteristics of a MOOC (autonomy, connectivity, diversity and openness) and the eight principles proposed by Siemens(2005a) are pedagogical in nature and fully assumable by a large number of learning theories."

Nowhere in connectivism is this denied. There is no requirement for one theory to be completely different from its predecessors; that would be an odd (and inconsistent) view of science and research. Indeed, it should be clear that the four principles I describe were borrowed liberally from a talk by [Charles Vest](#)²⁹⁷ in 2005; he was describing the principles for the success of the American university system, and I employed the same terminology for networks. It is also worth nothing that some of these are also employed by James Surowiecki in [The Wisdom of Crowds](#)²⁹⁸.

They cite a number of places where some of these concepts arise, and specifically reference Ivan Illich, and then say, "Connectivism emerged later as an attempt to theoretically explain why and how those principles work." While Siemens can speak for himself, I can only say that my own motivations for pursuing this line of thought had nothing to do with Ivan Illich. This is not to say I do not respect his work tremendously; I do. But my motivations and foundations can be seen quite clearly in my [PhD dissertation proposal](#)²⁹⁹, and Illich is nowhere to be seen in it.

²⁹⁵ <http://psych.csufresno.edu/psy144/Content/Science/characteristics.html>

²⁹⁶ http://en.wikipedia.org/wiki/Occam%27s_razor

²⁹⁷ <http://www.downes.ca/post/34186>

²⁹⁸ <http://www.randomhouse.com/features/wisdomofcrowds/>

²⁹⁹ <http://halfanhour.blogspot.ca/2009/03/tnp-1-introduction.html>

Finally, they argue, "MOOCs and their pedagogical principles should therefore be regarded as an object of study, independent of connectivism, which, in turn, should be regarded as an approach (one among others) that tries to explain what happens in a MOOC."

People should feel to study MOOCs however they wish. It is a matter of empirical fact that MOOCs have evolved beyond their original roots as instantiations of connectivist theory; many of them (for example, the video-and-test offerings found in Coursera) are developed along explicitly instructivist lines. Suggesting MOOCs should only be understood from a connectivist perspective makes no conceptual or empirical sense, and nobody would argue for it.

*Moncton, Canada
October 3, 2013*

Concepts

On 2013-10-12 9:02 AM, Matthias Melcher wrote:

If we consider, on one hand, all the aggregated connection patterns that make up a simple concept or word in an individual, and OTOH, in a society or a community of practice, we consider the small part of knowledge of that society that roughly corresponds to one term used by this community, can we say that these two are very similar, except for the notorious 3rd person vs. 1st person distinction?

(If the question is not relevant for you, please feel free to just tell me, because even this would already be a valuable hint.) We need to be more precise about what you mean when you say "can we say that these two are very similar".

If you mean "the concept of 'Paris' in an individual is similar to the concept of 'Paris' in a society", then although there is an overlapping association with the word and sound 'Paris' I have no reason to think that a person's concept and society's concept is similar at all. But even here, it depends on how we define 'similar'... my own thinking of 'similarity' is roughly the same as Tversky's feature-based analysis of similarity, however I additionally incorporate a concept of salience, following Stalnaker's employment of the term in modal logic. But what is a 'feature', in this analysis? In a human, a feature is an aspect of sensory awareness, what the positivists would have called a 'sense datum' (but without the presumption of logical atomism; it's just a sensation, a percept, not an atomic proposition). What would society's analogous 'sense datum' be? How does a society perceive? I would be interested in an answer to that question.

If you mean "the notion of a 'concept' for an individual is similar to the notion of a 'concept' for society" then I would agree. A concept in an individual - loosely speaking - is a subset of the full set of connections in the human brain (and to 'think' of the concept is to have at a given time that subset, or a sufficient part of that subset, electrochemically activated (ie., 'spiking'). A concept in a society is the same sort of thing - depending on how exactly we want to construe it, it is the connection of a subset of the set of all individuals in society (*), and society 'thinking' of the concept is the activation of that subset, or a sufficient part of that subset. For example, a concept similar to 'rage against the machine' might be active when enough people open their windows and shout "I'm mad as hell and I'm not going to take it anymore." The spreading of a meme (see my paper 'Hacking Memes') through speech, print, artifacts, text, etc., is an instance of society 'thinking' of a concept. Though that said, probably social concepts are far more complex than that - it is very unlikely the concepts a society 'thinks' are very similar to the concepts an individual thinks (as I suggested in the first paragraph).

(*) We can have different accounts of 'social concepts' depending on how we define the concept of a social 'node'. If we define it as individuals only, then a concept requires the activation of individuals, and would be expressed eg. by what individuals say, do, etc. - a 'culture' on this

account is essentially a set of social concepts. If we expand our set of individuals to include artifacts, then we can have a much wider sense of social concepts, particularly when the artifacts are not simply static, like books and paintings, but dynamic and interacting, like stock futures, financial exchanges, highways systems, etc. We can extend the idea of social concepts by a third degree if we allow the set of individuals to include non-physical entities, such as words and concepts; now the set of interconnected entities includes the associations of words and other non-physical entities with each other (though this would have to happen in a physical substrate).

If this isn't clear to this point, stop here, because the next bit will really mess you up.

It's this: no set of connections, or activation of a set of connections, is inherently a 'concept'. What we call a concept (and similarly, what we call an 'idea') does not exist inherently in nature, but exists only insofar as it is perceived and *recognized* as such. For example: a set of points on the surface of Mars might be connected and inter-related, and when the light shines on them, activated (by reflecting light), and hence form the physical conditions necessary to instantiate a concept. But it takes a third party - specifically, *another* set of connected entities (a neural network, in this case) - to *recognize* that this set of points on Mars looks like Jesus, and hence instantiates the concept 'face of Jesus'. An entity (or set of connected entities) X is 'recognized' as the concept P when perception of X causes a sufficient set of activations of a network to cause the full set of activations of the connections constituting P to occur in the neural network. Or to make the same point more colloquially: a bunch of mountains on Mars is called 'the Face of Jesus' when a person looking at the light reflecting off the mountains sees enough of the face to think "hey, that's the face of Jesus."

What we call consciousness or sentience is the capacity to do this in ourselves, that is, the activation of a set of connections in one part of our brain is sufficient to cause the recognition process to happen in another part of our brain. So we have the perception of some orange in a background of green, and this causes the full set of connections constituting the concept 'tiger' to be activated more deeply in our brain. (It can also work in reverse: when the connections constituting the concept 'tiger' are activated, for whatever reason, we can sometimes have the experience of perceiving orange and black stripes).

So why am I hesitant to use the word 'concept'? It's simply because the word 'concept' has so much baggage attached to it. People see the word 'concept' and they start thinking of intentionality and meaning, things out there in the world, sets of logical propositions, models, and more. There is an entire set of (fictional) artifacts built around the concept of 'concept', and I don't mean any of them when I use the term.

*Moncton, Canada
October 12, 2013*

Connective Knowledge and Open Resources

The following is a set of responses to interview questions I answered over the weekend. The interviewer was from China, and I understand the content was published in China, but beyond that I have no information.

The Theory of Connectivism

Chinese readers firstly know you and George Siemens by the theory “connectivism”. How did you start your cooperation initially? What is the background (or reason) you create this theory? Can you introduce the meaning of connectivism and illustrate its characteristics in details?

That’s a good question, and I don’t really know the answer to it. George and I have been exchanging email since the late 1990s – we each had our own online newsletter (mine was *OLDaily*, his was called *elearnspace*). We read each other’s work, talked about the same subjects and encountered each other at conferences. And we had very similar perspectives on the nature of online learning.

To me, the theory is and always has been ‘learning networks’. This is a play on words: it is in part a theory about using networks to support learning, and in part a theory about how networks learn. For me, this is based on an associationist philosophy of knowledge, and rooted in connectionist theories of artificial intelligence. I wrote a long PhD proposal on it in 1990³⁰⁰.

When I began working on online learning, I brought this theory with me. It led me to propose content syndication networks in education, and to embrace social media in education. I outlined my theory in the paper ‘Learning Networks’ in 2004³⁰¹ and George wrote his important paper also in 2004.³⁰²

He came up with the term ‘connectivism’. I think it is derived from the term ‘constructivism’. His version of connectivism is much more socially oriented than mine, much more about social networks. Mine is rooted in artificial intelligence and neural networks.

Either way, the underlying propositions are the same. A person’s knowledge is the state of connectivity in their mind – the connections between their neurons – and to learn is to form or

³⁰⁰ <http://halfanhour.blogspot.ca/2009/03/tnp-1-introduction.html>

³⁰¹ <http://www.downes.ca/post/20>

³⁰² <http://www.elearnspace.org/Articles/connectivism.htm>

reshape these connections by strengthening or weakening them through interaction and use. It's a theory where we grow knowledge, rather than acquiring it, where we learn by immersion in a field of study rather than by being told about it.

Connectivism and Practice

The “connectivism” is extended to the whole world recent years, how did you combined it with practice in a subsequent study ? Can we think OER is an effective way to implement the theory?

The practical implementation of connectivism is the massive open online course, or MOOC. George and I developed the first MOOC in 2008, called ‘Connectivism and Connective Knowledge’. It was intended very deliberately to be an *example* of the theory we had formed over the previous four years, and not simply a place to talk about it.

The key aspect of the CCK08 MOOC was that it was distributed – that it, it was not based on a centralized core of content, and it was not located on a single website. Rather, we encouraged people to create course content and to contribute to the course through their own websites, through discussion groups, communities, and other forum they chose. We had about 170 blogs created to support the course, and we aggregated these using RSS – content syndication supporting online learning.

The CCK08 course and all the other courses we have developed since have been based on open educational resources (OERs). We use OERs as a way to talk about the concepts and ideas in the course. They may be papers, lessons, diagrams and images, videos, or anything else. What was most important what that they were sharable – we needed to be able to move them from one location to another in our distributed course.

The course as a whole was formed in the structure of a network. The OERs were the signals being sent back and forth between individuals in this network. The knowledge created in the course was the *result* of this interaction, and not the *content* of the interaction.

Open Online Educational Resources

From your web & blog, we found you were a passionate advocate of OER, can you share with us your first experience about open online educational resource? and the purpose and meaning of the action at that time?

I knew about open educational resources before anyone knew what the term meant. By no means am I alone in this. It has always been common for teachers and instructors to create and share learning materials. It is only with the arrival of the internet that we could do so globally.

It's really hard for me to find a ‘first’ instance of experience with OERs, but if I was forced to do so I would probably say it was my ‘Guide to the Logical Fallacies’. You can still see this guide

today³⁰³ and it was created in 1995. I created the text for it when I was teaching at Grande Prairie Regional College in 1994, because my students needed a good way to think about logical fallacies. I was trying to get them to spot fallacies by *recognizing* them, by seeing signs that would remind them of common patterns of argument.

When I moved to Brandon and began working at Assiniboine Community College, I converted the guide into HTML and posted it on my brand new web site. It was partially to share the content with the (small) internet community, and mostly to show people at the college what could be done with the web. It led to our first web-based course a year later.

This was before Creative Commons or OERs, and only a few years after Richard Stallman created GPL. But there was still a sense in the community that there should be a type of licensing that allowed people to use content for free. I attached such a license to my Guide to the Logical Fallacies – it was modeled on George Reese’s license for the Nightmare Mudlib software package.

Definition of OER

You have your own definition of OER which is apart from the official definition, can you explain it? And talk further about the role of OER in personal learning?

When I’m asked to define OERs I use the UNESCO definition, which is, “teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution.”

Generally, when I think of OERs, I think of *digital* resources, simply because non-digital resources cannot be shared in the manner envisioned in the definition.

In addition, my definition of ‘teaching, learning or research materials’ is a *functionalist* definition, rather than an essentialist definition. That is to say, I do not believe it is the *nature* of a resource that makes it a ‘teaching, learning or research material’, but rather, its *use*.

This is significant because some people say that OERs must have a certain format or construction – for example, they must have learning objectives, or an instructional focus, or a mechanism for assessment, or some such thing. I don’t agree with this. If a resource, whatever it is, is *used* to support teaching, learning or research, it is by that fact an educational resource.

Finally, when I employ the term ‘free use, adaption, and distribution’, my sense of the word ‘free’ includes the sense of ‘without cost’. Many supporters of OERs argue that the license must

³⁰³ <http://www.fallacies.ca/>

allow commercial reuse, including sale or subscription fees. I don't agree with this. If someone wants to license their material to permit commercial use, I have no objection, but for me, 'free learning' does not have a price tag attached.

There has been in the past some efforts made to define a type of open license that would apply specifically to educational use. I have opposed this because such a definition would define educational use as use by a college or school. But to me, the great strength of OERs is that they enable a person to learn without relying on an educational institution. OERs become, as I said above, the *vocabulary* learners can use to talk with each other about a certain domain. In this sense, OERs ought to be freely usable, and sharable, not only by institutions, but more importantly, by students and learners.

Massive Open Online Courses

We all know you are the originator of the Massive Open Online Courses (MOOCs), what's your perspective on OER's potential impact on MOOCs? Can you summarize the major elements of MOOCs?

The major types of MOOC are the cMOOC, which we created, and the xMOOC, which is the sort of MOOC offered by Coursera, Udacity, and the like. The difference is that a cMOOC is designed as a network, as I described above, while an xMOOC is based on a central course site and content that will be followed by all students.

The xMOOC, in other words, is like a traditional college or university course. It typically requires that custom content be created, and is therefore very expensive to build. Costs can run into the tens of thousands of dollars. Sometimes this is necessary, if for example you are creating a MOOC in a new subject area or new language. But often, the content already exists on the internet as OERs.

In a cMOOC, we begin with the presumption that the content exists out there somewhere. So when the MOOC is set up, we begin with what is a bare outline, usually just a list of topics and ideas. Course participants begin by reconsidering this outline – not everything will suit everyone, of course, but nobody has to do everything. Then, as the course progresses, participants (including the instructor) find OERs from around the internet and link them to the course.

Note that this *use* of OERs is very different from the traditional online course. In a traditional course, or an xMOOC, all the content is brought into the central website and incorporated as a part of the course. Not only does this create a lot of work, it also raises licensing issues, as you are now copying or republishing the content. In a cMOOC, though, we leave the content where it is, and simply *link* to the content. So a cMOOC is not a package, like a traditional course, it is a network of related and connected content.

Sometimes this content will be found on the internet, but just as often it will be created by course participants. That's why it's important to have a mechanism – like RSS – to link different websites together. So in any given week of the MOOC, participants will be able to read text and watch videos that were either found on the internet, or to read text and watch video that was created by participants in the course.

What, then, are the major elements of the course? In one sense, they are whatever the course participants want them to be. In another sense, the major elements are:

- The course participants, including the instructor
- Resources. Either found on the internet or created by participants
- A mechanism for linking participants and resources with each other

It's this third part that traditional courses and xMOOCs lack. Because they are centralized, everything is brought into the course site. But in a cMOOC, we use a system that connects people.

In our courses, we used the gRSShopper application that I created.³⁰⁴ It can be used as an RSS aggregator to harvest resources found or suggested by participants. It also harvests Twitter messages and discussion board posts. It then organizes these resources, most commonly as a daily newsletter, which is then distributed to participants. They can either subscribe by email, reads the RSS version, reads the website, or follow the course on Twitter or Facebook.

cMOOCs and xMOOCs

Could you analyze the differences between cMOOCs and xMOOCs³⁰⁵? As the commercially driven, xMOOCs explode in popularity very quickly, how do you think about the limitation of its development in the next level? And what's the development space of cMOOCs?

Well as I mentioned already, the xMOOC is centralized and the cMOOC is distributed. The xMOOC has a core content that everyone follows, while the cMOOC has a wide ranging network of content which people browse through and sample according to their own interests.

But more than that, the pedagogy of an xMOOC and a cMOOC is different. The xMOOC is typically based on the *transmission* model of instruction. That is to say, the instructor will attempt to take some knowledge he or she has, and through a process of communications, transfer it to participants and students. Success in this kind of course occurs if the student's resulting knowledge resembles or (ideally) is identical to the instructor's knowledge.

³⁰⁴ <http://grsshopper.downes.ca/>

³⁰⁵ <http://www.blogger.com/null>

In a cMOOC, by contrast, an *immersion* model of instruction occurs. That is to say, the instructor creates or sets up an *environment* similar to one in which the students will want to be successful. The instructor will *model* correct or successful behavior in the environment. Because the environment is dynamic and continually changing, the students will not be able to replicate the instructor's knowledge, but instead will have to generate his or her own strategies. Success in such a course occurs if the student is able to successfully navigate the environment without scaffolding or support from the instructor.

The difference is like, on the one hand, telling a person how to swim, and having them repeat that information back to you, and putting a person in the water and showing them how to swim, eventually letting them go to swim on their own.

There is room for both types of instruction. But in any field, students will have to graduate from the simpler transmission mode of instruction to the more complex immersion mode of instruction.

MOOCs and Development

In your article you mentioned [MOOCs](#)³⁰⁶ provides a fair opportunity to learn, and it eliminates one of the great advantages the wealthy have always enjoyed over the poor. Can we think it bring great impact on developing countries' education?

In the recent Times Higher education article George Siemens talked about students in India telling him their lives had been changed by Coursera. I can easily believe this. The traditional form of learning requires schools and professors and facilities and resources. The cost is enormous compared to what the provision of internet access costs. Whatever people can learn on their own is that much more countries do not have to hire professors to teach them.

A lot of people argue, correctly, that you cannot have a full education without in-person instruction, hands-on experience, and even the social contact you get with other students in a school, college or university setting. They are quite right. But the point here is, we do not need to set up *all* education in this way. And there is a great deal people can learn on their own.

We've seen this in India, even before Coursera. Many major software companies are built using Indian programmers. These people taught themselves on the internet. They accessed open source learning materials, they participated in online discussions and in online communities, they created software working on open source development projects, and through interaction and immersion, they developed their own software development skills. On their own, without college

³⁰⁶ <http://www.blogger.com/null>

or university. Now they compete worldwide – I just took part in an online WizIQ session, through a very nice collaboration tool built and run by Indian software engineers.

Not every nation will focus on software, but every nation will focus on maximizing the amount of learning a person can do on his or her own. This creates tremendous opportunities for developing nations, because if they can enable their citizens access to these online resources, in their own language, then they will be able to develop skills equal to those in more industrialized countries.

Yes, this *by itself* will not be enough. But it significantly improves the capacity and opportunity for developing nations.

I should add, it's not MOOCs specifically that create this capacity. It's open online learning generally. MOOCs are just one way to structure and deliver educational experiences. Development communities – such as open source software communities – are another way. The main and underlying element here is open access to learning resources and community. Open access to learning networks, in other words.

gRSShopper

We know you develop the gRSShopper application, can you introduce and explain how that affects MOOCs?

I have already described the functionality of gRSShopper. The way to think of it, and similar applications, is as an open content distribution system.

This is important. It is not enough simply to have open educational resources. If nobody can find them, if nobody can access them, they serve no useful function at all. If a person creates an OER and has no way to distribute it to students who are interested, the OER is not very useful.

gRSShopper employs open syndication standards – specifically, RSS and Atom, along with open APIs and other mechanisms, to create this distribution network. In a MOOC, the network is created specifically for a given course, but gRSShopper is designed to support open content distribution and syndication generally.

People who used Google Reader or who use Feedly or Evernote or similar tools are accessing a similar capacity. When we use channels like RSS, we do not need to depend on publishers or distributors to find and package information for us.

In the past, I used gRSShopper mostly to *distribute* content – to make my own RSS feeds and my own email newsletters. When I first started work on it, there weren't any good ways to do this – people were building RSS feeds by hand. Over time we saw Blogger and WordPress and Livejournal developed, and RSS feed generation was automated, but I still needed the registration and email newsletter function. And none of these supported aggregation – the RSS

readers and blogging engines were always separate products. So gradually it became my integrated tool that did everything.

It was this all-in-one functionality that made the first MOOC possible. In this one tool I had a mechanism that would collect student postings and make links to them available to everybody else, in whatever format they liked. Without this tool, our course would have looked like any other course, and would have been nothing special. And when – inevitably – someone mass-marketed an open course (like Stanford AI) there would have been no alternative model to compare it against.

MOOC Pedagogy

You mentioned a paradox that the more autonomous, diverse and open the course, and the more connected the learners, the more the potential for their learning to be limited by the lack of structure, support and moderation normally associated with an online course. Do you find the appropriate solution or approach for this problem later? Whether the learning analytics(LA) can be think as problem-solving techniques?

Well the reason why their learning is limited by the lack of structure is that they have never learned to be able to learn for themselves in an environment that lacks structure. This makes them unable to function in most environments, not just MOOCs, with the result that even after completing their education they still have a great deal of learning to do in the workplace or the community.

Most educational institutions – and most corporations, and governments – respond by creating more structure, so people are more easily able to cope. And there is certainly a merit to this approach; when we want large numbers of people to be able to do something, the more clearly defined the structure, the more likely they will be successful. But this works *only so long as the structure can be clearly defined*. And in most of what happens in the workplace or the community, this becomes impossible.

Take transportation, for example. The most structured system of transportation employs buses or trams moving at predefined times. This works for as long as transportation needs are limited. But if people have more complex needs – they need to deliver milk, for example, or they need to go into the country – then the bus and tram system is inadequate. So we have to adopt a *less structured* system, such as the automobile, and teach people to manage their own transportation for themselves. Even with cars and trucks, there's still structure – there's still roads and traffic regulations and signals. But the denser and more difficult the traffic, the more ineffective such structures are, and people have to learn how to *self-organize* in traffic. Exactly the same is true of learning.

Right now, we have a basic learning system. We put people into schools and colleges and take them through predefined routes. But if we say we do this because people cannot learn for

themselves, we are fooling ourselves. People *will have to learn* how to learn for themselves, because our learning needs are becoming as complex as our transportation needs.

So how do we approach this. Rita Kop and I looked at one way of doing it, using a MOOC to help people learn the basic tools of learning – the course was called *Critical Literacies* and it was a mixed success. I do intend to try it again, because I think that the basic tools for learning – the critical literacies – are just like the basic tools for traditional learning, like reading and writing, and can be (must be) taught and learned at a basic level of education, with children, as a platform to support future learning.

Assessment and Credentialing

With respect to actual assessment and credentialing, there are two basic approaches, except learning analytics, you mentioned your own approach—a network clustering approach, can you explain it for us?

I can sketch the idea, but it's important to understand that it's an idea that needs a lot of development, and that other people probably have a greater grasp on this idea than I do.

It's a two-step process. In the first step, we identify what the competencies are that constitute expertise in a given area of study. In the second step, we compare an individual's performance against that expertise.

What makes the method I propose different is that I propose to use network analytics for both steps. This is importantly different because the competencies won't be typical competencies, which can be expressed as a proposition (like: 'staple two pieces of paper together') but will rather be a complex collection of network behaviours that can be described in words. So people won't be able to just imitate the right words, they will have to be able to master the actual performance.

Recommendations

Finally as the end of this interview, can you talk about technologies that will impact the development of MOOCs in the future? And make some recommendations for the development of China's MOOCs?

I have never even been to China, so I am very hesitant to make recommendations for the development of China's MOOCs, except to offer wide platitudes: don't close your options, embrace a diversity of approaches, focus on helping people learn for themselves, and develop a culture of sharing and cooperation. But you know all that.

Every technology will impact the development of MOOCs in the future, but we can probably reduce them to three major types of impact: carbon, carbon, and carbon.

First, carbon will play a key role in the development of super-strength materials for construction, etc. Carbon-fibre already has a wide variety of applications (my laptop, a Lenovo, made in China, is made from it). Carbon fibre redefines where and how we can build computing power into things.

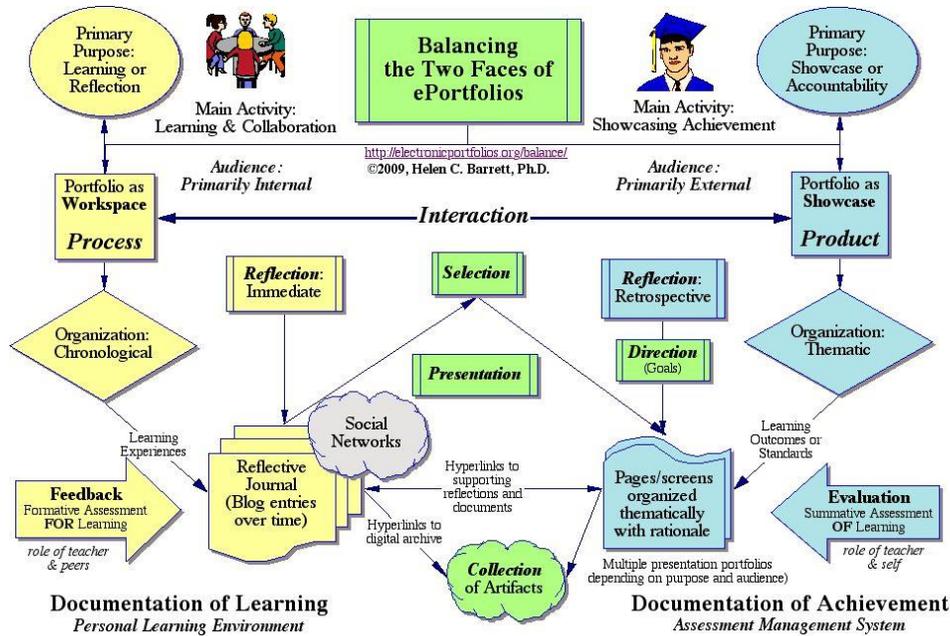
Second, carbon will impact power and information storage. Carbon nanotubes, graphene supercapacitors, etc., will enable powerful computers to hang on the wall, be read like books or worn like clothes.

Third, carbon-based life (such as genetics, organic computing, crops, seeds and medicines) will inform the nature of computing in the future. Connectivism is only the first iteration of this. A next-generation version of connectivism will envision the develop of learning from the creation of network structures to the organization of knowledge in forms resembling DNA.

*Moncton, Canada
October 20, 2013*

A Few Words on ePortfolios

I was asked, *I think that it would be of a great interest that you (as a world wide reference in education) can write a very brief review (between 200-300 words) about your vision regarding ePortfolios.*



(Graphic: Helen Barrett³⁰⁷)

ePortfolios have been around for a number of years now and we're beginning to see how they may be applied in learning and development. An ePortfolio is a collection of digital materials uploaded by a student to an e-portfolio repository; the repository owners can then make this material available publicly to prospective employers or clients, as requested by the student. A good example of such a system is the Desire2Learn ePortfolio system³⁰⁸. A good ePortfolio system will not only allow storage and sharing, but also interact with social networks and support comments and annotations.

³⁰⁷ <http://electronicportfolios.org/balance/index.html>

³⁰⁸ <http://www.desire2learn.com/products/eportfolio/>

As Helen Barrett illustrates (see above) on her ePortfolio website³⁰⁹ the role of ePortfolio has developed in two major directions over the years. On the one hand, the portfolio may focus predominately on learning and reflection. Such a portfolio may come to resemble a student's journal or sketchbook. On the other hand, the portfolio may be used primarily for evaluation and assessment, becoming more a documentation of achievement than a personal workspace. As Barrett notes, the former model focuses on the ePortfolio as process, while the latter contemplates the ePortfolio as product.

In recent years discussion of ePortfolio has been eclipsed by the excitement around massive open online courses (MOOCs). I think this is a mistake. It is important to encourage students to create and share their own work. That said, the focus on taking many courses from multiple providers makes it difficult to rely on a single provider's ePortfolio service. Increasingly, students will have to manage the hosting of their online portfolios on their own.

In the MOOCs we have offered over the years, such as Connectivism and Connective Knowledge (CCK08), we approached this issue by encouraging students to use their own blogs or websites. In this case, the primary function of the central course management system was not to create and store student ePortfolios, but to aggregate from them and to facilitate the sharing of their contents with other students. In this light, a worthwhile project developed at University of Mary Washington called "a domain of one's own" is probably the modern version of ePortfolios.³¹⁰ It encourages students to establish their own web presence independently of service providers.

Increasingly in the future students will be responsible for managing their own online learning records and creative products. Though they may use a variety of services - such as Blogger, Flickr, YouTube, Google Docs, and more - to store their work, they will need to manage these resources, index them, and enable access to them. This will enable them to balance between the process-oriented and product-oriented aspect of their work. This will become important as employers will over time rely less on tests and formal assessments, and will instead look for tangible evidence of personal achievement in web-based repositories. Maintaining an ePortfolio will become tomorrow's equivalent of achieving certification and polishing up one's resumé.

*Moncton, Canada
October 23, 2013*

³⁰⁹ <http://electronicportfolios.org/balance/index.html>

³¹⁰ <http://umwdomains.com/>

Strive Less, Share More

I was asked by [Jane Wilde](#)³¹¹:

Would you be willing to give us a brief response to any one of the following questions. I know each is potentially big, and we don't want to impose. So maybe you could answer with the first thing that comes to mind.

1. What is one skill/attitude/habit of mind that will benefit educators as they strive to be effective and relevant to today's learners (and why)?
2. What skill(s)/attitude(s)/habit(s) of mind can we (educators) help foster in our students so that they can become connected learners?
3. What strategies do you recommend to an educator who wants to become a connected learner?

Actually the same answer applies to all three questions.

What is one skill/attitude/habit of mind that will benefit educators as they strive to be effective and relevant to today's learners (and why)?

In a word, sharing. Or generosity. Or giving without thought of reward.

I once read a piece of advice to seminar and plenary speakers which said, in effect, "love your audience." It's attributed to [Luciano Pavarotti](#). "Some singers want the audience to love them. I love the audience."³¹² The idea here is that the secret to successful performance is to give without reservation. I talk about the same concept [here](#)³¹³ in a summary of a talk by Michael Wesch. "...Diana Degarmo. She was talented, but inexperienced. She was horrible for the first three weeks, and then became a rock star and went almost to the end. They asked what happened. She said, her hairdresser said, "Love your audience and they'll love you back." Instead of focusing on self, she focused on the beauty of the audience and the whole event."

The idea of giving yourself over to the performance of whatever you are doing without reservation is actually very old. It can be found, for example, in the Buddhist concept of mindfulness. As the [Wikipedia article](#)³¹⁴ (accurately) summarizes, "Enlightenment (*bodhi*) is a state of being in which greed, hatred and delusion (Pali: *moha*) have been overcome, abandoned

³¹¹ <http://esmequnhua.blogspot.ca/>

³¹² <http://chrisguillebeau.com/3x5/luciano-pavarottis-secret-for-online-success/>

³¹³ <http://www.downes.ca/post/53377>

³¹⁴ <http://en.wikipedia.org/wiki/Mindfulness>

and are absent from the mind." And it is reflected in Taoist tradition. "Therefore the sages place themselves last but end up in front, are outside of themselves and yet survive. Is it not due to their selflessness? That is how they can achieve their own goals." [Tao Te Ching, ch. 7](#)³¹⁵ Even [Leviticus \(19:17\)](#)³¹⁶: "You shall love your neighbor as yourself."

We see the concept a lot in the literature and [lore of performance](#)³¹⁷ in the idea of giving yourself over completely to your performance, without worrying about making a fool of yourself. [Cynthia Heimel](#)³¹⁸ says, "When in doubt, make a fool of yourself. There is a microscopically thin line between being brilliantly creative and acting like the most gigantic idiot on earth. So what the hell, leap." The best performances come when people think least about what they will earn for themselves, when they feel they have nothing to lose, when they commit themselves fully to what they are doing. The same applies in athletics, and in work. Devoting yourself completely to helping the *other* succeed is what builds success in yourself.

From the perspective of education, the same principle applies. And yet it's so hard to find in the literature. [This page](#)³¹⁹ has '30 tips for storytelling' and not one of them talks about actually giving yourself over to the idea of delivering the maximum good to the listeners. It's full of "tips and tricks" but these so often serve (and fail) as substitutes for authentic caring about the outcome. When telling a story to children (or to anyone) the practice of completely immersing yourself in the story, becoming the voice of the characters, and listening to yourself with the children's ears, is paramount. It not merely improves your performance, it makes you *care* about whether the story is of any value at all, and to navigate the story, and yourself, toward that end. It's not about 'the moral of the story' - that's usually the message *you* want to pass on. It's about how best to serve the needs of this child in this moment.

In my own work, I seek (often imperfectly) to accomplish the same objective. It is not merely a sideline, but a priority, to share the work I do. This comment, for example, will be posted on my blog, where it will be read by people who will think it useful, people who will think it stupid, and people who will wonder why I would bother posting it at all. I can't care about what they will think of me for posting it. What I care about is that it is a full and honest expression of the work that I am doing - in this case, offering an answer to a small group of graduate students studying new media and educational practice. Look around, and the examples of great web practice you see are also examples of this principle - [Randy Pausch's last lecture](#)³²⁰, for example, as a gift to his children. "If you lead your life the right way, the karma will take care of itself. The dreams

³¹⁵ <http://www.taoism.net/ttc/complete.htm>

³¹⁶ <http://www.biblegateway.com/passage/?search=Leviticus+19%3A9-18&version=ESV>

³¹⁷ http://blogs.citypages.com/gimmemoise/2013/10/sexy_delicious_interview.php

³¹⁸ <http://www.goodreads.com/quotes/26680-when-in-doubt-make-a-fool-of-yourself-there-is>

³¹⁹ <http://www.teachthought.com/literacy-2/30-storytelling-tips-for-teachers/>

³²⁰ http://www.youtube.com/watch?v=ji5_MqicxSo

p.245

will come to you."

Strive less. Share more. If you express this principle in your own life, it will be replicated many times in the lives of your students.

*Moncton, Canada
November 3, 2013*

MOOCs Will Ultimately Play a Transformational Role

This is my contribution to the WISE online debate - you can find other contributions [here](#)³²¹.

The democratization of the MOOC cannot be underestimated

We have reached the point in the history of MOOCs where the initial excitement is waning and people are beginning to ask questions about whether MOOCs will play a useful role, much less a transformational one, into the future. This comes as record numbers of MOOCs are being offered by numerous providers MOOCs have become a worldwide phenomenon, with Britain's FutureLearn launching in beta and the first Arabic MOOCs coming online.

The criticisms surrounding MOOCs are based in fears that they will replace professors with technology, concerns that the social and personal aspects of learning will be lost, concerns about the need for MOOC participants to be self-motivated and academically ready, and concerns about the high dropout rates all MOOCs have experienced. While some early experiments in certification have been started, there is also widespread skepticism that MOOCs can provide a route to traditional academic credentials.

These criticisms, far from identifying where MOOCs will fail, offer glimpses into the future of MOOCs. For while we may agree that these are weaknesses of the current model, the fact is that the advantages of MOOCs make it more desirable to press forward with the concept, rather than abandoning it and returning to traditional online and classroom-based courses and programs.

The first advantage is accessibility. As the name 'Massive Open Online Course' suggests, MOOCs are available to everyone, requiring only an Internet connection (now 40 per cent of the world's population, according to the International Telecommunications Union). Even if certification is not available, the fact that participants do not need to pay tuition makes them especially attractive to people outside the traditional university audience. As evidenced by the hundreds of thousands of people registering for courses like Stanford AI (artificial intelligence), there is significant demand for open access to higher education content.

As important to accessibility is flexibility. People can, for the most part, pick their own time to study. Even if students miss the live online presentations, they can view the recorded archive. They can study the material at their own pace, and even if they fall behind, they can continue to

³²¹ <http://www.wise-qatar.org/edudebate-moocs-disruptive-learning>

access content, work through the examples and assignments, and continue to learn from the course.

The community that develops around MOOC courses has made MOOCs attractive to students worldwide. In 'connectivist' MOOCs, such as those offered by George Siemens and myself, this interactive community is actively encouraged and content contributed to such diverse sites as Blogger, Tumblr, Moodle forums and Twitter feeds is harvested and shared with course participants. In the case of video-lecture based MOOCs, such as those offered by Coursera, communities have developed outside the official channels, as participants meet with each other and discuss the course in their own space.

This democratization of the MOOC cannot be underestimated. It represents a transition in the management of learning from a centrally administered service, such as offered by a corporation or university, to a distributed and essentially unmanaged form of cooperation on the part of students themselves.

And this is what points to the most important element in the future of MOOCs. Today MOOCs are hosted by Coursera or Udacity are based at universities. But over time, they will develop their own presence and their own existence. Take, for example, the Stanford AI course, or the Introduction to Complexity course offered by Melanie Mitchell. While at the moment they are strongly associated with an individual university, over time on sites like Complexity Explorer they will forge their own identity, separating themselves from their university origin.

What will happen in such a scenario is that one course may be offered by several universities. There is no reason why the complexity course could not be shared by MIT, Stanford and the University of Calgary, with local services (such as tutorials, labs and social events) being provided by host institutions, while the content, community and activities are based in the online environment. In the past I have referred to this as the 'online-host provider framework'.

Some pundits have begun to discuss the 'flipped MOOCs', wherein the online MOOC offering is 'wrapped' by the trappings of a traditional course. But this should not be confused with the host-provider framework, where the academic content is defined and provided exclusively by the MOOC providers. Participants will obtain certification from the MOOC provider, which may be converted into local credentials - but the local credentials will be viewed skeptically if not based in the course certificate.

In any case, over time the importance of credentials and certificates will decline. What MOOCs offer is a place and a mechanism whereby individual students can participate in activities and events related to a discipline, work through challenges posed by the course with other members of the community in an online environment accessible worldwide (much like the way open source software works today). These activities leave digital traces, and future employers will not look so much at credentials as they will depend on intelligent software which harvests these traces and constructs a digital profile of prospective employees.

This changes the debate regarding participation and completion rates and even motivation and academic skills. Instead of being requirements imposed by providers on students (usually as a means of assessment for credentials) they will become optional, something students can use to advance their own profile, but not in any way essential aspects of a course. Again, consider the case of open source software (OSS) - a person can contribute as much or as little as they wish, and there's no sense to be made of OSS 'completion rates' or any such thing.

When we view MOOCs as a means of obtaining an education, and establishing a track record, rather than as courses leading to credentials, our original hesitation about the perceived weaknesses of MOOCs can be overcome. The democratization of learning will lead to large and small online courses provided by a range of providers - from major universities to governments to oil companies - but it will be students themselves who decide whether to participate, and whether these courses are worth their time.

*Moncton, Canada
November 6, 2013*

Learning and Performance Support Systems

This post is to introduce you to our Learning and Performance Support Systems program, a new \$19 million 5-year initiative at the National Research Council that I will be leading.³²²

If I had to depict LPSS in a nutshell, I would describe it as a combination of the MOOC project we've been working on over the last few year, as well as our work in Personal Learning Environments (PLEs). The objective is to build a system where individuals can access, and get credit for, learning from any education provider at all, whether from home, the workplace, or at a school.

What follows is a version of the case we presented to NRC senior executive in order to have this program approved. They supported our proposal, and for the last few weeks I have been engaged in developing the program implementation with a large team of NRC colleagues.

Program Overview

The Skills Challenge

Despite existing levels of unemployment in Canada, more than a quarter million jobs go unfilled, many because no candidates can be found. The Canadian Oil and Gas (O&G) sector alone loses an estimated \$4 billion per year due to skills shortages. Canada's O&G sector will need 105,000 new recruits in this decade, including some 30,000 to fill newly created positions.

Similar skills shortages have been reported in other sectors, such as biotechnology and engineering. In Canada, there are 25 job groups that consistently show signs of skills shortages. These groups represent 21% of employment in Canada, they experience an unemployment rate of less than 1%, and show an annual raise in wages of about 3.9%, more than double that of the overall economy.

Training current and prospective employees is time-consuming and expensive. Although advanced learning technologies are available, the bulk of training continues to be offered in the form of in-person courses. These courses are typically quite short, ranging from one day to a week, and are expensive, often costing several thousand dollars, not including transportation and time off work. Many of them are in the Professional, Scientific and Technical Services sector.

³²² <http://www.nrc-cnrc.gc.ca/eng/solutions/collaborative/lpss.html> - I led the program from September, 2013 to April, 2016.

Though there are significant opportunities for growth, Canada's training and development industry is fragmented, with no clear leader, and is subject-focused, with limited competency development and management capabilities. Companies in this sector lack the research depth to advance and grow into new markets. Expansion internationally is difficult without a clear innovation advantage.

Learning and Performance Support Systems

The LPSS program will deliver software algorithms and prototypes that enable Canada's training and development sector to offer learning solutions to industry partners that will address their immediate and long term skills challenges. In the short term, LPSS will respond to the immediate needs of industry with existing tools and technologies on a research contract or fee-for-service basis. In the long term, working with strategic industry partners, LPSS will develop a learning and performance support infrastructure that will host and deliver the following key services:

- learning services and a resource marketplace, providing content and service producers with unfettered access to customers, and employees (and prospective employees) with training and development opportunities;
- automated competency development and recognition algorithms that analyze workflows and job skills and develop training programs to help employees train for specific positions;
- a personal learning management tool that will manage a person's learning and training records and credentials over a lifetime, making it easier for employers to identify qualified candidates and for prospective employees to identify skills gaps;
- and a personal learning assistant that enables a student or employee to view, update and access training and development resources whether at home or on the job, at any time.

The LPSS infrastructure includes underlying technologies to support these services, including identity and authentication services, cloud access and storage challenges, personal records and credentials, document analysis and analytics, and interfaces to third-party services such as simulation engines and other advanced training support services.

Program Design and Scope

The LPSS is designed along three technology thrusts. In the first of the two program phases the Program leverages NRC's existing technologies to execute short term projects while at the same time developing the basis for longer term agreements negotiated with strategic partners. In these short term projects, NRC helps industry provide personalized access to learning resources and services to existing and potential students and employees.

The second phase begins when NRC has signed its first agreement with a strategic partner specifying the development and transfer of underlying LPSS technology from NRC to the

partner(s). At this point, development of commercial services based on the Common Platform begins, in accordance with the signed agreements.

This model is based on the understanding that small projects move quickly while larger agreements require more time to negotiate and finalize. It enables NRC to respond to industry demand immediately with funded, targeted and focused projects, while at the same time supporting a sustainable program strategy.

The figure below provides a simplified view of the various elements that are considered within the scope of the Program (denoted by elements in orange or surrounded by an orange outline).

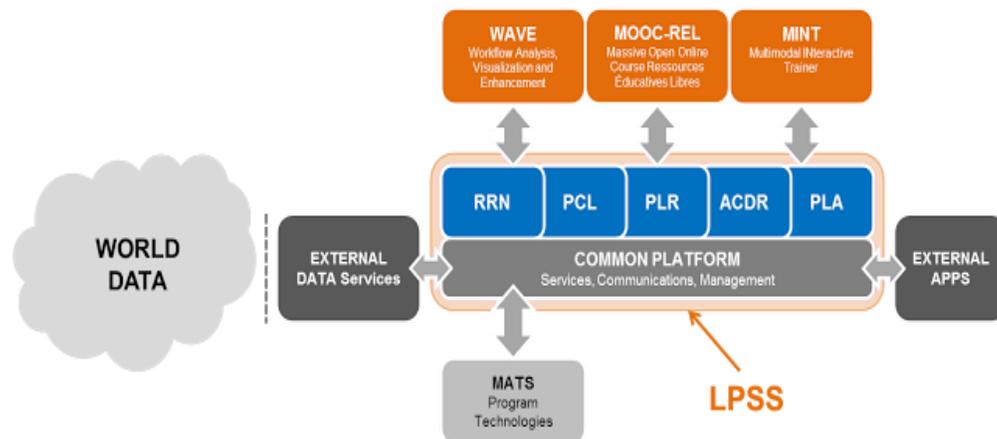


Figure 1 – LPSS Platform Overview

Core Commercial Technologies

Core commercial technologies combine to create an overall LPSS platform through which the services described above (section 1) can be offered. The purpose of the platform is to create LPSS services to interact with existing third-party services, including advanced algorithms and modules developed in other NRC programs.

Development of the LPSS platform will thus focus on three major thrusts that will be pursued during the two distinct phases of the Program.

Common Platform

LPSS will partner with technology companies and end user clients to fund and develop a Common Platform and set of basic applications to enable a first version of end-to-end LPSS functionality. The Common Platform itself will consist of: a learning application for industry staff and their customers; data and information harvesting services; data and information synchronization services across platforms; and a common industry marketplace for training resources and services.

The purpose of this thrust is twofold: first, to develop the necessary software and specifications for the overall learning resource delivery system, and second, to generate a user base including both resource providers and prospective clients accessing the platform. To this end, LPSS will support the hosting of implementation projects throughout the Program's duration.

Capability Development

This second thrust consists of five major projects identified as client priorities. Each of these projects extends the functionality of the Common Platform.

Learning as a Cloud Service – will create a distributed learning layer, which is a mechanism for working with data no matter where it is stored, through desktop, mobile and other devices.

Resource Repository Network – will create a resource graph of learning/training resources data from multiple sources and multiple formats including live and dynamic data such as workplace data, plant instrumentation, or market information.

Personal Learning Record – will define how we represent, capture, and leverage user activity, including ratings, test results, performance measures, and the like, in a distributed learning and work environment.

Automated Competence Development and Recognition – whereas existing recommender systems depend on manually defined metrics and taxonomies, this system will detect new and emerging competences and automatically assess employee performance.

Personal Learning Assistant – will develop an integrated learning appliance, a mechanism for looking up or finding references or resources inside other programs or environments.

Each of the projects within the second phase of Thrust 2 represents investments ranging from \$1.5M to \$2.5M.

Implementation Projects

In this thrust, the Program consolidates development, deploys training, and realizes efficiencies by the end of year five. While there is no individual project associated with this thrust, its purpose is to make clear that all projects will include a stage where technologies are delivered to partners and clients, and that this process needs to be articulated from the start of the Program.

The scope of this thrust extends to the development of IP tracking mechanisms, draft and approval of technology transfer agreements, negotiation and maintenance of licensing agreements, adaptation or installation of technology in client software are systems, and other client support as needed.

Presentation to UNCTAD's advisory group on "Developing skills, knowledge and capacities through innovation: E-Learning, M-Learning, cloud-Learning"



Presented to the Advisory Group on Developing skills, knowledge and capacities through innovation: E-Learning, M-Learning, cloud-Learning, Geneva, Switzerland, by Google Hangout, United Nations Committee on Trade and Development December 10, 2013.

Access

I'd like to begin^{323 324} with the issue of access. This is not where I usually begin a talk, because the main thing, I have to say, about issues of access is that's, to be outside the scope of the areas that I work in. But from the perspective of the learner, the online learner, there are two major

³²³ https://tft.unctad.org/?page_id=2012

³²⁴ <http://www.downes.ca/presentation/333>

forms of access that need to be considered. First of all, there is technological access, ranging from power to Internet access, to mobile delivery.

The main thing that, I want to say, there is that there is a very large difference between any sort of access, and all-the-time broadband access and that this degree of access might facilitate a difference in your ability to enjoy and use e-Learning.

As well as digital access, I want to talk about cognitive access, because this is equally a factor in online delivery. In particular, we face issues of, not only literacy, but also, digital literacy, that is, the ability to actually make use of the online learning materials that are made available to you.

As well, people are facing issues finding time to learn. We've discovered in recent offerings of online courses, people started out enthusiastically, but are unable to finish the course because they've run out of time.

As well, there is the idea that, learning is something that needs to be valued. This is something that does not come from the online course, or even the online environment.

This is something that is created by the community, the child's parents, or leaders in the community, the idea that learning and scholarships are something to be valued, and something to be pursued.

E-Learning

You're probably familiar with traditional e-Learning. e-Learning looks at the online course, as a course.

What I mean by that is the traditional college/university course. Indeed, e-learning in many respects begins as a set of course tools for web support. That's what the original learning management system was: course outlines and tests and things like that that the instructor could put online.

From this early beginning, they began to put course content online, which typically consisted of a text and perhaps some images and graphics. Only after this, do we move into the idea, of learning design and pedagogy, which is drawn primarily from the field of distance learning, where courses are rounded up as packages, or what we might call program texts, designed to lead the student through a course of instruction.

As e-learning developed in the late 1990s, early 2000s, the online course almost began to resemble a book, where the structure of the book was the structure of the pedagogy, and where course content was contained in small learning objects, which were digital materials of chunked content intended for discovery, reuse, and application in multiple online learning environments.

Web course tools, then became mechanisms for collecting, packaging, and presenting these. The course, as a result, began to resemble a publication. You begin to think in course packages complete with content, learning design, everything you need for an online course.

Massive Open Online Course

The Massive Open Online Course, or MOOC, is a bit of a reaction to this. It is, in many ways, an unbundling of this traditional course design. I'll talk about that as we go along.

Very briefly, what I mean by a Massive Open Online Course, is a course that satisfies each of those four terms. You've heard from Google and others about EdX, and Coursera, and the rest, and I caution that many of these online courses do not satisfy all four of these criteria.

By *massive*, I mean, massive by design, capable of handling large numbers of students, but not necessarily actually reaching them. The idea is to build into the design the elimination of bottlenecks or choke points that would make it difficult to deal with very large numbers of participants.

By *open*, I mean, open across many dimensions. Open, not in the sense of anybody can enroll, but open, in the sense of the content is free and open to use, to reuse, and there aren't limits on the use of the course materials.

Online, obviously means online. That does not mean that all course activity must take place specifically, and only online, but that there are no necessary elements of the course that must be taken offline. Put more plainly, you do not have to show up at a certain university campus, at a certain time and place, in order to pass a course.

By *course*, I don't mean course as in course package, in the sense we've just discussed, but rather course in the sense that it has a start date and end date and a sequence of materials in the middle.

Open Educational Resources

The Massive Open Online Course in the sense should be thought of as a form of Open Educational Resource. This Open Educational Resource is a concept that was identified and named by UNESCO in 2002 or 2003³²⁵. The idea of an Open Educational Resource is that it's a digital resource that can be used to support learning.

³²⁵ <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/>

Now, there is some dispute about the *educational* in Open Educational Resource, and we could have a long digression here, but what's important is that, it can be used to support learning. In a sense, any digital resource can be an Open Educational Resource.

As Open Educational Resources have been developed, they've been used to form courseware and this, in the traditional sense that I discussed earlier. An example of that is Open Education Resource University (OERu), created by the Commonwealth of Learning, which is made up of what is called anchor partners, universities from various commonwealth countries.³²⁶

The idea is that, courses are created as course packages using open educational resources. These course packages are offered by different universities for a credit degree.

They follow what is called the logic model, as created by Jim Davies from the University of Southern Queensland. The idea is that you go through stages of openness, from open content, to open learning design, to open educational activities and classes, through open assessment, and open credentialing.³²⁷

Now OERU does not go all the way to the top. Credentialing in the OERU level is closed to all but the participating universities, but with the idea of progression (through types of openness) is a well-established model.

Sustainability

With open educational resources comes the concept of sustainability. The concept of sustainability refers to the capacity of those supporting resources to continue to fund the productions and distribution of these resources. Models of sustainability³²⁸ can be broken down to the commercial models and the non-commercial models.

The commercial model includes the end up selling of extended services, the use of the platform for advertising and marketing, or to support a product, or to support a labor force. So, in all of these cases, the resource will be paid for by some commercial entity, and that commercial entity will expect some return on that initial investment.

Non-commercial models include public knowledge such as, the models provided by public broadcasting corporations such as, TVC, BBC and National Public Radio.

³²⁶ <http://wikieducator.org/OERu>

³²⁷ http://wikieducator.org/OERu/Logic_model

³²⁸ <http://www.oecd.org/edu/ceri/36781698.pdf>

They also include the charity model. OECD released a report called "Giving Knowledge for Free"³²⁹, which really depicts OERs as charity. A third model is based on a foundation or the community such as, the Apache Foundation, the Wikipedia foundation and the open source model, where the costs are borne by the community that is interested in releasing the software.

Publications vs Community

Now, in the study of open educational resources, which I did a number of years ago, for OECD, I looked at the different models of openness, and it seemed to me, at that time, and still seems to me, that the open model of educational resources themselves significantly acts as a sustainability model.

In a sense, there are two ways of producing an educational resource, which we might distinguish: the publications model and the community model.

In the publication model, a contractor is hired, or in some author is engaged, to produce the resource. Sometimes it is a university, sometimes it is commercial publisher, sometimes it is private contracting firm. The idea is that, first the resource is produced, and then it is distributed as a part of a course.

In the community model, the idea is that the community benefits from both the resource and the production of the resource for itself. One example of this is the student produced resources, where students themselves create the resources that will be used in their courses. This is the model that I advocated to the OECD, and forms the basis of the massive open online courses that we have offered.

This is a major difference between the courses we offer, and those produced by Coursera, edX and the rest. These courses use a publisher model of open educational resources, as opposed to a community model open educational resources.

Formal and Informal Learning

This also points to a significant difference in use application, of open online learning. There are many reasons to take a MOOC. And for the purpose of this discussion, I distinguish two major types. First of all, learning in order *to know*, and second, learning in order *to do*.

These characterize the differences between formal and informal learning.

³²⁹ <http://www.oecd.org/edu/cei/givingknowledgeforfreetheemergenceofopeneducationalresources.htm>

In formal learning, the course is defined by the content. While in informal learning, the course is defined not by the content, but rather by the desire of the interest of the user in accomplishing some task or some goal external to the course.

So, there are two different definitions of success. In one case, the formal learning case, success is demonstrated by mastery in the material. But in the case of informal learning, success is demonstrated by completing the task.

This creates a different source of support and a different source of authority for each of the two models.

In the formal learning model, support is intended to be derived from the professor, or the institution offering the course, while the community model receives an example of mutual dependence, and indeed, impendence, for support comes from the community that made the task, and the environment in which the person is working.

Now, in the creation of open line courses, this need for support, I would argue, creates one of these bottlenecks that we are trying to avoid with the design mass of open online courses. And there is a lot of talk about the need of the instructor to be present, with the interaction between the student and instructor, or a student and a team of teaching assistants, or whatever.

This contrasts with the community model, where support is distributed across the community of learners. And it is this distribution of the support, which eliminates the bottlenecks that are inherent in the formal courses.

Learning and Performance Support System

The technology and support that completes the provision of delivery of open online courses, that is to say, what I am describing in the sense to the community model, can be described within a rubric of a program that, we in NRC, are undertaking what is called a learning and performance support system. This will be a \$19 million, five-year program. This program is divided into five major components.

First of all, *access to resources* or repositories of resources. Here, I refer not to specifically ordinary published materials because that is the model of the formal course. But rather the productions created by the surrounding the student learner.

It also involves the *cloud storage infrastructure*, In most applications of cloud infrastructure in an educational context the student's cloud, is managed by, or is essentially the property of, the institutional host of the course. However, what we are looking at is this cloud infrastructure managed by and operated by the student. And this creates the question of synchronization, across multiple cloud providers.

If you look at that, for example, there are many available cloud providers such Google Drive, Dropbox, Box, Cubby, and the rest. A personal cloud is a method of managing access to synchronization of their materials in this cloud infrastructure. Also, this cloud infrastructure serves in turn, as a portal for their E-portfolio, or collection of materials that they created.

There's still a lot of discussions with E-portfolio, and the focus here is to manage on personal, rather than institutional basis, on the portfolio. The major components of informal learning, and personal online learning is the *personal learning record* - this could be a whole-talk in itself.

Delivery, need to be enabled in a variety of environments and there's a lot of talk about mobile devices. But, in my perspective, this is one and for many platforms which learning needs to be available. This leads to the concept of the *personal learning assistant*.

In particular, we would speak the idea of projecting learning resources, and projecting learning resources means, making content services available, wherever the person is, whether it be a laptop, desktop, a mobile computer, working with a tool or appliance, working with software system, or any other vehicle. There is a wide range of possible support.

Finally, in the LPSS, or Learning in Performance Support System, is *analytics, competence and assessment*, and this is essentially the application of artificial intelligence, and the pattern recognition to identify the ways in which a person can become competent at some skill or task, and the gap between where they are, and becoming competent.

Options

Finally, I just want to talk about the model of delivering this type of learning. One model is associated with the Udacity model which is to give up and focus on corporate learning. Of more interest is the Coursera option, but it's only part of the way toward the solution.

The Coursera option is essentially first of all, to focus on the provider, as offering a unique experience. But secondly is the promotion of the creation of learning communities. Now, Coursera has set-up a set of physical learn communities around the world. This is based mostly at US Consulates and similar sorts of infrastructure provided by the American Government around the world.³³⁰

I think, full support of a community-based model of all online learning is to follow what we might call, 'The Triad Model', or "The Host-Provider Framework," Where, the MOOC stands as an independent entity, not belonging to any particular institution, which can be thought of as an event hosted by an online community practice, that start/stops dates and contents in the middle.

³³⁰ <http://www.downes.ca/post/61316>

Where experts, or people who are active in the field, make presentations, provide resources, and generally serve as a focus or an attractor to bring people to the event.

The host is the learning community itself. This may be online. But very often this will be a physically-based community, where a mutual support network is created for people in the community to talk about, and discuss among themselves, to create resources for this online course.

Host communities may be online, or may be community-based groups or a combination of both.

The idea here is that the community brings a part of itself into the community-based open online course. So the course becomes, not only a method of propagating and distributing learning, as though it were a publication or a book, but rather a mechanism for sharing and exchanging information and learning, and creating new learning in the model of conversation in the community.

That concludes my talk, I'd be happy to entertain any questions or comments that you may have.

Audience Member: *I don't think you can see me, but I'm particularly interested in books right now, I'm doing a feasibility study for OECD which is examining how as an organization that could use massive online courses for its own knowledge production, examination and so on.*

I have two questions. One, is on your perspective on MOOC aggregators so the course has new densities and so on. Except for the xMOOCs.

Is there, from your standpoint, a comparison to be made between these aggregators and what else are there and read other sort of journal publishers have done, by basically claiming content produced by universities, by researchers and then selling that content to the same universities, and the same institutions libraries? Just to get your perspective on that.

Thinking and listening to my second question, which is, what would be your advice or recommendation where an organization wants to develop, that makes the decision to develop a massive open online course.

Does an organization today, this is a non-profit organization. Does it need the organization or the partnership with a formal learning institution or a higher education institution, in order to deliver on a promise of not to be scaling up and opening up knowledge and learning? That's my second question.

Scaling Up

I'll answer your second question first, because it's easy. The answer is no. What really matters is that the organization is able to engage on the community, that is interested in learning, in some

way, shape or form. If it was an organization like OECD for example, which just released its PISA results.³³¹ Just as an example.

OECD could easily create a MOOC around the results by setting up a series of discussions, five, six, seven discussions like people who are involved in the case study creating online event and then encouraging the creation of community supported resources around that.

And any organization can do this. It doesn't require educational institutions; it requires mostly some technical smarts, and the idea, that contact of creating that resource. In any open online course created this way you can use open-source technology.

We use technology that developed, but you don't need to use that. You should use, for example, WordPress with the BuddyPress plugin, in order to create a community and aggregate content across that community. I can go into that in a lot more detail, but the short answer is that the idea of a PISA MOOC.

It would not be for people to master the material or learn all of the content. It would be a way for people to get together, to explore the idea of these, and to develop their own thoughts and their own ideas around it.

And people would draw from it, different senses, different communities, different learnings and application of that learning.

Publishing

To answer the first question, it's really hard to distinguish between platform, Udacity, Coursera and the like. The model is...and it's interesting the question was phrased in comparison with a publishing model where professors, universities are invited to contribute their material to a publication, which in turn sells them access to their own material.

The difference between this and Coursera or Udacity is that the publishers are selling the content back to the institution, what they are doing is selling access to the platform in which the content is located back in the institutions.

Technically, in a sense, it's not a case of selling the institutional content back to itself. But that might just be accomplished in any case by sleight of hand. My own preference, and people have heard me express this a lot, is for institutions to manage and publish their own content, their own learning content, their own academic content, their public relations content. There are many good reasons for this, and they are mostly significantly, this content for some raw material on open

³³¹ <http://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>

online course, potential raw material maybe in open online courses, created in many different ways.

If the content is made available for free, then it can be re-used by people offering online courses where they're first setting up an open online course and inviting participants to populate that course useful converted materials, simply by linking to it. This greatly reduces the cost of production and greatly facilitates the ease of creating a course, not just by your academic institutions, but by any institutional provider around the world.

One of the ways I like to talk about this, and it's an alternative way of thinking about this, is that the academic content that is produced by professors, and universities, and institutes, and the like, is not content to be learned and retained by the learners or students, but rather becomes the words in a vocabulary that they use in order to communicate with each other.

Instead of sending sentences, in text, to each other, they send content which they refer to and talk about to each other, and very often content which they modify, and recombine or mash up with other content, to each other.

This content becomes the raw material, not just for the production of other courses, but for the conversations that people have among each other. It is for this reason that open online content is really essential in order to support a community-based model of online learning.

It is for this reason that I found myself, as have many others, butting heads against the publishers, who choose to put a subscription or other barrier in front of this content. What they're doing when they do this, is that they're creating barriers to the conversation that happens between academics and between students with academics and with each other. It makes conversation impossible.

Audience Member: *I have one question, Stephen, from my side. You mentioned something about the personal learning record. Just try to enlighten my mind, because this could be like medical stuff. How do you see, what is your vision about it?*

Personal Learning Records

There's definitely an overlap in the concept between the personal learning record, and the personal health record. One of the important elements here, and I'll start with that, because as I think it characterizes it, is that the personal learning record needs to belong, essentially, to the individual holding the record.

It's not some other institute's record of your learning. It's my record of my learning. This record would need to be able to be supported, or substantiated with reference to individuals, so at least a part of the personal learning record would consist of links to credentials, academic or otherwise, that are held by other institutions.

Much like your wallet contains a driver's license, which is connected to a record in the government department for transportation, certifying that you're able to drive, and contains some insurance record which is connected to an insurance company record, which is a statement of their policy.

What's important here is that, like your wallet, it's personal. You don't show it to people. Other people can't look at it without your permission. You show it only to people that you want to see it.

The other aspect of the personal learning record is that, it contains links, references, and metadata regarding your performance. This would refer directly to evidence of that performance in the form of an e-portfolio or records in academic content service providers, et cetera.

In its widest sense, the personal learning record will keep track of all of the learning that you've done. This is the basis of a lot of analytics that providers of the MOOCs and learning management systems will talk about, where they talk of tracking a student's performance.

The difference between a personal learning record and a platform-based analytics, is that a personal learning record, can extend beyond the limits of the platform.

While a platform, such as an LMS, can only analyze your performance inside the LMS, a personal learning record would look at your work inside the LMS and would look at your work in social networks like Facebook, Twitter, or whatever.

It would look at your work in application programs such as Word, PowerPoint, et cetera. It provides a comprehensive picture of your own personal performance. This is why it's very important that access be restricted and security managed, so that your record remains personal only.

The thing is, this can be used as the basis of what we might call personal analytics, as compared to platform analytics, creating a network of voluntary exchanges of information, about personal performance and academic achievement among a community of learners, to create analytics based on the whole person in comparison with relevant information, to other members of the community, or of other members in the community.

Audience Member: *I don't know if you can answer this question, but you were talking about the difference between formal learning and informal learning. You were talking about the fact that the formal learning part is more about, how do you define success is by people completing the course, the formal course.*

I wonder, because we had someone from Google just before you. We were talking about that, saying that open learning is the news. It seems that people are not really so much interested in getting a certificate of the courses they have done.

I wonder if you had any sense of this evolution, or do you know the percentage of...are people interested in this completion course or certification anymore or not?

Because in the UN system, we are very much into the formal learning approach and the very formal certificate approach of credentials, or maybe compliance legislation. We don't have it good so far, sometimes. I wonder what's your knowledge about that.

Credentials

I think, probably the major observation of massive online courses has been that, their completion rates are low, and therefore certificates are offered for completion of the course. The certificate rate is low.

A big part of this is caused by the phenomenon of drop-ins, or tourists as they're sometimes called, people who just look at the course because they're interested in the content of the course, but they don't have the intent of moving from start to finish.

I will say that, the model of learning, where you proceed through course material from start to finish, and complete with some sort of a capstone exercise, such as a test or a presentation or project of some sort, is a very common model in learning.

It's a common model that characterized e-learning for many years. This model is well-known. The difference between MOOCs which follow this model, and traditional online courses is actually pretty minimal, the only difference being that the content available to MOOCs would be openly accessible.

Generally, there tends to be a limit or a restriction on completion or certification. As I mentioned, OERu requires that you enroll at the university to receive the capstone. Coursera has a model where they verify a person's identity for a fee, and that's how you get your certificate there.

I think there is demonstrated interest in obtaining the certificates. It's not the majority of participants, but it's a significant, non-negligible number of participants. I'm thinking of a graph that was drawn by Phil Hill and Michael Feldstein.³³²

Looking at the size of these populations, and as I recall the graph in my mind, it's in the 15 percent range, plus or minus ten percent of people who were interested in the certification.

³³² <http://mfeldstein.com/insight-on-mooc-student-types-from-eli-focus-session/>

This is especially the case, among that population that is outside Western Europe and North America, and where there are significant challenges to employment, and where even something like the Coursera certificate, say, would be a significant advantage in obtaining a job.

We do see this and that explains quite reasonably why certificates of completion are of interest to organizations such as UN. Where do I want to go with that?

Community Assessment

From that perspective, I think, Massive Open Online Learning forms a better alternative than the traditional system, but not a dramatically better initiative because the need for certificates faces the same barriers of technological and cognitive access.

It faces the same sort of bottleneck in terms of evaluation and assessment of the credential. The more you attempt to assess a credential, the more time and labor intensive it becomes, and that's a real concern.

Just to put this in context, and to explain partially why, I think that the open community-based model will ultimately be a better alternative, I think we're right at the point where, instead of evaluating learners by capstone exercises or credentials, we'll be able to evaluate people according to their portfolios, and according their performance in open online networks.

You see this in communities like the open-source software community already, where people are able to demonstrate their leadership capabilities and their software capabilities in an open community and can obtain employment, by that means.

This is true for Google... we might have mentioned that Google, in particular, has been known to hire people directly out of open source projects, for example people who created Mozilla foundation on the basis of the work that they've done in this environment.³³³

With intelligent analytics, and with learning and performance data shared in an open online environment, it will be possible to create a learning profile of people, drawing on their personal learning record, such that we no longer need these credentials offered by an institution, but rather only need the actual evidence of their performance, in order to create a comprehensive picture.

I think, we're looking at a coming sea change in the nature of assessment and certification. It's not here yet. It's going to take five or ten years, but I think it's definitely coming.

Audience Member: *I don't see any more questions from the floor, but just one sentence can sum up your vision or... I know it's hard, but just so we can go through.*

³³³ <http://arstechnica.com/uncategorized/2005/01/4549-2/>

One Sentence

I think that the future of education is in people working communities to provide their own learning, as opposed to having their learning provided for them by publishers or institutions. How's that?

Audience Member: I just have one comment, which concerns the ISO norms in terms of accreditation. We haven't been mentioning it and I'm wondering if someone could. We are not very aware of this inside of the WFP. We know that this has been an initiative. What is actually your experience concerning this?

Standardization

Stephen: I now know, what you mean by ISO. I would say ISO. It points to, even if you're using the same language, the problem of translation.

There's a lot about ISO I don't know. I'm familiar with the ISO metadata for learning, I forget the exact...it's LMR - Metadata for learning resources, which is a classification, a categorization scheme.³³⁴

I would not be surprised if there were other ISO standards that I'm not aware of, but I'm going to be careful and say, I don't know the full range of ISO standards with respect to learning, because ISO is just so huge. It's a question of standardization of quality in general.

It's expressed not only by ISO but also, for example, in initiatives like Common Core in the United States and even to some degree in the PISA evaluations which are setting baselines for math, language and science learning (Interestingly, not art, geography, or history, but that's a different issue as well).

It does point to the danger of standardization, and the danger is probably most characterized by the difference between formal and informal learning.

That is, this standardization presumes that everybody has the same objectives, the same understanding of quality, the same concept of mind. That's true of formal learning but it's less true of informal learning.

Standardization implies in many respects, that there is a definition of quality that can be created for a particular set of resources or a particular domain, and again, that's not necessarily going to be the case in informal learning.

³³⁴ http://en.wikipedia.org/wiki/ISO/IEC_19788

That is not to say that, there is no distinction between quality and lack of quality, but rather that quality is a relative property. Quality is in many ways in the eyes of the beholder, and in the case of education, the beholder includes not only the student but the education provider and the society in which the education is provided. If we look at the different values of different societies, we see that there's going to be a very different understanding of quality.

In my own case, I like to distinguish for the purpose of standardization between *syntactic* and *semantic* activities.

Syntactic activities refer to the mechanics of the interaction. We think of plumbing. Think of the pipe fitting, the size of pipes, the gauge of the thread, and material used in pipes. These standards are made, in order to make sure that pipes fit together with each other.

Electricity has standards regarding wattage, amps, the gauge of wires, the width of the light bulb that screw into the light socket, et cetera. This is to make sure the light bulb fits into the light socket. The standards do not address what you run through the pipes, mostly.

It certainly does not address what you use the water for, what you use the liquid for. The standards do not address what you're going to light with the light that you're lighting. In cases of meaning, value, content, et cetera. I don't think that they can apply standards.

In cases where you're dealing with semantic elements of learning, I think that it would be a mistake to establish standards, because each person approaches semantics from a slightly different perspective. That, I think, is the role of standardization, where can I identify my syntax mechanism for interaction.

I think, they're really important, but where we're looking at communicating values, I think, we need to look at other non-standardized approaches. It would be a community kind of approach where these things are determined as a result of interaction among people operating in and information network, and that's a short version of a very long concept.

*Moncton, Canada
December 10, 2013*

Economists and Education

Fred M Beshears writes, "*Here's an [upcoming panel discussion](#)³³⁵ that might address some of the issues we've been discussing. It will be interesting to see if the idea of 'Open Education' becomes linked to the idea of 'Free Trade'.*"

Does he mean the 'free trade' where corporations and capital are free to move about the world seeking the lowest possible wages and benefits while citizens are locked in their own countries by passport, visa and immigration laws that make it impossible for people to leave the sweatshops and migrate in search of higher wages?

Does he mean 'free trade' where commerce is governed by documents hundreds of pages thick and which can only be understood by lawyers, and even then only after jurisprudence, such as the case of NAFTA?

Or even the idea that 'education' is a commodity that ought to be produced and protected and bought and sold as though it were property? Because I'm not sure economists can see it in any other light.

Indeed, instead of asking how economists should consider campus course import and export policies, wouldn't it be more relevant to question why economists have any influence on education, articulation or matriculation policy at all? After all, degrees and certifications shouldn't simply be things bought and sold on the open market - should they?

Steve Foerster writes³³⁶, "*I'm with you on the immigration issue, and agree that regardless of what it's called, if something is long and hard to understand then it's almost certainly a way to protect well connected companies rather than really being a free trade agreement.*"

"I believe that most economists would look at education not as a commodity, but as a service. And it certainly can be provided like any other service, although people with different first principles will disagree whether it should. I don't think economists have all the answers, but in areas where they know what they're talking about it's unwise to disregard them."

I agree that " in areas where they know what they're talking about it's unwise to disregard them." No doubt they understand currency exchanges. But they do not understand education.

³³⁵ http://www.us-jpri.org/en/week_201402.html#event7

³³⁶ http://innovationmemes.blogspot.co.uk/2014_02_01_archive.html

'Teaching' is a service. An 'education resource' is a commodity. But 'education' and 'learning' are neither commodities nor services. You can't buy a 'temporary PhD in Astrophysics' the way you can buy a temporary tattoo.

Economists get this sort of thing wrong a lot. Other things that are neither commodities nor services are 'climbing a mountain', 'true love', 'health', 'a positive outlook', etc.

The reason economists aren't able to deal with this is that they cannot be expressed in monetary value, not because they're priceless, but because they cannot be counted.

Even the word 'commodity' has suffered from this sort of myopia - it originates from the Latin from Latin *commoditatem* (nominative *commoditas*) "fitness, adaptation, convenience, advantage," from *commodus* "suitable, convenient", but only in the 15th century with the rise of mercantilism does it come to mean, "benefit, profit, welfare;" and later "a convenient or useful product."

You can't count 'fitness' or 'adaptation', you can only count the proxies for these, and economists over time have come to value these proxies so thoroughly they do not even equate terms like 'education' and 'learning' with their original meanings.

That is why when we read people like Kevin Carey we read a lot about test scores, about institutions' ranking on league tables, about the value of a degree, and such.

A bank or a business can be judged to be 'successful' by economic metrics, but I think few would judge the 'success' of Harvard or MIT in their respective communities in terms of the money they make or even the earnings people accrue from having attended them. When I visited Harvard, I went there to soak in the weightless atmosphere, not to count bricks.

Economists are the logical positivists of social and cultural theory. They believe they have been able to identify a strictly rational path from observations to principle. But along the way, they have lost the concept of 'value', rendering it a useless reduction into purportedly theory-neutral 'observation statements' and hypothetical-deductive models. Economists should read [Quine](#)³³⁷. But, of course, they don't. There's no money in it.

I wouldn't complain, and would be happy to pat economists on the head, just as I do logical positivists and behaviourists, and say "there there, that's a good boy," but they have inserted their way into political and policy discourse, creating a misguided and generally harmful social and political theory, often known as 'capitalism', into common convention and culture.

³³⁷ <http://www.ditext.com/quine/quine.html>

But as my friend [Graeme Decarie writes](#)³³⁸, "Government is a social institution, not a financial one." It may make sense for a business or large corporation to achieve 'success' through the reduction of others (aka 'the competition') to poverty, but government and society cannot function this way.

Economists talk and act as though we will accomplish nothing if what we accomplish is not measurable, because progress toward that 'accomplishment' cannot be tracked. In a business environment, where we are exchanging value and money for accomplishment, this makes sense. To a person cycling on a lonely dead-end forest road, this simply seems confused.

And hence, talking about education in the same terms as 'free trade' comes to make sense for them, while to any more knowledgeable observer the identification of these two very different things is at best a dog whistle and at worst a conceptual howler.

And that is why there is no merit to debating an economist on education or learning policy. It's like debating a True Believer. As [Bill Nye found](#)³³⁹, after a certain amount of discussion you ask your opponent "what would change your mind about this?" and the answer comes back, "nothing."

I put it to economists, what can you prove? They spend all their time coming up with explanations about the past. What can they really predict? All these interventions that they propose - programmed learning, class size rationalization, anti-teachers' unions, high-states testing, educational league tables - all these seem to have, when tried, a negative impact on learning. If chemistry or even education were wrong so frequently, we would be comparing them with phrenology and astrology, not discussing whether we can design a society based on such principles.

I've stopped reading people like Kevin Carey. If I want to read about numbers, I can consult a calculator.

*Moncton, Canada
February 24, 2014*

³³⁸ <http://themonctongrimes-dripdrain.blogspot.ca/>

³³⁹ https://www.youtube.com/watch?v=6j8Babr_n4w

Like Reading a Newspaper

I've stated this in many times in talks and interviews, but I can't find it anywhere in my actual text-based materials, so let's get it on the record so people can have something to cite, should they want to.

It has to do with MOOC completion rates, and the oft-cited criticism that MOOCs have low completion rates. Here's a [citation](#)³⁴⁰:

The average completion rate of xMOOCs is 7.6%, with a minimum of 0.67% and a maximum of 19.2%. The 19.2% appears to be an outlier from Ecole Polytechnique Fédérale de Lausanne, although it may be worth figuring out how they got their rate so high.

Other people have argued that there is a very large number of people who sign up and never return, and that completion rates are much better if we look at the number of people participating after the first rate. But that's fine; let's stipulate that completion rates are abysmally low.

My response is that this argument misunderstands the nature of MOOCs (and certainly, MOOCs as we've designed them in the connectivist world).

The traditional course is designed like a book - it is intended to run in a sequence, the latter bits build on the first bits, and if you start a book and abandon it part way through there is a real sense in which you can say the book has failed, because the whole point of a book is to read it from beginning to end.

But our MOOCs are not designed like that. Though they have a beginning and an end and a range of topics in between, they're not designed to be consumed in a linear fashion the way a book is. Rather, they're much more like a magazine or a newspaper (or an atlas or a city map or a phone book). The idea is that there's probably more content than you want, and that you're supposed to pick and choose from the items, selecting those that are useful and relevant to your present purpose.

And so here's the response to completion rates: *nobody ever complained that newspapers have low completion rates*. And yet no doubt they do, probably far below the 'abysmal' MOOC completion rates (especially if you include real estate listings and classified ads). People don't read a newspaper to complete it, they read a newspaper to find out what's important.

³⁴⁰ <http://mfeldstein.com/the-most-thorough-summary-to-date-of-mooc-completion-rates/>

This, indeed, is the model for most media, and most things. I've made similar analogies many times:

- nobody says the restaurant has failed if a person doesn't eat all the foods in a buffet
- nobody says a map has failed if a person doesn't look at or reference every street name in the gazetteer
- nobody says that a hockey or football game is a failure if you didn't watch every play from every player beginning to end
- nobody says a grocery store is a failure because a person doesn't complete the food selection available
- nobody says a television channel is a failure if people don't watch the entire run of programming from sign-on to the national anthem
- nobody says a Lego set is a failure if a person does not build every model in the guidebook

It's actually very rare to find media of any sort that is intended to be consumed in its entirety. Most of the time, in most things, we pick and choose what is *important* to us. That is the normal mode of interacting with content, and it is the normal mode of interacting with a MOOC.

I know that the book-people think completion is very important. But theirs is in fact a very small words. And even in the case of books, nobody thinks a library a failure if you don't read everything in the collection, or an author a failure if you don't read their entire *corpus*. And just so with MOOCs.

Update March 23, 2014 - some Twitter interactions

@mweller Mar 21: Like reading a newspaper - @downes with a nice MOOC analogy (blogged partly at my request, ta Stephen) <http://halfanhour.blogspot.ca/2014/03/like-reading-newspaper.html> ...

@mdeimann Mar 21: but still such an argument does not work for education where there is a lot of obligatory content to know.

@mweller Mar 21: yes, i don't think Stephen is saying all education needs to be this way, but for moocs as he envisages them

@mdeimann Mar 21: ok MOOCs should not be portrayed as an opposite to trad. education but as vehicle that helps engaging people into it.

@downes Mar 22

Why? Why shouldn't MOOCs, especially as I see them, not be considered an alternative to traditional education? People talk of necessary content that must be learned. Even given this, why can't a MOOC provide it? Why must we be led? Moreover, where is the argument that there

is core content that must be learned in any (let alone all) courses? The lack of common standards, and difficulty transferring credit, argue the is no core content, and if not cMOOCs can replace traditional ed.

@mdeimann Mar 21: but still such an argument does not work for education where there is a lot of obligatory content to know.

@mweller Mar 21: yes, i don't think Stephen is saying all education needs to be this way, but for moocs as he envisages them

@mdeimann Mar 21: ok MOOCs should not be portrayed as an opposite to trad. education but as vehicle that helps engaging people into it.

22 Mar 2014 @downes

Even if these are pre-requisites there isn't exactly one way to study them, not exactly one body of materials to study. and even if there is exactly one way to study (still not granted), the evidence is most universities get it wrong... I recall my own calculus class in uni, for example - a prof with a thick accent, an impenetrable text, chaotic tutorials. But in fact, knowledge has neither an internal order nor a socially constructed order; there are at best conventions...

*Moncton, Canada
March 21, 2014*

The MOOC of One

Presented as *The MOOC of One* at International Academy of Technology, Education and Development (IATED), March 10, 2014, in Valencia, Spain.

I want to talk about the MOOC of one³⁴¹. What I mean by that is I want to talk about the development of the MOOC or the Massive Open Online Course. I'm one of the people who designed the concept originally in 2008. I want to explain myself so that you know what we did and why we did it. And I want to lead into a discussion of what will follow, what the next generation technology will be to follow after the MOOC.

I want to do a bit more than that. I want to begin this conference challenging you to rethink some of your perceptions about what it is to teach, what it is that an education is supposed to provide. We have this picture in our mind that an education is to shape or to transform, or in some way make somebody something, whether that somebody be a doctor, whether that somebody be a responsible member of society, whether that somebody be employed or an entrepreneur.

I want to begin by asking the question, "What does it mean to be one person?" What does it mean to be, say, Valencian? What does it mean to be a doctor? We have this intuitive idea that we think we understand when we begin to educate someone, we're going to make somebody a doctor, but what does that mean? I'm not sure we even know, and a major part of the reason we developed the MOOC is to challenge our thinking around some of these ideas.

In the traditional course, and that includes the traditional online course as well as the traditional offline course in traditional education ([Pape](#)³⁴² talked about it as well) we have this idea that there is the authority at the center who will throw content at you - lots of content, piles of books, piles of video, and hope some of it sticks.

Even the MOOCs, the Massive Open Online Courses, that have followed the MOOCs that were developed by George Siemens and myself, the courses offered by Khan Academy, Coursera, Udacity, Udemy, and the rest are all based on the idea of some body of content.

Is being one being the same? That's kind of a hard question. It's not even clear what I mean when I ask that. Let's take doctors. Does being a doctor mean having exactly the same knowledge as every other doctor? No.

³⁴¹ <http://www.downes.ca/presentation/336>

³⁴² <https://www.linkedin.com/pub/pape-samb/7/627/7b2>

Pape told us quite reasonably, different people work in different contexts. If they all had the same knowledge they might be useful in one place, perhaps New York General Hospital, but not useful in another place like Moncton General Hospital where I live.

Two contexts, two ideas of doctor. Just throwing content at people, cannot be sufficient to create doctors. It's the same with being a Valencian, or being a pine tree, or being anything else. It's not just being the same thing. Is everybody in Valencia the same? As I walked all around the city yesterday, I can tell you they are not!

What is it to be a Valencian? Think about that. If we're trying to promote cultural awareness say, "What does that mean? Do you have everybody memorize the Valencia song?" No. George Siemens and I created the MOOC, the Massive Open Online Course, to challenge some of these ideas.

People often ask us, "What do you mean by MOOC?" We say, "Well, Massive Open Online Course." They say, "No. What do you mean by MOOC?"

What I mean is **massive**, not massive in the sense that we saying not or that we reach 1,000, 10,000, 1 million people. Anything can be massive in that way. Sea weed is massive in that way. What I mean is massive by design, massive in the sense that it can continue to scale without losing its essential shape.

In a typical course, the more you scale, the more you begin to depend on the central professor, the more elevated the central professor gets, and at some point, you have this iconic figure at the front of the room talking to all the masses. That becomes something very different from education where it was just and your friends figuring out how to put a truck together.

Education changes. Traditional education changes when you make it massive. We wanted to design a system that could scale without changing the nature of learning.

Open, by open, we meant free, *gratis*, *en français* and *libre*. Free as in beer, free as in open, free as in the doors aren't closed. Free, as in you can do what you want with it.

By **online**, we meant online. The reason why we meant online is because we understood that if we required somebody to actually physically attend our classroom, people in Africa, and people in India, and people in Europe would not be able to take their course, and we wanted them to.

And **course** is certainly an odd thing, but a course is something really, very simple. A course is something that begins, something that ends, something that has a topic, and that's about it. You might ask, "Well, why courses? Why not communities, video collections or whatever?"

We wanted to have something small that you can involve yourself in without committing yourself to for the rest of your life. You join a community, you're stuck with it, but the course, you have the happy knowledge that eventually this course will end, and you're out of it.

This is what our Massive Open Online Course looks like. Our Massive Open Online Course has a little website in the middle, but mostly what the Massive Open Online Course is about is the set of interactions between the participants.

What we've done, very deliberately, in our open online courses, is to create this kind of network structure, so that the promotion of information, the distribution of content, is a very, very minimal part of what the online course is.

We've done a number of courses in this model. We began with the course called 'Connectivism and Connective Knowledge 2008,' and that's popularly known as the first MOOC. It became massive only by accident. We set it up, we expected about 22 students. We got about 2,200 students. We were very surprised by this, particularly since the topic isn't exactly widely popular. 'Connectivism and Connective Knowledge' who signs up for that? Artificial intelligence, yeah, I can get that.

We did more courses. We did one called "Personal Learning Environments Networks and Knowledge," PLENK. George named that course. I had nothing to do with it (the name). We had a 30-week marathon course called "Change," in which we learned that 30 weeks is too long to have a Massive Open Online Course. We had one on the future of higher education. We did that one with the Chronicle of Education, EDUCAUSE and the Gates Foundation. That was very short course. It was over before it even started.

Right now we've just, in the past week, launched a course in French, a French language course called REL, Ressources Educatives Libres, Open Educational Resources 2014³⁴³. We have about 1,000 people attending this course.

We've got some experience behind this. We're beginning to figure out what it is that makes a MOOC work, what it is that makes a MOOC not work. We've applied these lessons to open online learning generally.

One of the things I've learned to expect in the first weeks of every single course that we offer are complaints. So many complaints the first week.

"Reading this course is like reading a dictionary," they say. Or there's always someone, "I can't find anything. Where's the nice, easy navigation?" Or there's always someone, "I don't know what to do. Tell me what to do. I don't know what to do. Tell me what to do."

Always people complaining. "There's too much content to read." I say, "Well, pick something then, and read that." "Just pick something." "No..."

³⁴³ <http://halfanhour.blogspot.com/2014/02/rel-2014.html>

[laughter]

In a sense, I don't blame them. I get it. It's confusing. It's hard. It's awkward. It would be so nice if we just gave you a series of videos and told you "Follow this path. Do this thing. This is the process. That's what we all want."

Instead we give them this. Look at that mess. That's the course we designed out of the box, and then we told our students -- our participants, as I prefer to call them -- to take that, and add on to that, however they wanted.

We did not want to tell them what to do. We had people create groups in Second Life. This was back in 2008. Second Life was still a thing. We had people create Google Groups in the REL course. That's happening right now. There are Google Groups set up. There's a Facebook group that's set up. There's a Twitter hashtag that people follow.

People spin off and create their own communities, their own version of this course. I try to convince Robert, who's my partner, Robert Gregoire, in presenting this course: people never go to the website. And it's true. They don't go to the website. They're too busy taking the course to go to the website.

People want process. Let's think about that. Is that how we become 'one'? Is that how we become a doctor? If we do the right things in the right order, that will make us a doctor. Does that seem right?

There's a whole school of thought, or multiple schools of thought, out there in the world. In the history of philosophy, different ways of defining identity. Operational. You are such-and-such if you do this kind of operation in this way.

Telephone operators are like that. I guess they don't do that anymore, but there used to be people in telephone offices that connected lines for you. They did everything very precisely, in the right way. I'm showing my age here.

Sometimes people define somebody in terms of the function or the purpose or the similarity of method that they use. We wonder is that what we mean. Is a doctor just a person who does things in the doctor method?

No. Not really. That's not really what we're training them to be. So there's got to be something more to learning to be a doctor than just serving the right function.

What about teleological? We hear this a lot. The course should have objectives, and if you satisfy those objectives, you will thereby have become a doctor or a Valencian or a pine tree or whatever.

But that doesn't work either. You can have all the objectives in the world, but still not be the thing that you wanted to be. Why not?

Philosophers have worried about this long before I have. There's a guy call Thomas Nagel. He looked at theories of identity based on operation, or function, or objective, or goal. He said, "These are empty because they miss the aspect of what it feels like."

I think that's pretty important. To be a Valencian is to feel like a Valencian. Isn't it? I don't really know what that feels like, because I know I'm not one.

He wrote a paper, Nagel did, called "[What Is It Like To Be a Bat?](#)³⁴⁴" That's really interesting because we could do everything a bat does and still not know what it's like to be a bat, because there's a certain sense in which it *feels* like something to be a bat.

There's a whole basis for definitions of educational method based on feel like this. It's the idea of creating the experience of being such-and-such. You want to teach somebody to be a doctor? You create the experience of being a doctor. You want someone to be an entrepreneur? You create the experience of being an entrepreneur, very much like what we just heard.

There's a lot of merit and a lot of validity to that. This is where we see theories like discovery learning and experiential learning coming into play. I happen to think there's a lot to the idea of having the experience.

Thomas Kuhn -- who wrote "The Structure of Scientific Revolutions" -- when he was asked, "What is to be a physicist?" He said, "Well, it's not knowing a whole bunch of things. It's seeing and feeling the world in a certain way. It's knowing how to answer the problems at the end of the chapter."

The problems at the end of the chapter never have anything to do with what's inside the chapter. If you've ever taken physics, you know what I mean. They're tests of a way of seeing the world, not just a reciting of facts.

What is it to create a doctor? What is it to create a Valencian? We create the experience.

I saw them doing that. In Valencia yesterday, I walked around the city, and in the air, they are throwing firecrackers and lot of firecrackers and having celebrations and eating in the sidewalk cafes in great big pans of paella. People are in the city learning what it feels like to be Valencian.

We have that aspect because it's a really important aspect in our MOOCs. The idea of creating this underlying network or layer of support that gives people the interaction and the experience that they need to have in order to feel like what it is to be such-and-such.

³⁴⁴ <http://rintintin.colorado.edu/~vancecd/phil1000/Nagel.pdf>

Our first course, Connectivism and Connective Knowledge 2008, it was about being an educational technologist (we love recursion). We are teaching people how to be like us.

What we tried to do is create this experience and what it's like to be an educational technologist. We built the resources and we have people create their own resources. We set up this whole dynamic web.

From a provider perspective, this all makes a lot of sense. If you're seeing this from the perspective of the institution giving the learning, we're really on to something here. We have the students create content, we have students who are receiving content.

We have some course content that we're throwing into the mix. We have maybe events, recordings, all the elements there in our course of a whole community, really. Our course could be Valencia. It isn't obviously, but it could be.

All the structures are there, the experiences, the ways of speaking, the conversation with each other, the doing things, the making things, of finding your path around the city, all of that. We have created the experience of being an educational technologist. That's what we tried to do in the course.

But that's not enough. It turns out that our feelings are notoriously unreliable. I *feel* like I'm a doctor. I'm not.

Think about personal identity. What makes you, you? Most people say, I feel, I have my memories. I have my thoughts, my stream of consciousness. Of course the first question that comes up is what happens to you when you're sleeping then? Where do you go? The *feeling* of something disappears. Our memories go away. What happens to them when we're not having them? Do they no longer exist? Simply, our sensation of the experience is not enough. We need to build more into it.

I'm glossing over a lot here. There have been over the 20th century two major approaches to this question, which I'll call 'The Big Answer' and 'The Small Answer'. Yes, I made those terms up at about 2 AM last night, and I'm very sorry. Now you know what I do the day before a talk.

The Big Answer is this. We have the experience. Think of it as a movie screen or a computer screen. It's in my head. We have the experience and what creates that experience is we turn the camera out into the world and our experience is of the world.

What we're doing as students is trying to make sense of that experience. That's an approach to education based in semiotics, in meaning, in context, in representation and it's an approach to education based on not just what we feel, but objective external fact. There is a lot of sense to it.

This is where we get things like social constructivism or even empiricism or logical positivism where there is learning. We are trying to construct, or make sense of, or make meaning out of the perceptions that we have out there of the world. That's the Big Answer.

I'm glossing over very quickly here, but this is fun.

What's the Little Answer? Instead of the camera pointing out there, you turn the camera in and point it in here. Why not? Here are our experiences. Whether we're pointed out there or pointed in here we know, we're going to see the same thing.

The littler answer is we're trying to make sense of our own awareness, our own cognition, our own understanding. The Little Answer is based on a primacy of reason, it's based on critical or digital or whatever literacy's. It's based on the idea that we can look at whatever our mental contents are and make sense of them.

Education is a process of making sense of these things. Sounds great. Social constructivism, neuro-constructivism, it's a very popular approach to learning, so much better than dumping content on people, so much better than trying to make people just do the right functions, so much better than just experience, because now our experience has a context and a frame.

A significant part of the educational world is in agreement with this, and they have good reason to be. Frankly, this is where I think George Siemens is. George Siemens is smack dab in the middle of the Big Answer.

I think that his version of connectivism is social constructivist of some sort with a network overlay. I take it a step further, because here is my problem: there is no one to do the constructing.

Think about it. Here is my screen, here is my camera pointed out, pointing in. Who is doing the making of meaning? There isn't some other little guy looking at all my perceptions, figuring things out, because then *he* would have to have a camera too to look at my perceptions.

That's the problem with social constructivism. There is no constructor. There is no person other than the learner themselves to do the constructing. There is no little man, there is no camera. That picture I just gave you, the Big Answer and the Little Answer - take the camera away. There is no camera. There is no one to construct our representations for us.

Now I've just destroyed every educational theory there is, what's left? I'm very sorry about. What's left is this screen, except it's not just a screen. That's [an idea](#) from the 1,600s, this idea that there is this *tabula rasa* on which you have senses that make little impressions.

Actually, this is a very special kind of screen we have, which is our mind, our brain. It is in fact a self-organizing network. Interestingly, so is Valencia, and interestingly, so is a group of crickets

and indeed, pretty much any large number of things that can interact to together, are self-organizing networks.

They are *at once* perceptual systems and reasoning systems. There is no constructor. The thing that has the feelings is also the thing that organizes the feelings. That makes sense doesn't it?

I know, I've got to tell you more of a story than it. I've got to prove it with numbers and logic. I've got to show you working examples. I get that. It's a half hour talk. You'd have to give me some slack.

How do these self-organizing networks work? There are some design principles that make good ones as compared to bad ones. What's a good one, what's a bad one, we can talk about that.

In general, human neural networks, student educational experiences, the cities, ecosystems and anything else you want to create a network out of work better if they satisfy the following four criteria.

Autonomy, the individuals in the network makes their own decisions.

Diversity, being one isn't about being the same. Let me repeat. Being one isn't about being the same. Being a Valencian isn't about being the same, being a pine tree isn't about being the same, being a doctor isn't about being the same. Diversity, in fact, is what makes being doctors possible.

Interactivity, the knowledge created by a network is created by the interaction between its members and, as we would say, is emergent from its members and is not simply the propagation of one person's opinion to another, to another, to another, to another. Everybody contributes together to make knowledge.

There is no one person out there who is the person in charge of what it is to be a Valencian. This concept is ridiculous.

This is why when Pape says, everybody has something to contribute, everybody has something to contribute, because what it means to be a Valencian is determined by the totality of activities, thoughts, expressions, being of every single person in that city.

You take one person away, Valencia is different. Kind of an important realization. Your approach to learning changes when you realize that.

Finally, *openness*, because networks cannot work if they are closed. Networks cannot work if there are barriers to communication, if there are barriers to entry, if only some kind of messages are allowed.

These are the design principles. You don't have to like them. It's an empirical matter as to whether or not networks that have them function better. My proposition is take a bunch of

networks, test them against these principles. You will find that they worked better if they're going to shape these principles. Don't trust me. Go test it.

That leads us to this concept of personal learning. What is personal learning? We talked about MOOCs, talked about it open online learning, all of that. I'm going all way from massive courses to talk about individual personal learning. Why? Because the approach of a MOOC is based on the idea that individual people as defined by that screen, that's self-organizing screen are taking the course. This is the thing.

When we design these MOOCs, we realized every single person taking our course is going to be different. Some use Internet Explorer, some of them use Firefox, some use Opera, who knows why, some even use Safari (and nothing works in Safari! [laughter]). Different languages, different cultures. Some people want to get the knowledge, some people want to socialize, some people want to meet other people.

We had one person in our first course, the sole purpose of their membership in the course was to call George and I techno-communists. That's what they wanted to do. That's cool. We've gave them their chance and they did that and everybody went on their way. The whole idea of the MOOCs the way we built it is based on the idea that each person is a self-organizing, perceiving, and reasoning system of neurons (and the course as a whole each person is a self-organizing, perceiving, and reasoning system of people).

In our MOOCs, there's no constructor of things. MOOCs (and people) are self-organizing networks that process and organize perceptions in a natural automatic way given that they are provided proper nutrition, diversity, openness, autonomy, and the rest.

From the student's perspective, if they're taking the MOOCs - reflect on your own experience here for a second - they're right at the center. Goodness, they might even be taking more than one MOOC at a time. From different institutions at the same time, I know it's heresy but they might be doing that. They might be communicating on WordPress or on Flickr delicious, posting videos on YouTube, but they're always at the center of their Internet sphere.

That's basically how we, in developing the next phase - remember I promised a new technology after MOOCs - but here is what it looks like. It's really MOOCs Mark II, but now we're telling the story from the perspective, not of the education provider, but from the perspective of the individuals who are participating in the learning.

We understand that they are perceiving and reasoning self-organizing networks. They will be coming into this with that capacity, but with those needs, and therefore what we're attempting to do, we're creating something called learning and performance support system (I'm really sorry about the name) to provide that measure of support.

In practical concrete terms, technological terms, and I can only gloss over this at the center is a *personal learning record* where a person keeps their learning records and everything related to do with their learning.

We have support for a *resource repository network* to access all of these resources out there in the world. A *personal cloud* to allow them to store their photos, videos, et cetera, wherever they want.

A *personal learning assistant* (no we don't mean an iPod, no we don't mean an app) - what I mean is a way of projecting the capacities of this system of the personal learning environment and of the associated learning resources, MOOCs, et cetera into whatever environment they find themselves. Maybe it's into a mobile phone, maybe it's into a computer, maybe it's into a car.

I like to tell the story of a fishing rod. The fishing rod is very smart. It's connected to your LPSS, to your personal learning environment, and your fishing rod would help you learn how to fish, and it will complain if you do it improperly. Fishing rods are known for having short tempers.

And for what we call an *automated competence development and recognition* which is a long way for understanding and again come back to a path here. Understanding what the gaps are in our knowledge, what resources we need in order to obtain the knowledge, obtain the resources, become the kind of person we want, help us self organize into being whatever it is that we're trying to be.

There's some more organized description of the same project. The blue things there are the research projects that I've showed you, research repository networks, and the rest. We're working with different organizations and companies to provide extensions of the service and we're working with education providers and the rest of the Internet in order to connect up the learning resources that are available around the world, from different MOOCs and different learning providers into each individual person's personal learning environment.

So what is it to be 'one' after all that?

In a sense, to be one is to know that you are one, to *know* that you're a doctor, to know that you're a Valencian.

But what does that mean? If you look at how these self-organizing, perceiving, reasoning networks worked, basically what they are - and I'm glossing - they're pattern recognizers. Now that's a simple two word explanation and more complex functionality, but it will do.

So, if you're Valencian (are any of you Valencian here? How many of you are Valencian? One, two, three) you recognize that building (don't you? I assume you do because you're really a bad example if you don't) and the point here is that there isn't some sort of set of conditions, set of sameness, functionality, all that big long, long definition, et cetera. You look at the building you

recognize it. How does that happen? Because you're self-organizing, perceiving, reasoning neuro-network is the kind of think that recognizes things.

How does one doctor know that another person is a doctor? The doctor *recognizes* another doctor. To *be* one is to *know*. To know that one is a doctor, a Valencian or whatever is to recognize that they are. It's a matter of pattern recognition, a perceptual property.

And finally to be one is to be you. Now, everybody talked about *massive* open online learning. I don't care about the massiveness of open online learning. It's important - that there are seven billion people in the planet, whatever we do has got to work for everyone of them - but it's only going to work for every one of them, one person at a time. There's no other way of doing it.

There's no other way of doing it because there's no other way that's going to be genuine. There's no other way that's going to be effective. What makes the MOOCs special is that each person taking the MOOCs makes it their own. They create and shape their own learning according to thier own needs and their own interests, their own values, their own objectives. And that to me is what learning and education is all about.

So I hope you're thinking about these things. The different ways of knowing how something is one, the different ways of knowing whether you've trained someone to be a doctor, incultured them into being a Valencian, or just persuaded them to recognize pine trees.

Think about these things as is hear the presentation and think about the views of learning in education underlying the different presentations that you'll hear over the next three days. These slides and way too many more presentations are all available on my website and I thank you for your kind and patient attention.

*Valencia, Spain
March 25, 2014*

Connectivism as a Learning Theory

I think the students in the Building Online Collaborative Environments Course have an almost impossible task. [Here is their effort](#)³⁴⁵ to prove that connectivism is a learning theory.

"Connectivism has a direct impact on education and teaching as it works as a learning theory. Connectivism asserts that learning in the 21st century has changed because of technology, and therefore, the way in which we learn has changed, too.

"Not too long ago, school was a place where students memorized vocabulary and facts. They sat in desks, read from a textbook, and completed worksheets. Now, memorization is not as prevalent because students can just “Google it” if they need to know something."

Though this is not very accurate, in fairness it was an impossible task because of the readings they were assigned ([Verhagen's criticism](#)³⁴⁶ of connectivism and [Siemens' response](#)³⁴⁷ to Verhagen) and because the context appears to be the application of learning theories in the [classroom](#)³⁴⁸.

Verhagen's criticism is an early and not particularly well-informed criticism, which Siemens does a reasonable job refuting. But if the sort of perspective of connectivism that you're given is one where 'you look up answers through your network instead of remembering them' then your understanding of connectivism will be significantly limited.

What is a Learning Theory

So in this post, let me clear, first, about what a theory actually *is*, and then let me outline the ways in which connectivism can be thought of as a learning theory.

To start then: theories *explain*. They're not handbooks or best-practices manuals. They're not taxonomies, in which a domain of enquiry is split into types, steps or stages. Theories answer *why-questions*. They identify underlying causes, influencing factors, and in some cases, laws of nature.

³⁴⁵ <http://spring14-bce-01.wikispaces.com/Group+A+6-A-1>

³⁴⁶ <http://www.scribd.com/doc/88324962/Connectivism-a-New-Learning-Theory>

³⁴⁷ http://www.elearnspace.org/Articles/connectivism_self-amused.htm

³⁴⁸ <http://coolcatteacher.blogspot.com/2007/02/connectivism-in-classroom.html>

Explaining why learning occurs has two parts: first, describing what learning is, and second, describing how it happens (or what causes it to happen). Both parts are important. Theories may be as deeply divided about what something *is* as they are in how it happens.

A learning theory, therefore, *describes what learning is* and *explains why learning occurs*. It is not a teaching manual or a set of pedagogical best practices. You don't 'apply connectivism in the classroom' (though you might apply an *understanding* of connectivism in the classroom).

What is Learning?

According to connectivism, learning is the *formation of connections* in a network. The learning theory, therefore, in the first instance, explains how connections are formed in a network.

But think for a moment about how this contrasts with the theories of learning offered by other theories. For example:

- in behaviourism, learning is the creation of a habitual response in particular circumstances (or as Gilbert Ryle would say, to learn is to acquire a *disposition*).
- in instructivism, learning is the successful *transfer of knowledge* from one person (typically a teacher) to another person (typically a student).
- in constructivism, learning is the creation and application of *mental models or representations* of the world.

As you can see, these are very different stories about what learning is. This is why it's difficult to compare theories of learning. The vocabularies are different, and they are talking about different things. Thomas Kuhn called this the *incommensurability* of theories.

As you can see, connectivism says that learning is something very different from what is described in other theories. This is one reason we say connectivism is a learning theory: the vocabulary of learning it employs is in some ways importantly incommensurate with that of other theories.

When I say of connectivism that 'learning is the formation of connections in a network' I mean this quite literally. The sort of connections I refer to are between *entities* (or, more formally, 'nodes'). They are not (for example) conceptual connections in a concept map. A connection is not a logical relation. It is something quite distinct.

In particular, I define a connection as follows (other accounts may vary): "A connection exists between two entities when a change of state in one entity can cause or result in a change of state in the second entity."

Why is this important? Because it captures the idea that connections are something that we can observe and measure (they're not a black box), and because it captures the idea that networks are

not merely structures, but also that they enable (what might be called) *signalling* between entities.

How Does Learning Occur?

The question of how learning occurs is therefore the question of how connections are formed between entities in a network. There is a deep and rich literature on this topic, under the heading of (not surprisingly) 'learning theory', though most of it is published outside the domain of education. The first chapter [available here](#)³⁴⁹ provides a good overview.

The literature describes either actual networks of neurons ('neural networks', such as human or animal brains) or simulations of these networks ('artificial neural networks'), which are created using computers. In both cases, these networks 'learn' by automatically adjusting the set of connections between individual neurons or nodes.

This is a very different model of learning from that proposed by other learning theories.

- In behaviourism, learning takes place through [operant conditioning](#)³⁵⁰, where the learner is presented with rewards and consequences.
- In instructivism, the transfer of knowledge takes place through memorization and rote. This is essentially a process of presentation and testing.
- In constructivism, there is no single theory describing how the construction of models and representations happens - the theory is essentially the proposition that, given the right circumstances, construction will occur.

To be fair, a long discussion here would be required to talk about constructivist accounts of model or representation formation. This is a weakness of constructivist theories - there's no particular means to determine *which* constructivist theory is actually correct.

And this points to an underlying weakness of all three approaches: they all involves, ultimately, some sort of *black box* beyond which no further explanation can be provided. *How* does reward stimulate behaviour? *How* is transferred information stored in the brain? *What* is a model and *how* is it created?

In my talks I've presented four major categories of learning theory which describe, specifically and without black boxes, how connections are formed between entities in a network:

- *Hebbian* rules - 'what fires together wires together' - neurons that frequently share the same state then to form connections between each other

³⁴⁹ <http://www.michaelnielsen.org/ddi/neural-networks-and-deep-learning-first-chapter-now-live/>

³⁵⁰ http://en.wikipedia.org/wiki/Operant_conditioning

- *Contiguity* - neurons that are located near to each other tend to form connections, creating a clustering effect
- *Back Propagation* - signals sent in reverse direction through a network, aka 'feedback', modify connections created by forward propagated signals
- *Boltzmann* - networks seek to attain the lowest level of kinetic energy

The actual *physical* descriptions of these theories vary from network to network - in human neurons, it's a set of electrical-chemical reactions, in social networks, it's communications between individual people, on computer networks it's variable values sent to logical objects.

These are the actual learning theories. Connectivism essentially collects these theories together into a single package as a mechanism for explaining how connections are formed in a network.

Building on the Theory

These are the foundations of connectivism as a learning theory.

As you can see, it has nothing to do with 'looking up the answer on Google' or any of the surface characteristics commonly associated with it.

A connectivist view of the world is very different from one found in other theories.

For example, to the question *what is knowledge* a connectivist will talk about the capacity of a network to *recognize* phenomena based on partial information, a common property of neural networks.

Connectivism proposes therefore what might be called 'direct knowledge', following the work of people such as J.J. Gibson. This is very different from what might be called 'indirect knowledge', which is based on the creation of models or representations using an internal (and possible innate) language or logic.

Consequently, a connectivist account of *literacy* will be very different from that found in other theories. These theories are essentially language-based and are concerned with the coding and decoding of information in such a language. Major principles will revolve around syntax (aka grammar) and meaning and truth (aka semantics).

A connectivist account of literacy reinterprets both syntax and semantics, looking well beyond rules and meaning. In my 'Speaking in LOLcats' presentation, I propose a six-element connectivist account of literacy, one that also includes elements of cognition, context and change.

Additionally, the question of how we *evaluate* learning in connectivism is very different. Rather than focus on rote response, or on manipulations inside a model, a connectivist model of evaluation involves the *recognition of expertise* by other participants inside the network.

In connectivism, the principles of *quality* educational design are based on the properties of networks that effectively respond to, and recognize, phenomena in the environment. In various works, I have identified these as autonomy, diversity, openness, and interactivity. These are very different from standard accounts of quality.

With each of these aspects of connectivism being identified and developed, it becomes increasingly apparent that a connectivist sees learning very differently from those who follow other theories.

They see a person learning as a self-managed and autonomous seeker of opportunities to create, interact and have new experiences, where learning is not the accumulation of more and more facts or memories, but the ongoing development of a richer and richer neural tapestry.

They understand that the essential purpose of education and teaching is not to produce some set of core knowledge in a person, but rather to create the conditions in which a person can become an accomplished and motivated learner in their own right.

*Moncton, Canada
April 21, 2014*

Mass Collaboration Workshop

Introduction to the Workshop - Ulrike Cress

Why a workshop in mass collaboration? Recent mass phenomena: Wikipedia, tagging, blogging, Scratch, massive open online courses and connectivism, citizen science, maker-space.

Who is creating these? Nature article on massively collaborative mathematics (see the wiki PolyMath).

How do we describe these phenomena? Is it just aggregation? What role does coordination play? Is it a mass phenomena? Is it an emergent phenomena? Is it collective intelligence? And what are the processes behind this?

In science we need new methods for this. Previously, we would passively observe - but now we want people interacting. We have to try and find what these methods can do.

Can we design mass collaboration? Is it just something that self-starts, or can we create this?

CSCL 2013, we brought together people to talk about this. This led to the larger workshop we are hosting today.

A Brief History of Mass Collaboration

Allan Collins, Northwestern University

Homo sapiens traded with others many miles away, while Neanderthals did not. Trading leads to specialization, which is the first basis for mass collaboration - it leads to people getting better at producing things, via division of labour. This altogether creates a virtuous cycle of increasing trade, specialization and learning.

The next major development is the development of cities. Geoffrey West - when creativity is measured by patents, by researchers, etc., a city 10 times larger is 17 times as creative. Examples of hotbed communities include Cremona, Hollywood and Silicon Valley.

Marshall's theory of hot spots: these areas exist for three reasons:

- pooled resources - workers and firms are drawn to these places
- specialized products and services - for example, hairdressers and agents in Hollywood
- 'ideas in the air' - information and skills flow easily between people

Brown and Duguid on Silicon Valley - 'The Social Life of Information' - there are these 'networks of practice' across firms, eg. software engineers, LAN designers, etc. So knowledge flows across firms to find its most successful niche. Even where there are failures, that seeds

different companies in the Valley. People can see what's doing, what's doable, and what's being done.

The third major development was the invention of writing and printing. Writing allows you to share ideas at a great distance and hand down ideas to later generations. It is what makes 'study' possible (Walter Ong) which is critical to science, history and geography. Printing led to the spread of books and universal literacy.

The world scientific community, fourth, created a set of norms and a set of structures. For example, scientific meetings like this foster interaction among scientists. It produced scientific journals to spread findings and ideas. And it produced government support, because the more science you have the more invention you have. Scientific norms include: objectivity, replication, equal standing, and sharing of data.

Clay Shirky, in 'Here Comes Everybody', argues that the internet and the web are making it much more possible for all sorts of new ways to collaborate to occur. Here's the list:

- web communities: Xanga, fan fiction, Scratch
- collaboratories - share tools, data, designs
- digital libraries: videos, satellite data, models
- public repositories: Flickr, YouTube, Wikipedia
- collective action: Twitter, Facebook
- crowdfunding: ArtistShare, Kickstarter
- MOOCs: Coursera, Udacity, edX
- Games: Foldit
- Open source: Linus, Wikipedia

Shirky makes the point that weird and risky ideas have a much better chance of taking hold and that 'collaborative entrepreneurs' like Linus Torvolds and Jimmy Wales can succeed. This process, he writes, undermines existing hierarchy - eg., 'Voice of the Faithful' - which responded to the Church's suppression of the priests molesting young people - it is only something that happens in this particular communications world.

I would like to think the ideas Seymour Papert and Ivan Illich are now more likely to be brought to fruition - for example, the 'Samba Schools' where people teach each other in Brazil. Schooling segregates us, it creates peer culture. Illich wrote of (a) resources everybody could have a hold of, which is what collaboratories enable; (b) skill exchanges where people who had expertise can share it with others; (c) peer communities.

As you get more and more collaboration, you get a speed-up of innovation. This leads to what Toffler called Future Shock.

Gerhard Fischer

Center for LifeLong learning & Design, University of Colorado, Boulder

There are two types of problem transcending individual human minds or individual disciplines:

- problems of magnitude which individuals and even large teams cannot solve and require a contribution from all stakeholders, for example, Scratch, Wikipedia, 3D-Warehouse
- problems of a systemic nature requiring the collaboration of many different minds from different backgrounds, for example, approaches to lifelong learning, aging population, etc.

For example, an article from Axel Pentland (MIT) in Der Spiegel asking the question, where does mass collaboration start? At six people, at 60 people? Units with more people than the size of a mid-sized city are difficult to organize with today's technology.

So, what is the research methodology here: from how things are, to how things should be. Marx: philosophers interpret the world in different ways, but what matters is to change it. So, how do we study how things could be? This requires theoretical frameworks going beyond antidotal (anecdotal?) examples helping to interpret data in order to understand the context- and application-specific nature of mass collaboration.

People have employed new media in learning organizations as gift-wrapped around our existing understanding of learning and education. But we need a rethink: "distance education is not learning in a classroom at a distance." We evolve new forms of learning. For example, we define rich multidimensional landscapes of learning. Eg. 'how' - in a classroom the instructionist domain scales well, but problem-based learning does not scale. (Say).

Looking at the shift from consumer cultures to cultures of participation, where everyone can participate in personally meaningful problems. The Encyclopedia Britannica is an example of consumer culture; but Wikipedia is an example of a culture of participation (of course, we should differentiate between different levels of participation). Other examples: iTunesU, YouTube, Encyclopedia, PatientsLikeMe, Scratch, Stepgreen, SketchUp and 3D Warehouse.

Two different models for knowledge construction and sharing:

- model-authoritative (you first filter, then you publish - the output filters are not needed because the content is authoritative);
- model-democratic (you publish, and then you filter - you need better output filters to (eg.) find the information).

We had a research project that analyzed the SAP Peer Community Network (SCN). It was designed to help companies know what they know. What is the 'tea time' for mass collaboration networks? Some of the dimensions investigated included:

- responsiveness
- engagement intensity

- role distribution
- reward mechanisms

Another project: the CreativeIT wiki - in which we learned that most wikis are dead on arrival. You see this a lot - they set up a wiki where everyone contributes, but you go back 6 months, and there's nothing there. Our wiki - we put a lot of effort into it, we seeded it, and it did not take off. So we are studying why this is the case.

There are ecologies of participation - we can find clearly identified roles, from project leader and core members out to bug reporter, readers and passive users. (SD - and then there are a series of mechanisms designed to move participants up one level of participation).

So we turn to MOOCs - the hype is that MOOCs will revolutionize higher education. There is both over-hype, but also under-estimation of MOOCs. So what did MOOCs contribute? They generated discussion transcending the narrow confines of academic circles, they represented an innovative model that shook up models of learning and institutions, and they might force residential research-based universities to focus on core competencies.

But we need frames of reference on MOOCs: many of them are looked at by economic (scale, productivity, cost) and technology perspectives. But another perspective: global versus local. MOOCs can reach out beyond national boundaries. In the US you have miles per gallon, while in Europe it goes litres per 100km. Now if you think about mass collaboration and trying to create a common understanding among people, this is probably a common problem. (SD- yes!)

We worked on the Environment and Discovery Collaboratory (EDC) - we created 'reflection spaces' where people could act on what they were reflecting. But we found there were only 12 people around the board - what about mass collaboration? Perhaps a virtual equivalent to the face-to-face meeting? This would fit the mass collaboration paradigm. Then you can have the local one having theirs, but you could collaborate with people in Costa Rica.

So - what are the open issues.

- can there be a lower limit for the number of participants? Is this number context-dependent?
- is there a difference between collaboration, cooperation, coordination, participation, etc.?
- in MOOCs (often with over 10K people) - does any mass collaboration take place among the participants?
- does any mass collaboration take place in Facebook and Twitter? If no, what are the future developments to create mass collaboration?
- is there 'participation overload' in the way there is information overload?
- is active participation in whatever form an absolute prerequisite for mass collaboration
- are there problems society is facing that make mass collaboration an necessity?
- what is the role of personal idiosyncrasies?

In summary: mass collaboration and education is an important theme for further research.

Mass Collaboration as Co-Evolution of Cognitive and Social Systems

Ulrike Cress

Mass Collaboration is typically presented as an artifact - for example, Wikipedia. So we see mass collaboration as a conflict of two systems, a cognitive system and a social system. The cognitive system is autopoietic - it exists through its own operations, it operates by a process of meaning, and is operationally closed; thoughts build on thoughts.

On the other side, the social system is also seen as a system, but it operates not through thinking, but through communication, which entails a reciprocal understanding. It happens between people, but it is stimulated or irritated by its environment. It as a system tries to make meaning - it processes information, some things become central, others things die out - it's the the system that decides over time.

These systems interact - both systems can be an environment for the other, both systems can be irritated by the other. Each can stimulate the other's development. This co-evolution - both systems develop each other. How do we study these systems?

1. Wikipedia - how it operates, how it builds meaning. For example, the coverage of Fukushima (Daiichi Nuclear Power Plant). Point of reference: the Wikipedia 'norms' - neutral point of view, citations from authority, etc. In the first 9 days: 1200 edits, 213 substantial. 194 had a reference, 19 did not. For the references, some came with a reference, some were added after the fact. There were only 4 deviances from neutral point of view, and these were deleted almost immediately. So the principles were followed.

The quality of the constructed knowledge - by day 9, according to experts, the Wikipedia was a balanced and objective presentation of what happened (even though most authors had no formal knowledge in engineering or nuclear power). So, laypeople wrote the article, but as a collective the social system could make meaning.

2. What triggers co-evolution? The difference between both systems - how they are able to irritate each other. There must be a difference between the personal and the social system. We ran a test where a person and the system had different 'pro' and 'con' arguments for an issue. What we found was that a middle level of incongruity created the most change (and the most learning).

3. Large-scale study of Wikipedia - to confirm this result. Eg., a domain 'traditional and alternative medicine'. We found about 45,000 articles (via machine learning) - these were being modified by a large number of people. We created article profiles to determine whether articles were more or less in favour of alternative medicine. We could also do the same for the authors. We could thus calculate the incongruity between the author and the article.

When authors started working on articles, they were at a middle level of incongruity. So the most productive activity took place at the middle level. It is the incongruity that triggers co-evolution. This created productive heterogeneity. But there's an optimal level of heterogeneity. If a person wants to change the system, he/she must adapt to the system. Hence mass collaboration is not free or not democratic at all. If you bring in an idea that is not accepted by the system you will have no impact on the system.

Individual vs Collaborative Information Processing

Aileen Oeberst

There is a great deal of literature about the benefits of collaboration, but from psychological literature we know that individual information processing is biased. Does this bias level out in collaboration? Or does this translate to collective bias. Or does it become more extreme?

So, for a bit of research, we took as a question, whether individual biases are mirrored in collaboratively authored Wikipedia articles. Wikipedia has of course strict rules such as verifiability and neutral point of view. These rules are intended to prevent bias, and they're pretty good, but there is a concrete counterexample.

The bias is hindsight bias. We say 'we could have foreseen this'. The bias is, your perception after the event is different from what they were before the event. In hindsight, the likelihood, inevitability and foreseeability of an event is always increased. Take Fukushima. Or the Turkey coal mine disaster. People try to explain these things, to make meaning out of them. So you selectively focus on information that is consistent with the outcome of the event, and ignore the information that would have spoken for a different outcome.

Hindsight bias has been repeatedly demonstrated. Once you know about it, you see it repeatedly in newspapers. It's widespread, difficult to avoid, and people usually are not aware of it. So it is reasonable to assume that hindsight bias is shared by Wikipedia authors, and that it enters into Wikipedia articles. So is there evidence for hindsight distortion in Wikipedia articles?

The method was to find things where an article existed before the event. For example, there was an article about the Fukushima power plant. They were analyzed to ask 'to what extent does the article suggest the event was likely to happen'? The number would be the same if there is no hindsight bias. But there was a significant increase. Of 17 events, 6 or 8 events did not have any tendency at all, while the others demonstrated a range of between factors of 1 to 7. Eg., before the accident, there's a small 'accidents' section, after the event, there was a large selection of design issues and risks (mostly from data that existed before the event).

So why select these and not other references. First, because it added to the explanation. But also, there was a selection based on relevance.

Limits: we can't conclude that all of Wikipedia is biased, nor say we've found an overall pattern. There is a substantial number of articles without any tendency.

A second study looked at more events, including both unknown (disasters, etc.) and known (eg., elections) events. Categories included disasters, decisions, elections, personal decisions, etc. The same mechanism for evaluating the events was used. What we see is that only for disasters do we see the significant hindsight bias.

So: there was no hindsight bias based on whether the event was known in advance or not. Nor is there a general hindsight bias. But there was a hindsight bias for disasters. But - in hindsight - this makes sense. They have considerable impact. You would like to prevent them. So they elicit a particular need to be explained. And this creates a search for antecedents.

Future work: to example whether collaboration increases bias, whether using biased resources increases biases, looking at other biases (eg., ingroup biases, such as distorted representations of their own group - is there a difference of representation in different language versions in Wikipedia? eg. Manypedia analysis of the 6-day war in different languages).

Wai-Tat Fu – Illinois

From Distributed Cognition to Collective Intelligence

Perspectives, from cognitive science, and from HCI/CSCW. How do we define success in mass collaboration? How do we define success for a cognitive system? Perhaps in a competition, eg. Deep Blue versus Kasparov. The outcomes were controversial - Deep Blue did win. But also the process - did the program just do search? A human can evaluate 100 times fewer moves than the machine. But maybe the outcome is not what we like to consider success.

Physical Symbol System - cognitive computations involve operations of symbolic structures in a PSS. How about collaboration? Maybe we can expand from computations inside-the-head to those that involve multiple heads (cf Andy Clark's 'extended mind' theory) (cf also 'the Siemens answer' in connectivism - SD)

So, why does search become important? Cognitive computations **always** involve search. All computations are local in the sense that there's no what happens here will impact something else. When local computations need more information it needs to know where this information is and how to access it. And local symbol structures make heuristic search possible. What matters most is whether you have enough local symbol structures that make such a search possible.

(By putting these terms all in computational terms that means you can actually implement them.)

So - even though you have local computation, you always have to access the symbol structures from a distance ('distal access'). The crux of the argument is this: local to distal access to

information. This has to keep on going until you've found the distal symbol structures that you need. This local to distal symbol processing is they key to intelligence.

Examples:

Chess: from 'Deep Blue' to 'modern' chess programs. They represent a shift from searching for massive numbers of moves, to 'intelligent search' - learning from a lot of patterns. 'Success' is defined by how much searching the computer does *not* have to do.

Web information search: based on representations of web data, so you don't have to search every listing. The agent needs 'knowledge' to choose the right action based on local information, and local information has to have sufficient structures to enable this.

(Video - Aibo robots playing soccer - better 'square robots' actually passing the ball - (Stone and veloso video))

How do robots know how to do that? There must be some kind of rules to tell them what the others are doing. So what sort of rules should we pay attention to? You have to have some kind of model for what the other person's doing.

So - for collaborative systems - what kind of rules do we want people to have, and what kind of rules might we want to impose?

Successful collaboration involves local to distal heuristic search processes to achieve a set of goals. ie., using local information, each agent needs to infer how to find the information.

Eg. in mass collaboration - we look at how multiple minds collectively 'search' for information, where knowledge is a set of symbol structures that allow efficient search.

Eg. in animals, success depends on how well they can exploit the local-to-distal symbol structures.

Eg. cognitive psychology / science - success depends on how well knowledge is structured.

Eg. sociology - network analysis shows the importance of networks, of nodes and edges, where success depends on crucial network structures.

Another example: Wikipedia. Wikipedia has very good local structures. The problems with Wikipedia that the structures seem very local - the method for linking is perhaps too stone age - they don't provide much local information for assessing the right distal knowledge. So the challenge is: how to make local structures more coherent and local. Eg., maybe by having individuals provide semantic structures.

An example of such an approach is social tagging. These generate local structures, but not enough to help access distal information. And again, the challenge is, how to improve it.

Hypotheses:

- local-to-distal heuristic search plays a central role in collaboration/cooperation
- social technologies that support collaboration will benefit from design features that facilitate generation of local-distal structures to support distal search

Question: what is 'distal'? We have distal processes, search, structures, etc...

What we have locally is a symbol: the distal is whatever it stands for.

Question: the argument depends on the idea that success is how easy it is to access the thoughts of another person.

Interesting concept: tagging recommendations

Proposition (from Ulrike): intelligence is 'metaknowledge' (not in the sense of 'knowing how to know' but in the sense of having higher order mental structures or representations (but does mass collaboration require some sort of collective intelligence?))

Collective Knowledge in Social Tagging Environments

Joachim Kimmerle, KMRC

Even though it is hard to find good definitions of knowledge, most psychologists would agree that knowledge is an internal mental representation of external environments. This may seem to be contradictory to the idea of 'collective knowledge', but the point of this presentation will be that the concept makes sense. In collective knowledge, large groups of people externalize their representations into digital artifacts. An example is social tagging networks.

Background: there is a huge quantity of information on the web - this makes it hard for users to find the best resources for adequate navigation, but at the same token, the web can trigger learning. So in our work we examined the potential of social tagging, and the impact of individual and collective knowledge on social tagging systems.

Prior to the experiment, literature background: Information Foraging Theory (2007, Fu and Pirolli) describes how individuals select links and forage for information. Users have to choose between different links and navigation paths. The 'information scent' is the perceived usefulness of the resource. This information is scent is based on 'the semantic memory' (my quotes - SD). There are cognitive models of semantic memory - eg. Anderson, 1983; Collins and Loftus, 1975. Chunks are connected to other chunks; connections may have different strengths.

Also, some background on tagging: this is the practice of annotating resources with keywords (aka 'tags') on sites like Delicious, Flickr, etc. People use tags in order to structure, organize and refind resources. Social tagging aggregates the tags of all users (Trant, 2009; Vander Wal, 2005). The resulting collective tag structure represents the collective knowledge. Note that coordination

here is not really needed, in contrast to other systems of mass collaboration. The tags establish a network of connections among the resources and the tags, and among the resources themselves, and the users who read them. These associations are represented in 'tag clouds', in which the font represents the strength of the links in the tags.

In our experiments - interested in independent variables (individual strength of association, collective strength of association) and dependent variables (navigation, incidental learning). The topic in question: wine from the country of Georgia (this topic is chosen in order to prevent people from having preconceptions about the topic). (Surprisingly, 10% indicated they had prior knowledge on this topic, so they were not used in the experiment). We measured how people tagged, and how they clicked on the tags, and what region of Georgia they would select if they wanted typical wine from Georgia. People tended to click on the larger tag (ie., the tag with the higher association strength). (Some discussion here of whether they were just clicking on the biggest links.)

Spreading activation theory: the activation of one chunk leads to the activation of associated chunks. (Meyer & Schvaneveldt, 1971). This was the subject of a secondary piece of knowledge. Again people were recruited via Mechanical Turk and eliminated people who had prior knowledge of Georgian wine. The secondary association was based on wine colour (specifically, 'white wine') and the question was, was white detected as 'typically Georgian', and aromas associated with white and non-white wines. Again, people selected the bigger link.

So: individual and collective associations are both relevant. Navigation and learning are linear combinations of both types of associations. And (as a consequence?) People internalize collective knowledge - they do not use it only to select which links to click, but they seem to acquire some knowledge about the topic.

Comment: but how is this different from just reading a text? And what is the role of agency?

Response: I don't think it is completely different - when you read an article, I understand some, I don't understand some, I try to use it - I would label this a collaborative process. The 'collective' aspect of social tagging basically comes from what the technology does.

A socio-cognitive approach for studying and supporting interaction in the social web

Tobias Ley

We want to talk about how we can make massive social network data work for us. The focus here will be a tagging system, and in particular a system for recommending tags.

We need a good understanding of the cognitive mechanisms involved in producing and consuming the data, and you need system affordances that facilitate its use. These affordances describe the coupling points between humans and machines. They have typically been studied at

the individual level (eg., the door handle) - it's a concept that sits between these things., ie., you have a door handle, but then you have a cognitive representation of it.

Affordances are socially constructed and can be created by aggregating social signals (eg., cowpaths). Similarly, in social systems, affordances can be the result of aggregated behaviour.

We want also to talk about what we can do to make these systems work better, eg., via recommendation systems.

This whole system can be viewed as a distributed cognitive system, an ecosystem of humans and artificial agents, where affordances co-evolve in the system. Cf. work on imitation in social tagging (eg., I see some tags, I decide to use them for myself - this is how some tags get popular and others don't get popular). Also - what is the role of memory in producing social tags - how are tags represented and processed in memory?

So, from the perspective of models of imitation, how does consensus emerge? A typical imitation mechanism is preferential attachment - you just copy a tag that has been used by someone else. Another mechanism is semantic imitation - you don't copy the word directly, but the tag creates a certain representational context in your mind, and you use these other concepts (eg., a tag 'book' leads you to use a tag like 'read').

A model for studying this is 'fuzzy trace theory' - you can be in different recall states when you have learned something. Sometimes you forget the words, eg. of a song, but you can remember the meaning. This can inform tag-based search - sometimes you learn the tag, sometimes you learn the gist (this is called the gist-trace). See Brainerd, et.al. 2010.

So - the experimental study: what role do verbatim and semantic processes play when imitating tags? And can these processes be disassociated using practically significant variables? The experiment uses the RTTT-Procedure (basically a way for people to tag the same photo several times).

Here's the model then, to dissociate verbatim and semantic imitation: if you learn the tag, you have 'direct access' to it, and you imitate it. Or you may have no direct access, then you may either reconstruct the tag, possibly even the original tag, or another semantically relevant imitation; or finally, you may have no recall, in which case you are guessing. The model fits the data very well.

The results? The rate of semantic imitation was relatively constant at about 13%; verbatim imitation varied quite a bit (8% - 20%). Influencing factors included semantic layout of the tags, size of the tags, and connectivity of the tags.

A technology recommender system was developed based on the principles of this model. It basically figures out the sorts of tags you would use, so it can recommend them to you. It is based on a connectionist network with a hidden layer, where resources are encoded in terms of

topics or categories (eg., Wikipedia page categories). The recommended learns for each person all the tag associations they have done in the past, and then tries to match this pattern to all the different examples.

Can this algorithm guess which tags people will use? The algorithm, was superior to semantic categories extracted from existing tags, and approaches where you just choose the most popular tags, or a spreading-activation model. But we don't know the answer to the question yet - it would be interesting to apply to a real system. So, eg., a 'tagging in the real world' project: eg., tagging real-world objects in construction, health care - some examples of people tagging machines (with warnings, instructions, etc). Another project - 'My learning episode' - a sensemaking interface. <http://developer.learning-layers.eu/tools/bits-and-pieces/RunningDemo>

Future work includes the study of tagging processes - is it an automatic process, done out of habit, or is it a deliberate process, where you look at other tags and decide whether to reuse them or not. Also, how strong is the affordance character of social recommendations? And what is the influence of the physical environment.

Network analysis of mass collaboration in wikipedia and wikiversity

Iassel Halatchliyski

We're looking at long-term self-organizing processes based on stigmergic methods of coordination, where these knowledge artifacts have a network structure.

What is important from the theoretical background is the focus on the link between individual and collective knowledge. (Reference to a bunch of theories by title - complex systems, socio-cultural construction, situated learning, etc).

The approach is to use network analysis techniques, metrics and algorithms, and apply them to networks of knowledge artifacts. Three studies.

Study 1: based on the assumption that the internal logic of knowledge is reflected in the network structure of the artifacts. This leads to the exploration of the potential for modeling collaborative knowledge through its network structure. It was a cross-sectional analysis of hyperlinked articles in Wikipedia. It asked the question, "what is the editing experience of authors who contributed to pivotal articles?"

So, eg., we have a network of two combined domains - education and psychology - with about 8,000 articles and 2,000 articles. We look at boundary-spanning articles using a 'betweenness' measure of centrality, as well as the articles that are 'central' in each of the two domains. The experience of the authors from working on different articles in Wikipedia is related to how pivotal the articles are that they work on in the long run, experienced articles create pivotal

articles. The explanation is that in the long run, experienced authors will write pivotal articles that set the stage for new knowledge.

Study 2. How is the development of new knowledge related to the articles with a pivotal network position? The background here is based around preferential attachment (Barabasi and Albert, 1999) and the idea of a world of ideas with their own lifecycle. This study followed the same network as it developed in Wikipedia over 7 years. 'New knowledge' in Wikipedia may be new articles or edits to existing articles.

Study 3. How do we identify pivotal contributions and moments in a discourse process? Discourse happens continuously over time and builds on previous contributions. This study used a scientometric method for quantitative studies of scientific work, which is used to identify the main network flows in a scientific literature connected by citations. (Some diagrams shown illustrating the 'flow of ideas' through a research community).

Is there a peer effect in knowledge generation in productive online communities? The case of German Wikipedia

Olga Slivko

From an economic perspective, we look at interactions between individuals sharing existing resources to produce a common socially valuable output. What processes drive contributions to online communities? There's pure altruism, there's social image, there's reciprocity to peers, etc. So the question is, is there any social reciprocity / social interaction in contributions to Wikipedia.

In Wikipedia there are differences from other social networks. There is need for coordination on a single page. There are no explicit friendship structures on Wikipedia. Individuals do not get a high 'reputation' on Wikipedia (so there are not potential monetary gains). So, do the 'peers' activity affect knowledge generation?

In previous research on peer interaction, we find strong input by peers on group behaviour (eg., health-related attributes such as smoking, GPA and choice of major). And social ties matter for engagement into open source software development projects, online music, and video gaming networks.

Measurement: the utility of an individual contribution to Wikipedia.

Network of editors: Editors are connected if they made a revision on a page within a 4-week span (these links can expire as well). We can construct networks of editors out of these connections (long 'standard' formula used to describe this).

Where do we go from here? Teaching, mentoring, and learning in the games and crowdsourcing era

Ben Shapiro

The point of philosophy is to change things (Marx) and maybe we should be looking at what we want mass collaboration (or cooperation?) to change things to.

We've heard of Wikipedia as a community of practice - but what does that mean? Reference to Lave and Wenger and legitimate peripheral participation. Bryant, Forte and Buckman 2005 - role and goal changes from being on the outside to gradually becoming a core member.

So, videogames: Minecraft. It's very popular, but it's also very unstructured. A lot of people just use it to build things. Another game: Civ V - you create civilizations, multiple ways to be victorious. People create multiple causal maps of how to be successful in a game.

Most of what's happening in a game community happens outside the game - people collaborate in ways the game environment doesn't allow you to. They create content collaboratively. World of Warcraft is another very popular game - with WoW you can't get very far in the game without working with other people. You have to apprentice with more serious players to get ahead.

It has also been explored how players playing warcraft are engaging in scientific practices and discourses, Eg. Steinkuehler & Duncan, 2007, 2008 - use of data and experiments in game play. But the hitch is they are engaging in these practices in make-believe worlds.

As designers we can do better, online environments that are as engaging as actual games, but embedded in real science.

There are some light-weight crowdsourcing games designed by scientists to collect data.

Crowdsourcing: was of a group of people work together to solve a problem posed by an interrogator. Eg. Galaxy Zoo - players go to the site, they see a picture of a galaxy, and they are asked to label the picture - is it a spiral? Is it clockwise?

But this is an inauthentic scientific process - scientists themselves do not feel this work is worth doing as part of science (but they like getting other people to do it). Also, the players must be strictly independent - they cannot interact, because you don't want to taint the data.

Another game, Foldit. You create protein structures. You can work as teams. Questions: is this a collaboration (with scientists)? Is this a learning environment? Popovic (creator of Foldit) says they do learn, but the players themselves have no idea what the 'blue and orange things' do.

Learning is not the point. These are labour systems, commoditizing the work that the machines cannot yet do. But they don't help you learn, and they're not collaborative systems.

So, there's the Maker Movement. It's this convergence of DIY with open source software and electronics. We have to study this as a distributed activity system, the people have different goals. There's an outreach to bring people in - eg. Make Magazine, Maker Faire, etc. Also, online communities and sites. It happens in communities, and also purpose-built places (eg. Island Asylum) - you pay a fee to access eg. tools and such.

Right now it's the early phase where there's a lot of excitement and little study (this would be a good place to start studying).

So - what could the future of this thing look like. Eg., participatory discovery networks. We see pieces of this in things like citizen science projects - they look at distributions of bugs or count birds in trees. Or after Fukushima, when people built real-time radiation monitoring.

So - a hypothetical example - how you might revolutionize medical imaging in developing nations. They need better diagnostic information - they have nobody to read the images. So, how do you enable people to build the hardware, how do you enable them to share it, and how do you have people around the world contribute.

We've been using a tool we developed called 'Blocky Talky' - build software by assembling blocks.

The online tools - eg. a Facebook plugin where you can access a CT scan where people could look at it, argue about what the image is, etc.

Imagine how the public could work together to improve public health? Could we get people working to make things and at the same time develop enough education to make devices that are useful? Could we build communities around this - people doing first-pass analyses of things, which can be passed to people with more experience.

Creating participatory discovery networks that address real problems is something we can explore.

Language Technology for Mass Collaboration in Education

DIPF Frankfurt - UKP Lab

Iryna Gurevych

The motivation for natural language processing in mass collaboration: there is evidence that learned information in collaborative learning is retained longer. There are instances of computer-supported collaborative learning, eg., discussion boards and wikis, computer-supported argumentation, and community-driven question answering.

These new forms of collaborative learning bring some challenges along with them. They result in massive amounts of unstructured textual content - people expressing their opinions, eg., and for

humans it is impossible to process all of this content. Especially for learners, it is difficult to process, and difficult to assess for quality.

The current issues can be summarized as:

- knowledge is scattered across multiple documents /locations
- difficulty having an overview
- abundance on non-relevant or low-quality content
- platforms for collaboration do not provide intelligent tools supporting users in their information needs

(The specific issue is that learners because they are learners do not have the background knowledge)

Natural language processing is a key technology to address these issues - it enables users to find, extract, analyze, and utilize the information from textual data.

For example, one of the things that can be analyzed are 'edit-turn-pairs' - edits are fine-grained local modifications from a pair of adjacent revisions to a page, and include deletion, insertion, modification, or relocation (a more detailed taxonomy was created). Turns are single utterances in the associated discussion pages, and again can be given metadata.

We asked: what kind of correspondence can be identified between edits and turns? What are the distinguishing properties of corresponding edits and turns that can be used to show they are correlated. How much knowledge in the article was actually created in the discourse on the discussion page?

(Example of an edit-turn pair)

Ferschke et al (2012) propose explicit performative turns: 1. turn as explicit suggestion, 2. turn as explicit reference, 3. turn as explicit commitment to edit in the future, 4. report of performed action. Other turns not part of this set are defined to be 'non-corresponding'. To find corresponding turns, Mechanical Turk was used to select corresponding turns. From 750 randomly selected turns, 128 corresponding turns were found.

Language processing processes were then used to analyze the turns. We find we can detect the non-correlated turns with a rate of 0.9 and correlated turns with a rate of 0.6.

Ivan Habernal (continuation of the same talk)

Argumentation mining is a rich and growing field. It includes stances and reasons and how argumentation is put forward and phenomena typical of argumentative discourse, eg., fallacies. Our research looked at controversial topics within the educational domain, mostly two-sided debated (eg., home-schooling, mainstreaming). The purpose was to enable people to support their personal decision and to give reasons for these decisions.

(Diagram of the whole things) - identification of topic, discovery of relevant posts, extraction of argumentative data, annotated argumentation.

So - we needed to create a corpus with which to feed our machine-learning algorithms - for example, to identify persuasive on-topic documents (as most documents are not one or the other). This was a binary decision over 990 documents (comments to articles, forums, posts), which obtained pretty good agreement (0.60).

Next, we are going deeper into the structure of argumentation in the documents. There are different schools to describe arguments from different perspectives. It was inspired by a model proposed by Toulmin (1858) which uses five concepts in logos dimensions: claim, grounds, backing, rebuttal, and refutation. There's also the pathos dimension, and appeal to emotions. We wanted to find the corresponding text and associate them with the labels.

Challenges:

- the main message is often not stated
- granularity of the concepts
- the very general challenge of analyzing argumentation that the users are not even aware of using

Results from this study, of 350 documents (sampled from the first phase) with 90K tokens, and found agreement for claims and grounds, less for others; for longer posts (eg. blog posts) we could not find agreement even for claims, grounds. The longer texts heavily rely on narratives, cite research articles, etc., and can hardly be captured by Toulmin's model.

Later this year: complex community-based question answering. Factoid questions can easily be answered by computer, but the 'why' questions are much more difficult. We would like to solve it by combining user ratings, model answers, etc.

Conclusions: these are three examples of NLP technologies that can be used in mass collaboration in education. These could be used to summarize arguments, and help students form their own arguments.

Question on 'indicator words' (or 'discourse markers') - they play a role, especially in well-written text. But in the social media discourse, these discourse markers were misused or missing.

Tool used: test classification framework (all open source tools).

Understanding and Bridging the Wikipedia Language Gap

Darren Gergle

There is an extensive literature on Wikipedia, everything from collaboration to participation to embedded bias to the uses of Wikipedia data structures by AI and natural language processing application.

So, in different places people speak different languages, but the presumption is people are reporting on the same things, and have the same sort of coverage biases. But as we consider the global nature of information we need to think about equitable information access, retaining diverse perspectives, and algorithmic biases and the role they play in information structure, representation, and consumption. A part of this talk is to look at tools that address this.

Gerhard Fisher presented a nice picture of how things are - this presentation is more about how things should be.

To what extent is there content diversity among Wikipedia language editions? I thought this would be a simple question - five years ago. There are two aspects here in the implicit assumption that every language describes the same sorts of things, and so there is a global consensus among the concepts. But there is diversity at the concept and sub-concept levels.

We have concept diversity - that is, the set of titles of articles.

We have sub-concept diversity - that is, the set of topics within a given article.

First of all, the methodology, matching pages to concepts. So we want (eg.) to find a core concept ('chocolate') and then match the pages in different languages to this topic. There are 'language links' on the Wikipedia pages that will take you to the other language for the same page. We take a hyperlingual approach, which gives us a cluster of pages (sometimes even if the link between two language editions is missing).

The 'conceptual drift' problem also occurs - the boundaries of conceptions changes across language. So, eg., we have a page in English on 'river', which links to a German page, which links back to 'canal', which links to a French page, which links back to 'canyon'. So the algorithm has parameters to tune the tightness of concepts - it first limits the number of edges from a given language, and second, has a minimum number of languages to allow an edge to remain.

So after examining the concepts we discovered that the archetypical concept looks nothing like 'chocolate'. They look more like a region or place or person (explore this?) We also find that the bulk of concepts are single-language concepts, with only a small number of concepts common to even three languages.

So - why? Maybe it's just that English, being the largest, is a superset. And everything else is just growing into it. But when we do pairwise comparisons this doesn't bear out - comparing English to German, for example, we find 40 percent of the concepts unique to each language.

So - analyzing the concepts - we can (Adafre and de Rijke, 2006) use the links on the page to create a conceptual representation of the page. Now we can compare these between languages. So we look at which links they have in common, which defines an 'overlap coefficient'. The mean OC is 0.41 - that is, about 59 percent of the links in the shorter articles (in one language) don't appear in the larger articles (in another language).

So, what accounts for this diversity?

We look at the concept of self-focus - the degree to which language-based cultures centre their descriptions around objects and entities of regional importance. So we used geo-tags to examine this, drawing out articles with a spacial location. We use a technique called 'spatial indegree sums' - so, for example, we take an area like 'Poland', find the entities within that region, and then find all the articles that link to those original entities. So we can give a particular weight to a given geographic area. This allows us to compare an indegree sum for different languages for a given geographic area, which allows us to measure self-focus.

So - the global consensus hypothesis would suppose that each region has relatively equal indegree sums for each region, while the diversity hypothesis would predict that the polish-language Wikipedia would favour Poland. The actual results show regional diversity - people regionalize the information around them. The English Wikipedia focuses on the US and Britain, the Russian Wikipedia on Russia, etc.

So: self-focus is a systemic bias in Wikipedia. People orient the knowledge and language around themselves. This diversity is a serious concern for semantically based AI and NLP applications.

On the converse side: we could create applications that take advantage of this diversity. We built a system called Omnipedia that provides access to 85M+ concepts in 25 languages. Pick a concept - it displays the number of related links for each of the languages, as nodes: you click on the node, and we use a representative snippet, translated through Google translate, to give the gist of the article. As you continue, you can find concepts that are listed in many languages - but you can still see how the same concept might be described differently.

We've done some evaluations on the system...

Some tools we've developed for researchers: an API, WikAPIdia and WikiBrain (get access from GitHub). These are tools that download and organize Wikipedia datasets. You can do eg. relatedness metrics (eg., how related 'engine' and 'car' are in different languages).

Some comments & questions - there are huge difference in the practices around different language editions - first-mover advantages, management of articles, etc.

What we were doing (in part) was a pushback against a lot of data scientists and AI researchers who use the English version of Wikipedia as a baseline. The degree and extent to which there is

unique content across languages is shocking - only 1 percent conceptual overlap over 25 languages.

Comment - if there are diverse concepts, then the philosophy of a 'neutral point of view' is contrary to fact. They (Wikipedians) believe there is a world-wide 'neutral point of view'.

Mass-Collaboration as a basis for procedures for e-participation

Thomas Herrman

How can several people be supported to contribute to the solving of problems in the social context? In this situation, how is creativity encouraged? How can democratic principles be taken into account? How large a group can this support?

The concepts of social and collaborative creativity partially overlap; so do the concepts of mass collaboration, e-participation, and social/cultural creativity (but there is 0 overlap in Google Scholar for all three).

In Germany, there are laws supporting co-determination that determines the degree of co-management and employee contribution (mitbestimmung). There are special teams called Betriebsrat that manage this. So eg. there are discussions concerning working conditions, layoff, which ultimately allow for co-determination among people.

There is a range of increasing degrees of participation, from informing people and observing people to interaction to co-management of outcomes. These have technical equivalents ranging from linear MOOCs to big data to brainstorming through to discussion forums, open source and discussion and e-voting.

So now: the case of the German Citizen dialogue on demographic trends. The goal was to propose improvements to society. It took place in cities, with 80 people each. Three major themes:

- how will we live together
- life-long learning
- the influence of this on work environments

There people sitting at individual tables (10 tables of 8?) which would address one of these questions for th full day, and report back. There were two phases: first, the comment on the current situation, and second, proposals for improvements.

Afterword, representatives from the cities were called to meet in Berlin, and a final report was produced.

Facilitation: we had at every table a facilitator and a taker of minutes. Participants didn't see the notes being taken; from time to time a summary was read to the participants. Results were not visualized; the goals were not visible. Facilitators tried - with limited success - to encourage less active participants.

Role of the experts: experts were invited to give an opinion, but then citizens complained that they did not want to be the victim of expert participation, so in the next round the experts stayed in the background and waited for the citizens to ask for help, which never happened. Experts were not asked to support the finding or proposals or to clarify whether an idea had been tested elsewhere. There was a strong focus on practical regional knowledge, but this was not compared at the global level of what has already been done. A lot of singular experiences were discussed but there was little attempt to discuss at a systemic level.

Overall, there was a low level of interaction between the tables - sometimes highlights were presented (by the opinion leaders) and participants had no input in the production of the final report. The experts made additional contributions which were included without any critical discussion.

Lessons learned: people who are highly interested and willing to be engaged are not necessarily well-prepared to contribute novel ideas. The process of converging a huge number of contributions and exploit potential for synergy is difficult. And the influence people have on real political decisions was unclear - was it really about mass collaboration, or merely mass contributions.

So the questions are: how can people be encouraged to relate their ideas to each other? Eg. to escape the hidden profile trap - people take out of the whole set of mass contributions those parts which sound familiar to them. The group does not base its decisions on the information because it's not really shared. It's difficult for people to relate to what others have said.

Also, how can participants be motivated to take existing knowledge or expertise into account?

How can the dominator-follower relation be transformed into a symmetrical relation?

And how can research on small group creativity support be transformed to the level of large numbers of participants? How can the transition from mass contributing to mass collaboration be defined?

Which facilitation studies are sufficient - visualization, prompting, etc.?

Why do people take part in mass collaboration? Many of them just like it - it's not because they believe they will create change, it's just because they like the experience of participation.

There is a need for scaffolding and prompting, to support directly referencing to others' experiences - alternating between contributing and comparison of contributions, detecting the

most interesting similarities and contrasts, to create something 'new'. Needed, the activation of more passive people.

We look for socio-technical approaches to maintain the awareness of existing information - maybe we need several facilitators, to represent different positions or interest groups (eg. if you have a conservative facilitator, he or she will filter out more progressive contributions). The political directions of the attendees should be mirrored at the facilitator level.

In general, we may have:

- type A1 - not appropriate to be carried out in small groups
- type A2 - not appropriate to be carried out via mass collaboration and
- type B1 - more efficient when carried out in small groups,
- type B2 - more efficient when carried out via mass collaborations

How can sociotechnical solutions support a shift from A to B? Example, production-blocking and fear of evaluation in small groups can be avoided by organizational and technical measures, eg., anonymous comments submitted electronically.

Claim: facilitation is needed!?! Question: can facilitation develop spontaneously? The whole facilitation business is developed on the basis of the ineffectiveness and inability of small groups.

What is facilitation? 'any activity that makes tasks for others easy'.

A procedure is proposed:

- preparing participants (mess finding, data finding, etc) - often we get brainstorming, etc., without this phase of preparation
- making contributions - online we typically think of written contributions, maybe there's a way to do oral contributions (it's easier for a lot of people) - at the same time taking new content into account
- observe the process of merging

So we need to shift facilitation work to support mass participation.

- from one facilitator, to several facilitators (plus a metafacilitator)
- from qualitative comparison of viewpoints, to quantitative evaluations
- from., giving every contribution equal weight, to, the main perspectives should be represented
- from simple voting mechanisms, to complex voting mechanisms
- from contributions visible to all participants, to extra support needed to make the facilitators work visible
- from interventions and prompts being delivered to all, to them being delivered selectively

The transition from collaboration to mass collaboration is not clear. Mechanisms are needed to build the most promising subsets (7 +/- 2). Collaborative facilitation is needed for prompts and representing diverging positions.

Comments: differences between small groups and mass - eg. scientific community as an example of mass collaboration. Journal editors as facilitators? It seems odd - the facilitators are mostly for co-located groups. In mass collaboration, facilitation is created by means of the structures. Eg. Wikipedia has a particular set of structures and norms, Linus does, web communities do, but they typically don't have facilitators. (But - by contrast, go back to the field of business in the 1950s - that was mass collaboration - why shouldn't the same improvement be possible in mass collaboration - it is worth at least typing, to not only rely on the structures). Comment: comparing the role of curation and facilitation. Even in the OS community, people identify needs. In this context we have virtual ecologies of participation. The facilitator role is changing. Response: there is less research in the area of the effects of facilitation in the context of mass collaborations.

(SD - the presumption here seems to be that people are not participating correctly - but maybe that's backward)

Comment: people are trying to scale from small groups to masses; and on the other side, people who study masses, less interested in impacting or steering or moving the masses. Also there is this concept of 'liquid democracy' by means of technology. Maybe there is research on this.

Summary Discussion

Major issues:

- collaboration vs cooperation
- democracy: governance vs democracy, collaboration vs right of minorities
- how masses really operate
- can we design or influence how masses think or operate - can we make the masses more effective? the MOOC?
- (?) tools to study mass collaboration

Discussion: concept of the 'flipped classroom' - we do our readings ahead of time - some of us did extended abstracts - but these create resource constraints. We see this with MOOCs - they are not a big success, because they require additional resource commitments (on the part of students). And similarly with a book - it creates resource constraints.

Moving beyond the workshop? (Discussion of the idea of publication)

*Tubigen, Germany
May 21-23, 2014*

New Learning

Those of you who are my age may remember something called '[new math](#)'³⁵¹. The idea was to replace fixed-value mathematics, which is characterized with an emphasis on rote learning, with variable-value mathematics, which emphasized an understanding of equations, inequalities, and ranges.

As [Richard Feynman](#)³⁵² wrote in the essay "New Textbooks for the 'New Mathematics'" (via Wikipedia):

"If we would like to, we can and do say, 'The answer is a whole number less than 9 and bigger than 6,' ... In the 'new' mathematics, then, first there must be freedom of thought; second, we do not want to teach just words; and third, subjects should not be introduced without explaining the purpose or reason, or without giving any way in which the material could be really used to discover something interesting."

New math was hard, and it was hard for those of us living through that transition to wrap our minds around the ideas. But it was better, because it was more real, more practical, and embedded in experience.

It was also hard for our parents, who were no longer able to help us with out homework. The world had changed beyond their comprehension, and there was and is a reaction to that, an emphatic 'back to basics' movement, which means 'back to the way we learned it', even though there is and was mounting evidence that they were no longer prepared to meet a complex, dynamic and changing world with the knowledge they had.

Why do I bring this up? Well there's [a post out today](#)³⁵³, YALA (Yet Another List Article), which describes "8 Ideas That Will Permanently Break Education As We Know It," by Terry Heick in TeachThought. The author means well, and actually talks about the new learning being difficult for our parents to understand. It's a good overview of the ways education is changing, but it subtly misses the point item by item.

So call this a SOYALA (Son of Yet Another List Article) wherein I explain, point by point, how New Learning is different from the way our parents did it (indented quotes are from the original Heick article).

³⁵¹ http://en.wikipedia.org/wiki/New_Math

³⁵² http://en.wikipedia.org/wiki/Richard_Feynman

³⁵³ <http://www.teachthought.com/trends/disrupting-education-8-ideas-will-break/>

New Knowledge

"Connectivity is replacing knowledge," writes Heick. "Or rather usurping it in terms of sheer credibility. Businesses, education institutes, groups, organizations, people—everyone wants visibility and access. These occur through connectivity."

This of course is the core idea of connectivism, or what I have in the past called 'naive connectivism', which is the idea that our need to remember things is being replaced by our need to find things on the internet.

But what is more fundamental is the change to our understanding of knowledge itself. We are shifting from *knowledge as remembering* to *knowledge as recognizing*. The difference is that we understand knowing, not as an accumulation of facts, but rather, as a development of the self, of the creation of a 'mental muscle', which is in essence a set of reactions and instincts.

Sometimes, new knowledge *looks* like remembering, especially then the knowledge being applied is simple and straightforward. Sometimes it looks like a performance or skill, as when we perform a complex and adaptive task. Somethings it looks like mastery of the tools, as when we know exactly what and where to look up the information we need.

New Students

"Student are clients," writes Heick. "There are new options for learning, and the most innovative don't have the word 'school' in them. Charter schools and eLearning have been about as brazen as education can bring itself to be."

Not quite. Although it is tempting to describe learning and students in the new language of business, it's inaccurate, because the new language of business is old thinking. Business itself is changing. The concept of the 'customer' is being undermined.

Instead, it is more accurate to say *students are prosumers*. They both produce and consume their own education. They access experts and learning resources directly, and organize these themselves. They form their own communities, work at their own pace, and share extensively with each other.

And students are learning informally. What this means is that they are not learning to acquire a body of knowledge leading to a credential, but rather, they are learning on an as-needed basis in order to address some immediate problem or objective that lets them complete some task or project.

New Software

"Adaptive software can replace 75% of what a teacher does," writes Heick. "No, apps can't replace teachers, but in terms of the way teachers spend their time, adaptive software—whether minor (like Knowji) or major (like Knewton) in scale—can automate the bulk of these tasks."

Again, this misses the point in an interesting way. First, software isn't simply replacing what a teacher does - it's not just delivering content and marking tests and recording grades (though of course it can do all of that). But more, second, new software isn't simply adaptive. *Software becomes intelligent* the way students become intelligent, by associating data, recognizing patterns, and making inferences.

The concept of software as a list of instructions that computers simply follow is gradually being replaced. Yes, at a basic level, computers must be told what to do (just as, at a basic level, human brains follow the laws of chemistry and physics). But the organization of software allows it to develop an artificial intelligence.

This intelligence, rather than a more basic set of instructions, is what enables software to respond to learning needs. Adaptive software, traditionally construed, measures performance on tests and assigns new learning materials according to predefined outcomes. Intelligent software identifies patterns and regularities in the world as a whole, extracts outcomes, and associates these with learning materials, activities and resources that might not have existed when the software was written.

New Media

"YouTube is way, way more engaging than reading and writing," says Heick. YouTube is packaged for consumption. It's visual, social, diverse, mobile, and 'chunked' in ways that promote (often reckless) consumption. Always-on learning must compete with this—which means reading and writing must compete with this as well."

Not quite. Video becomes *one of* many media that are being used simultaneously. *New media is interactive multimedia* offered through multiple screens and multiple channels, all at once. Try to imagine new media as stereo (and even quad) emerging in a world that has always been mono.

The phenomenon of the 'second screen' is already well-known and measured. Today people may be using a television or video feed at the same time they are using a mobile device, perhaps even while attending a live event (this is *exactly* what I was doing yesterday).

This isn't quite the 'multitasking' that was envisioned by Tapscott and others; our attention can and does shift from one to the other. But there's an element of multitasking - we are processing information from multiple channels and communicating our reactions in various ways.

New Writing

"Reading and writing should be social," says Heick. This doesn't mean they always have to be social, but they need that potential built-in from the ground up."

It's not simply that they are social. New writing often isn't even writing any more. New writing might be the creation of a lip-sync video in an empty airport, a droll LOLcat, a cartoon or animated gig, or any of a wide variety of media.

Being social is just a part of it. *New writing is expressive* in a way that old writing was not. Writers don't *follow* the rules the way their parents did. They *make* the rules.

Old writing followed rules and formulae, from the standard 'five paragraph essay' to form letters to the traditional academic publication. Rules of grammar were strict, and a common and limited vocabulary was understood by all.

New writing is purpose-built. It doesn't follow rules but does employ conventions, memes, or archetypes - any sort of pattern or regularity. These communicative tropes are no longer universal or culture-wide, but are often focused to the needs, perspectives and understandings of a particular community.

New Internet

Heick writes, "The disruption of mobile technology will be complete... Companies like Microsoft, Apple, Google, Honda, Amazon, and well just about every other forward thinking company on earth are scrambling to adjust for a mobile culture that is cloud-based and social."

It's more than that - mobile technology is just one aspect. *New technology is ubiquitous and connected*. The reason mobile devices work at all is that they are carried in a technology-rich environment.

The new internet is not just the mobile internet, not just the internet of things, but rather, rather is being called the 'internet of everything' (IOE) that connects objects and sensors.

The effect of this is that knowledge, information and learning resources are all available 'on demand', in much the same way we find water or electricity in our environments today. It will be in products and devices, local and specific, and available from the air itself.

This changes the nature of these resources. People learn by doing in authentic environments, and learning support changes as the person demonstrates greater skills and more adept responses. It is also context-aware - sensitive to and responsive to the needs of the situation.

New Parents

"Parents don't understand teaching and learning," writes Heick. "Parents speak in the language of terms and compliance because that's how we speak to them." But also, "Parents are the sleeping giants in education. Think of them as students with 25 years of life experience added on."

Indeed, *parents should now be thought of as co-learners*. They can't simply transfer their knowledge and wisdom to their children, and even if they could, much of that knowledge wisdom is outdated, wrong, and sometimes dangerous.

The way parents will teach their children in the future will not be through telling, but through example. The things they learn - new economy, new operating system, new work, new social order - will be learned at the same time their children learn them, but they will model and demonstrate *how* to adapt to this new world.

This extends beyond learning itself. We are entering an era where meaning, value and success are being defined differently. Parents have to adapt - today, it isn't about earning more money than your parents did, nor about having more stuff, but rather, in having good experiences, supporting community, and being environmentally responsible.

It was perhaps always thus, because children have always learned more through example than through dictation. But in the future, parents will be increasingly aware that the way they teach is the way the walk.

New Universities

Finally, Heick writes that "Universities are decaying. At least in their current form.... They simply cannot survive as they now exist—an awkward kind of hybrid of career prep and highbrow intellectualism."

There is this tendency to suggest that the number of universities will dwindle to a very few. But in fact, universities, if viewed as institutions of higher learning, will proliferate. They will be accessible and available, and number in the hundreds of thousands, not in the dozens.

What will change is that *universities will no longer be bastions of privilege and elitism*. That responsibility (as it were) will be taken up by a new kind of institution - and the elite universities are struggling to find out what that will be.

The learning offered by universities has always been incidental. Their primary purpose has been to create the sort of social markers, institutions and networks that would serve the next generation ruling class. They would be able to recognize each other in the future by distinctive knowledge, distinctive behaviours and mannerisms, even distinctive language and accents.

Now mutual support networks belong to everyone, and different communities can form their own sets of knowledge, values, languages and accents. No one community will rule (though there will be a concerted effort by existing elites, and their institutions, to preserve the *status quo*).

It's not just learning that helps people advance. It's the entire social network of social support, expectations and values. That's why today's learning outcomes are predicted by socio-economic standing (SES). As the trappings of privilege, *widely construed*, accrue to the rest of us, the social balance will with any luck be restored, and the people will prosper.

*Moncton, Canada
June 11, 2014*

The Achievement Gap

Response to Annie Murphy Paul, whose newsletter appeared in my email today, on her article, [Technology Is Making Achievement Gaps Bigger](http://www.americasquarterly.org/warschauer)³⁵⁴.

In your email you state "I'd love to get your feedback!" so I'll take that to heart.

My first impression was of the level of writing. Phrases like "making reference" (instead of 'referring') and "more vocabulary words" (instead of 'larger vocabulary') suggest a lack of writing experience.

There is also a naive air of 'research reveals' this or that (the phrase "Research is finding..." is actually used) when it does no such thing. People perform research, and of results are ever 'revealed' (which they are usually not) they are revealed by people.

Finally, why would you suppose that a few research studies of students in the United States can be generalized to anything? And what is the basis for suggesting that the *computers* increase the digital divide? The cause of (what you call) the Matthew effect is clearly the lack of social support (you refer to 'parents' but there's no reason to suppose that genetic relation is necessary here). So why transfer this problem to a discussion about computers?

So I think you're reading your sources uncritically. The sceptic in me wonders whether that is what you are being paid to do, if you are being paid at all - there is a substantial lobby seeking to limit and reduce the provision of social supports (including computers) to poor people. Or perhaps you simply haven't read sufficiently widely, as is suggested by the level of writing.

I detect a strong strain of the line of thought advanced by people like Daniel Willingham in your writing - we see this in the references to "background knowledge", for example. I don't think the Willingham position is well-supported in the field, and I think a lot of the supporting argumentative infrastructure, such as cognitive load theory, is methodologically unsound. You might disagree with me on this - and that's fine - but it makes presenting the research as you do here, as establishing some sort of fact of the matter - as misrepresentation and even a bit pernicious.

It bothers me because I see this same argument being advanced without any real consideration of its weaknesses from a variety of sources - this one <http://www.americasquarterly.org/warschauer> for example, from "America's Quarterly", even uses the same "social envelop" phrasing.

³⁵⁴ <http://anniemurphypaul.com/2014/06/educational-technology-isnt-closing-achievement-gaps-its-making-them-grow/#>

(As an aside, numerous researchers - not "one researcher", as you say - use the phrase "social envelop". But real researchers are careful to say "there is no one appropriate social envelop for educational computing." (Giacquinta, Bauer, Levin, 'Beyond Technology's Promise', 1993, p. 163)

Finally, it concerns me that the solution seems to be to divert resources away from people who need them. A lot of research has suggested that socio-economic background is the primary predictor of educational outcome. It's easy to say that we should simply focus on "training teachers, librarians, parents and children themselves to use computers effectively." But if the 'Matthew effect' is as you describe, then these too would increase the divide, because the well-off people can make better use of these services than poor people.

My own thinking is that the actual cause of the socio-economic divide in education is socio-economic disparity. We live in a world in which most social and institutional structures are designed in such a way as to disproportionately help those who already have an advantage. Proposals for structural reforms we need to address these inequalities are opaqued by distracting nonsense telling us things like "computers don't solve the educational divide all by themselves." Which is probably the point of such articles.

*Moncton, Canada
June 25, 2014*

The Facebook Research

The Facebook experiments are actually very clever.

The content stream is the presentation of everyone else's material to an individual user. So, in my content stream, I get stuff from Rod, stuff from my family, stuff from Moncton Free Press, stuff from the City, etc., including some sponsored or promoted content from magazines and advertisers.

Facebook has been tinkering with this content stream since day one. You can't show everything, because there's generally too much. So you show the most 'relevant' links (on some content streams you have the option to 'see most recent' and 'see most relevant'). They are experimenting with what counts as 'relevant'.

Facebook is an advertising company, and therefore the product it sells is the induction of beliefs in the users. Coke, for example, want people to think that Coke is good and good for you, and that they want a Coke now. The NRA wants you to believe that guns are harmless and that "they're trying to take away our freedoms."

So the experiments basically measure whether the presentation of posts created by friends and family, etc., rather than the creation and presenting of actual advertising, can produce the desired result. Intuitively, it should. Present nothing but crime stories in the news feed and you'll end up thinking crime is everywhere. The experiments measure whether this intuition is correct.

From the perspective of ethics, they are blending two things which are, on the face of it, innocuous:

- they are altering stream results in an attempt to produce a 'better' stream - something every content vendor everywhere does, and has done since the days of FTP and UseNet
- they are accessing publicly available data to analyze it for affective and cognitive properties, something we do as well, and something that does not require permission from individual users

Does the combination of them create an ethical dilemma?

It's not clear to me that it does. Sure, it reinforces Facebook's image as a somewhat greasy operation that will manipulate results in order to satisfy the needs of its advertisers (hence making it no different from Dr. Oz and your local news broadcast). But that's not unethical, at least, not in the sense that you'd take them before the courts.

The question of ethics comes into the equation when there exists some possibility of harm, and where that harm is a predictable outcome of the experiment, and where that sort of harm would

not normally be expected. The classic case, of course, is the testing of drugs that have harmful side-effects, where you have not disclosed the side-effects.

In the case of the manipulation of free digital content to stimulate emotional responses, and then measuring for those responses, the presence of actual harm is a lot more difficult to show. The mere production of emotional responses is not harm, otherwise most of what we do every day is ethically wrong. The mere measurement of emotional responses is not harm either.

If we don't actually harm someone, then how could it be ethically unsound? Doing all this in secret could be ethically wrong. But Facebook is not doing it in secret; it's all over the news.

There is a hard line in research ethics to the effect that any interaction with a user needs to be declared beforehand, and conducted with the explicit consent of the user. I don't subscribe to that line. In one sense it is impractical. There are too many interactions and too many users to require consent in advance. In a second sense it's unnecessary. Research is not inherently evil, and studying people to find out how they work is not wrong. And third, it can be harmful. Creating conditions of consent alters research results; tell people their emotions are being monitored and they change their emotions.

This is the point of disagreement:

"They formulated a research hypothesis and tested it on human subjects. For this, explicit consent is required."

Here is a counterexample:

Engineers have theories regarding the length of left-turn lanes on the highway. To test this hypothesis, they construct a left-turn lane, and then measure how much it underfills or overfills. Based on this work they publish a paper. No research consent is obtained.

Should consent have been obtained? It fails the three tests. First, it is impractical. You can't have drivers fill out a consent form before they enter the intersection. Second, it is unnecessary. No harm will be caused by the research. And third, requiring consent changes the outcome.

So it seems clear to me that this statement is false. The requirement for explicit consent must depend on different conditions. I argue actual harm must be the cause, that it must be practical to obtain consent, and that obtaining consent can't change the results.

Facebook's experiments on users and Emotional Contagion (via Peter Turney)

<https://gist.github.com/desilinguist/35e0a9f4abae47157104>

The full paper - <http://www.pnas.org/content/111/24/8788.full>

p.324

<http://www.telegraph.co.uk/technology/facebook/10932534/Facebook-conducted-secret-psychology-experiment-on-users-emotions.html>

<http://www.theguardian.com/technology/2014/jun/30/facebook-emotion-study-breached-ethical-guidelines-researchers-say>

Listen to your customers, not to the HiPPO - http://videlectures.net/kdd07_kohavi_pctce/

*Moncton, Canada
June 30, 2014*

Beyond Free - Open Learning in a Networked World

Published as *Beyond free: open learning in a networked world* in *Distance Education in China*, 2015:4 4-16, Aug 30, 2015.

Abstract

This paper examines the role of open learning in the development and design of the Massive Open Online Course (MOOC). It explores faculty and institutional resistance to open resources, arguing that institutional priorities are not supportive of student access. It suggests that these priorities shaped the design of institutional MOOCs, resulting in MOOCs that are inconsistent with the original intent as designed originally by the author. The role of the MOOC in incorporating, using and sharing open educational resources is highlighted from a pedagogical and methodological perspective.

Keywords: Learning, education, MOOC, open, institutions

What is the Problem Online Learning Seeks to Solve?

As the concept of 'open learning' has grown it has posed an increasing challenge to educational institutions. First admissions were open, then educational resources were open and now whole courses are open. Proponents moreover are demanding not only that open learning be free of charge, but also that the resources and materials be open source – free for reuse by students and educators for their own purposes. This formed the basis for the original design of the Massive Open Online Course as a connected environment in which participants created and reused resources.

In such a learning environment, the provision of education moves beyond the programmed delivery of instructional resources and tasks. Education is no longer 'delivered' (for free or otherwise) and instruction is no longer 'designed' in the traditional sense. Institutions are no longer at the centre of the ecosystem; their value propositions are challenged and new roles for professors and researchers must be found if they are to survive.

In this paper I address the concept of free, the concept of open learning, the concept of networked learning in a networked world and the concept of the institution. It may be thought of as a rebuttal to the way institutions are approaching Massive Open Online Courses and open learning generally today.

Diana Laurillard challenges the concept of the Massive Open Online Course by asking, "What is the problem that MOOCs appear to have solved?" (Laurillard, 2014) And she answers it, "The problem MOOCs succeed in solving is to provide free university teaching for highly qualified professionals." One might answer that's what the traditional institution is doing as well. One

might equally answer that that's what the Internet was doing 20 years ago.

What I want to examine in this talk, is not the problem MOOCs solve at the moment but the problem MOOCs were designed to solve. I'll take a little bit of credit. I'm one of the people that had a significant hand in designing the original concept of the Massive Open Online Course.

Diana Laurillard actually answers the question in the same talk, the same paper, in which she proposes. The dilemma, she writes, "By 2015 there will be 53 million out of school and UNESCO estimates that we need 1.6 million teachers to achieve universal primary education." (UNESCO, 2014) That's primary education. That's not secondary. That's not tertiary, primary. I did a quick off the cuff calculation. At \$50,000 or 25,000 pounds we would need an additional 80 billion dollars in salary a year not counting buildings, equipment, resources, et cetera, roughly 40 billion pounds.

That's a lot of money. It's not inconceivable that we could pay this amount, but the difficulty there is there seems to be no inclination on the part of governments and institutions in the world to actually pay this amount of money.

We have to find, says Laurillard innovative ways of teaching. I would say we have to find more innovative ways of *learning*. Because the problem isn't the way we design our courses. That might be a solution to the problem, one solution, but the problem is cost and access. Design is only one way, and, I would submit, a limited way of looking at the problem.

What is the problem? Very simply, who gets to graduate? Paul Tough, "New York Times", "Whether a student graduates or not seems to depend today almost entirely on one factor, how much money his or her parents make." (Tough, 2014) Look around this institution and ask whether that's the case here as well. Did it determine who got in? Does it determine who gets out?

"It's always going to be the case," he continues, "that the kids who have need are going to have been denied a lot of the academic preparation and opportunities for the identity formation that the affluent kids are given. Money does not simply buy access to a better education, it buys the background, the expectations, the culture, and the values that lead to better educational outcomes." So simply throwing money at poor kids isn't going to solve the problem, but neither is denying the money to make solutions to the problem possible. Money is a necessary, although admittedly not sufficient, condition.

Let's turn the question around. What is the problem for which colleges and universities are the answer?

Institutional Priorities: Why Universities Create MOOCs

It's not addressing issues of cost or addressing issues of access, is it? If we look at the results that they have produced, it's exactly the opposite of that.

Let's look at why colleges and universities and other educational institutions are running MOOCs. What are their reasons? They've been studied. One such study (Hollands & Tirthali,

2014) lists the following five reasons why institutions are building MOOCs. Check these off if they sound familiar. Check these off if you just heard them:

- extended reach and access (to markets),
- build and maintain brand,
- reduce cost, that is the cost to the institution, and raise revenue for the institution,
- improve educational outcomes, I could talk a lot about that, and, of course,
- research and innovation in teaching and learning.

Did you see cost in there to students? See access to learning there for students?

Meanwhile, academics deny that cost is even a problem. A ridiculous set of studies recently, the references are all there, argue that the benefits of college still outweigh the cost. The reasons for that, if you read the article are:

- That the opportunity cost of going to college has gone down. What that means is, when you go to college or a university you're giving up less income. Why? Because there's been a worldwide recession and you wouldn't make as much money. That's the argument. (Abel & Deitz, 2014)
- Financial aid programs drive college prices higher, as though they were incapable of doing anything else. It's like when the tuition caps were raised here in the UK to 9,000 pounds and the expectation, naive though it was, was that universities would settle out on a gradient based on relative ranking instead of all raising their fees to 9,000 pounds. When asked to rank themselves, they generally ranked themselves at or near the top tier, and demanded the maximum tuition fee. (American Enterprise Institute, 2014)
- And there's the argument that student debt is overstated, which is true if you, when you read the study, look at only people who are heads of households between the ages of 25 and 40 and don't look at the people who have not been able to establish their own household. In that case student debt is overstated, but if you actually looked at all students, you'd get a different story. (Leonhardt, 2014)

We've been told outright that money is not the problem, the implication being that we should not spend any money trying to fix this problem. (Lynch, 2014) That's why we're getting a lot of – a *lot* of - educational reform or, as it's characterized in North American, education *deform*. And they're saying what we really need is a culture change in the institution, that what we really need is accountability – perhaps to the BMO financial group that offered this study.

Figure 1: Unemployment and post-secondary participation rates for marginalized communities [2]

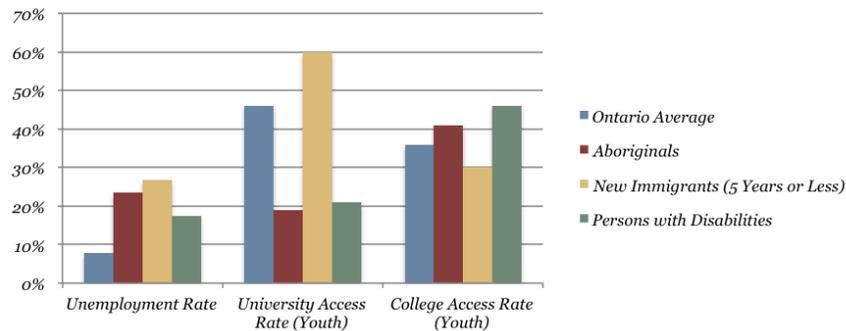


Image: Bristow, 2014

But for many people, let's be realistic here, and you can walk down the street and you can see it, for many people cost is the problem. In Canada, in North America, in general, university participation rates are lower among aboriginals, students with disabilities, the poor. (Bristow, 2014) Big surprise. Student debt acquired not only by paying tuition but by paying that opportunity cost that isn't as much now, has become an even bigger problem. (Eaton, Dioun, Godoy, Goldstein, Habinek, & Osley-Thomas, 2014)

It's interesting. You look at in constant dollars higher ed cost and instructional cost, they're more or less steady. But students are getting nailed on student loan interest. That's the light blue line. And the private colleges are making out like bandits.

Not only are students hurt, so are their families. (Canadian Alliance of Student Associations, 2014) This is a study from the Canadian Association of Student Associations. Parents are borrowing more. They're going back to work. They're dipping into their retirement savings. Those very same studies that say debt is not a problem are studies that ignore the impact on families that are supporting students trying to go to school.

And meanwhile the benefits - remember that, those of you are maybe my age - the benefits of digital resources, (like) open knowledge for all, never materialized. Recently we had a report in "The Chronicle of Higher Education," 11 publishers are raising their prices all at the same time. (Wolfman-Arent, 2014) But there's no collusion. The previous cost model for e-books was not sustainable.

Even universities agree that *that's* a problem, pretty surprisingly. Journals published by non-profit organizations, says this report, "2 to 10 times better value than those published by commercial companies." (Sample, 2014) Of course the journals don't want you to know this. Academia doesn't want you to know this. In one case they published the criticism only after the editorial board threatened to resign if they did not. (Jump, 2014) That's what happened a couple of months ago. And then when they publish the report, they'll publish it with a big disclaimer

saying it might not be true. (Harvie, Lightfoot, Lilley, & Weir, 2014) Those are the guardians of academic knowledge.

The Call for Alternative Resources and the Patent/Copyright/Trademark Threat

And what we're seeing in the community today are calls to recognize alternative forms of literature. (Hunwick, 2008, GreyNet, 2014) I'm a living alternative form of literature. They're calling on people to recognize research and technical reports, which I produce a lot, evaluations, of which I produce a lot, working papers, which is pretty much all I produce in the way of papers, conference papers like this, which isn't even a paper until well after it's created, multimedia content, and the like. There's a reason for this. This stuff is a lot more accessible, a lot more immediate than traditional published literature.

You know, the Internet 20 years ago was providing services only to highly educated professionals. And 20 years ago in 1994 a guy called Steven Harnad came out with what he called "The Subversive Proposal". (Okerson & O'Donnell, 1995; Poynder, 2014) The Subversive Proposal was to free the research literature through self-archiving. It has morphed a little bit over the years, but it's basically still the same concept today.

Originally the idea was to put these things up FTP servers (FTP servers are like websites but without pictures or links or hypertext or cat... well ok, they did have cat videos). "Self-archiving's time," wrote Harnad in a later presentation (Harnad, 2001) "has yet to come 20 years later." That doesn't mean there hasn't been a movement. There has been a movement. There's been a growth of a movement, the idea based on the firm belief that open access holds, at the very least, the promise of a faster and more effective system of sharing new knowledge.

And it's a promise that resonates not simply in the halls of universities like this, but in places where people are impacted by constant access, in the developing world, in the First Nation's communities, among the poor. (Poynder, Open Access in India: Q&A with Subbiah Arunachalam, 2014)

Now it's no coincidence that the worldwide web was created 20 year ago as well. The first accredited school, according to Phil Hill, to offer a course of the WWW, which is what it was called then, was the Open University in a pilot virtual summer school. (Eisenstadt, 1994; Hill,

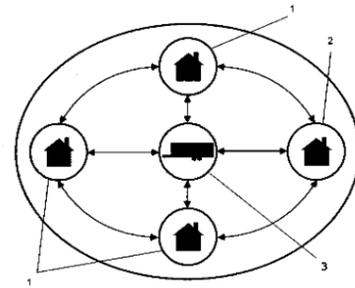


Fig. 1

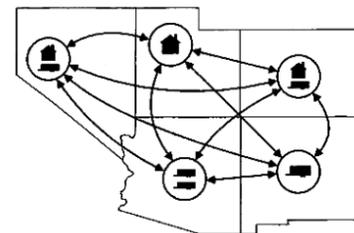


Fig. 2

Equation 1 - a patent for setting up a regional network in the south western United States.

2014) My own first online learning resource was called "Stephen's Guide to the Logical Fallacies," and I'm a relative newbie because it was published online as a website early in 1995. I'm a neophyte. And our first institutionally based online course, "Introduction to Instruction" at Assiniboine Community College was offered in 1996.

But you know we're still waiting for the benefits of web-based courses as well - this whole openness thing, this whole access thing. I once did a survey specifically for digital rights management technologies for learning resources. I did a survey of how long it would take me to read all of the patents. Since I was developing my own system, I thought it would be a good idea. It would take me more than a lifetime to read them all.

The history of online learning is the history of a plethora of patents. (Watters, 2014) This (figure 1) is a patent for setting up a regional network in the southwestern United States. That's Nevada, Arizona, New Mexico, Utah and Colorado. It's nothing more than a map, however, it now becomes part of a patent. Calling it a patent thicket is more than a slight understatement. And it's not just patents that are the problem it's copyright, trademarks, even trade secrets.

Here's one that came out a few weeks ago - I've actually got the screen capture - trademark for pi. (Poulsen, 2014) Yes, pi, the pi that you're all familiar with, 3.141 whatever (figure 2). This is not simply an isolated instance. It's the norm. It's a phenomenon that took place in the industrial revolution. It's a phenomenon taking place in the information revolution. It's a phenomenon of *enclosure*. You would think we learned from the last time, but we didn't. And it threatens the commons, the common heritage, common knowledge, common culture that we all thought that we own.

People say that I'm scare-mongering, that these fears won't really come true. Even the defenders of open content say, "Oh, you're way over. Show us one example." Well, here's one example: A study of 50 titles, this was from New Zealand literature prior to 1890 or something like that that have been digitized. Only three were hosted by repositories that do not restrict any type of subsequent use. (Clark & Chawner, 2014) These are contents that are public domain. The copyright has long since expired, but you cannot access them except through a system that imposes limitations to your use. And it's getting worse.



Figure 2- Patent for Pi

This is Tony Bates reporting that adoption by faculty and instructors remains a major challenge. (Bates, 2014) And this is repeated over and over and over and over. Peter Suber and the aforementioned Steven Harnad have come to argue that institutions need to adopt mandatory open archiving policies. Why would they advocate such a measure? Because faculty left to their own devices won't bother. And that's well documented.

There's no end to the reasons they offer (Jhangiani, 2014):

- For many disciplines, they say, there is no open textbook available. That's not true, but that's what they say.
- They're concerned about the quality, the comprehensive, clarity, currency, et cetera, as if existing textbooks are such models of comprehensive, clarity, and currency.
- They complain that in the world's most visual medium there are no illustrations, charts, or graphics.
- In a world of chat rooms and YouTube comments, there are no questions or clinical thinking exercises
- No online learning management systems available despite the existence of the aforementioned Moodle.
- And, crucially for faculty, there is no testing.

Professors who call out the institutional policies, the institutional indifference to cost and access, are accused of insubordination. A professor at the University of Saskatchewan, Robert Buckingham was summarily fired and stripped of tenure for criticizing administration plans to "rationalize". (CBC News, 2014)

Universities, meanwhile, disguise what is an increasingly unsustainable model by doing what they were doing to me, hiring poorly paid, temporary, academic staff. They're called sessionals in Canada. They're called adjuncts in the United States, I don't know what they're called here. I don't know if they exist here. They do. I'm getting nods. This is what the adjunct or sessionals say, "Our marginalization, meager pay, and lack of job security," all of which I can attest, "...all contribute to a culture of paranoia and enmity." (Shah, 2014) Sound familiar?

And our institutions who do not have access or openness as a priority have priced online learning using the same models, same mechanism even, that they've used to price in classroom. Here we have a report on an online learning consortium. "I don't see why university administrators could think that unapologetically pricing courses at \$1,400

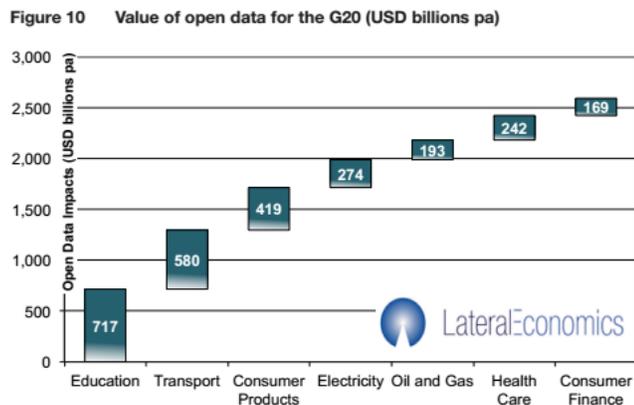


Figure 4- benefits of open access

per credit hour..." - that's per credit hour; most courses are three credit hours, six credit hours - "...for online learning could possibly work." (Straumsheim, 2014) But, of course, it worked in traditional institutions, so it should work online.

And "Mostly they see the new technology as a means to make more money." (Martin, 2014) McGill University looking at the new wonderful phenomenon of crowd sourcing has decided to use crowd sourcing to encourage donations (and yet again, the silo model, the model where the university is all prevails, they didn't use Kick starter, they built their own crowd funding platform. It boggles the mind).

Open Content, Open Networks – and Commercial Resistance

While university fundraisers pursue parochial interests open content advocates create resource networks. (Sheare, 2014) And that's a big difference between the world of closed and the world of open.

Why? Open access makes a massive economic difference, maybe not to the institution, although I would argue that it does, but especially to the users of that institution. The estimated rate from open data for the G20 nations is 2.6 trillion dollars, 1.3 trillion pounds, annually, from education, transport, consumer products, and the rest. (Dawson, 2014) (Figure 4)

The mechanisms we have today such as the Creative Commons license are being recognized finally as a patch, not a fix. (Brest, 2014) We shouldn't be adopting this world of closed content and copyrights and trademarks and patents as the default. They (Creative Commons) are now arguing, finally, that we should be working to a world where the default is open. And you know, that *is* the world outside academia. That's the world that has been unfolding in my experience, in my world:

- Things like Ergo, a free and open journal of philosophy. (Huber & Weisberg, 2014)
- Things like "Mini Lectures Using Learning Objects" (Nash, 2014)
- Things like, "A New Talk Sketched Daily" (May, 2014) in which an artist created a single-panel visual representation of a TED talk
- Even TED, although TED is, as I once commented, really the Upworthy of academia.
- Things like "The Open Textbook Toolkit" from BC Campus, basically a way to help people who want to create an open textbook create an open textbook. (BC Campus, 2014)

We are seeing what Martin Weller has called the "open virus". (Weller, 2014) He writes, "It's no coincidence that many of the MOOC pioneers had also been early adopters of open access, active bloggers, and advocates of open licenses, and creating open courses in that model seemed the next logical step."

Can we imagine a world of open resource, open access, open learning beyond the traditional world of open coursework, beyond the traditional university model? Maybe. Even the Open Coursework Consortium is changing its name, so we must be getting somewhere. (Open Education Consortium, 2014) We're seeing a worldwide – literally – embrace an alternative model of learning based on open content and even national and pan-national investments in open content networks and open content platforms. (Creelman, 2014)

But, of course, there's nothing that can't be corrupted by money. We should know, looking places like Canary Wharf, where entire industries have been formed based on betting on economic indicators, and not caring whether the result helps or (as it has on occasion) seriously harming the economy. In addition, we have, for example, a company that produces five minute educational videos. They're not TED videos. TED videos are longer. They have the intent of making them go viral. (Wolfman-Arent, Online Upstart's Goal: MOOC Lectures That Go Viral, 2014) Or we have this free online lesson from Disney called, "Play Games with Doc McStuffins." (Figure 5) The reference is clearly to products advertised to children by McDonalds restaurants. (Dickson, 2014)

Traditional universities are not immune, sadly, from this temptation. Events have proven that they're not. Some critics take them to task. They take them to task for MOOCs. People like Roger Schank saying, "I'm sure that Stanford itself won't give the stuff they produce to its own students. No one calls this racism or classicism, but it's education for poor people." (Schank, 2014)

On the other hand, Schank's solution. Give a Stanford education to everyone is ridiculous. I did the math. \$32.5 trillion a year - \$54.5K per year to attend Stanford x World population ages 20-24 of 596.3M. (Sullivan, 2012) That's more money than there is in the world. (CIA, 2014) It's hard to resist the idea that MOOCs are moneymaking scams, perhaps because there is so much money involved, and the solutions seem to impractical. (Nagel, 2014) You take the people charging that tuition, and you put MOOCs into their hands, that's kind of the image you get. Isn't it?

You almost wonder whether this \$0.00 MOOC offering is what they call a loss leader.

They'll get you hooked on the MOOCs, this free open content, and as soon as you're hooked on the MOOCs, well, now it's going to cost you a dollar, \$5, \$19.99, \$39.99. It's still cheaper than a course, but you know. Online education is a billion-dollar business motivated more by profits than quality education for students.

The research is telling us how bad these MOOCs really are. If you are isolated, poor and enamored of the prestigious MOOC university offering, the MOOC you're taking, you are less likely to complete it et cetera, et cetera. (Kolowich, 2014) But of course the sort of MOOCs that these critics are criticizing are the MOOCs created by the same people. In some cases exactly the same people like Richard Levin, for example, who wanted to raise money selling courses online,

and who also gave the impression during interviews that they don't really know what the software they're pushing does. (Hill, Partial Transcript: Richard Levin (new Coursera CEO) on Charlie Rose, 2014.

MOOCs as They Were Designed

We need to understand that MOOCs as they were designed are different, that they're not traditional courses, that they're not these moneymaking scams. They're not intended to be anyway. And we can begin by dropping the labels and the value points that we attach to traditional learning, for example, the label 'dropout,' (Wolfman-Arent, Study of MOOCs Suggests Dropping the Label 'Dropout', 2014) and characterize people by the actual impact they have on the system: uploaders, commenter, subscribers, viewers, lurkers. All the names you would normally associate with day-to-day Internet practice.

Because that's what the MOOCs are based on. It's true that one thing that characterizes the MOOCs is the sheer scale of participation. "1,162 students taking the final exam at this course," writes one person, "is more students than I've taught at Wellesley College over the last 10 years." (Rogers, 2014 May) Quite so. These numbers are not telling the story about MOOCs.

Michael Feldstein asks of MOOC analytics, did they look at any information giving us a clue of whether students desired to complete the course? The answer, no. Or get a good grade? The answer, no. Get a certificate? Well, some. Sample some material. No, that's not one of the questions they asked in these surveys. (Hill, What Harvard and MIT could learn, 2014)

And what we're finding - this is research from the MOOC Research Institute, George Siemens is saying at the University of Texas at Arlington (Siemens, 2014) - the bulk of MOOCs are created in the image of traditional courses. And eventually, I would say, they will be given the prices of traditional courses. And indeed the retrenchment to the form of traditional education has begun. The institution is saying MOOCs will not replace the traditional course. They will only supplement them (the phenomenon they call the 'wrapped MOOC'). (Christensen, Alcorn, & Emanuel, 2014; Kelly, 2014)

We are told that everything is negotiable. Remember that. That is the retrenchment. From my perspective *none* of it is negotiable. Especially the most important part: open. But traditional education, we are told, will simply absorb the MOOCs (Hollands & Tirthali, 2014), as it has absorbed, or as we say co-opted so many things in the past – rap, punk, the list goes on. That institutions feel that they would simply absorb the MOOCs doesn't surprise me. These institutions have had very different goals and ambitions all along.

The mission has shifted completely away from MOOC, completely away from open learning, and to the support of the university's prosperity. (Hill, Coursera shifts focus, 2014) Does that sound familiar? They want to build a new marketplace. And they even think it's a new idea. (Goodwin, 2014) This is the next land rush of online learning, the move to

marketplace. (European Multiple MOOC Aggregator, 2014) If you hear the word 'federation' in a talk this is what they're referring to: "a coalition of interdependent universities providing an LMS, content repository, and learning analytics system" which might connect maybe, if they supported single sign-on, to some external systems. (Feldstein, 2014)

What's important here is that MOOCs are not second rate, they're not disappearing, they're not being absorbed, or anything else. They are, to borrow that horribly hackneyed phrase, disruptive. (Christensen & Weise, 2014) They're going to be disruptive on price, technology, even pedagogy. That's because they're disruptive in terms of approach. And that approach is that MOOCs are designed, and built, and intended to be free and open. The one thing universities have always struggled with.

The idea of a national network for free learning is something that can endure, and eventually become entrenched. (Kamenetz, 2014) And it is becoming entrenched, but mostly outside the university system. We're beginning to see the importance of this: Matt Crosslin's been trying to design a hybrid MOOC presentation. All the connective bits of a connectivist MOOC, the way we designed it, and mix it up with traditional X-MOOC of traditional academic courses. He recognizes that the idea of free and open content is linked to the importance of dialog and interaction. It is impossible to exchange thoughts and ideas using media and artifacts if you are not permitted to share the media and artifacts. (Crosslin, 2014)

But why would you build a hybrid? What part of dialog and interaction actually requires a university system and lectures and the works? Why do we need these institutional structures to enable conversations? We don't! We looked at and analyzed the nature of conversation, and it turns out we can do it all by ourselves.

So people like Alan Levine, and many others, said, "Let's build mesh networks of people instead." (Levine, 2014) Let's imagine what we could do on a limited budget with free resources that are already out there that we can share, that we can use to communicate, that we can have other people take and run with to solve their own issues, their own problems, their own needs. (McGregor, 2014) Open content plus conversation equals learning networks, and the original MOOCs were not intended to be high-priced or even free university courses, they were intended to be learning networks.

The idea that professors tell students what to believe: that's the old model. And it's wrong. (Jaschik, 2014) By studying the MOOCs we've created, we're learning more what *does* work in these learning networks. We have, for example, derived things like the principles for dynamic networks. Some authors draw these principles from Deleuze and Guattari's work in rhizomatic (self-replicating) structures. (Mackness, 2014) In my own work, I have identified four principles: autonomy, openness, diversity and interactivity. (Downes, 2010)

Autonomy -- each entity in a network should employ its own internal mechanisms, its own criteria and its own principles, in the governance of its own actions, including the assessment and

management of incoming signals. Autonomy creates the capacity for judgement and resistance. It ensures that a signal propagates only if it satisfies a wide range of assessments, rather than a single, and potentially fallible, test.

Diversity -- the entity is composed of many different entities, rather than many copies of the same type of entity; minimally, each entity has its own set of connections and inputs, creating a unique perspective, rather than the same set of connections and inputs as the others. This ensures a variety of perspectives, a variety of points of view, and therefore a more multi-dimensional and reliable perception of phenomena.

Openness -- the network should have inputs and outputs, content should flow freely through the system, constrained only by the individual decisions of the entities, and entities themselves should flow freely into and out of connective relationships with others. Openness enables the possibility of perception by the network, and fluidity of connection enables the possibility of learning and adaptation.

Interactivity -- networks should adapt and grow by means of interactions between its members. Interactivity is the *creation* of knowledge, not the propagation of knowledge. Networks that support and sustain interactivity are able to learn; networks that limit and stifle interaction are unable to learn.

These principles apply not only to learning, but to networks generally, and have been observed in other domains. For example, we see the existence and influence of networks in social life in the work of Harrison C. White, who described overlapping nets with no clear boundaries. (Azarian, 2000) This is, again, exactly the opposite of universities, especially one with a big fence around it. The structure of MOOC is the structure of a network. The principles of the MOOC are the principles of the network. (Grabher, 2006)

We see the same principles in neurophysiology. For example, just as there's no such thing as a generic resource, there's no such thing as a generic person, and there's no such thing as a generic neuron. (Hall, 2014) Networks require and thrive on diversity. They thrive on different content created by different individuals, not single content created by an institution or professor. Far from curriculum, we're learning that we should be emphasizing diversity, be emphasizing experience, be emphasizing autonomy and learning. (Lunau, 2014) The idea of the MOOC is not the idea of open resources, or even the idea of open teaching.

It goes beyond that. It's about living openly. (Funes, 2014) It's not about teaching. It's about sharing the process of thought.

When I give a lecture, for example, I tell people to ignore the content of the talk, and to look at my work as a whole, and thereby to see the example of the MOOC instantiated literally on a day-to-day basis. Sharing with things like Board Thing. (Figure 6) (BoardThing, 2014) Sharing with things like MOOCopoly, the game (Levine, MOOCopoly, 2014). Sharing with things that are

decentralized, not centralized. (Cox, 2014) Of course decentralized is exactly what the institutions are clamping down on. Decentralized is why Internet access is being sold to the highest bidder. (Singel, 2014) Decentralized is why the open content movement is beginning to address open policy. (Open Policy Network, 2014)

Open content, open access, open learning. These are not only a part of democracy, a part of the free exchange of ideas, a part of the culture of learning, but they define all of these, and they define a system of free and open government. (Jarche, 2014) These things depend on them. When I say the institution has different values from us, this is what I mean. The very nature of the institution restricts access, is focused on profit, and is designed contrary to network principles. These are values contrary to the nature and intent of learning.

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Moncton, Canada, January 15, 2015

Beyond Institutions Personal Learning in a Networked World

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Abstract

This article looks at the needs and demands of people seeking learning with the models and designs offered by traditional institutions, and in the spirit of reclaiming learning describe a new network-based system of education with the learner managing his or her education. It questions the employment of models to design learning systems or the learning process, and recommends instead that learning be developed on a case-by-case basis by the learners themselves as they work within a network of learning resources within a personal learning environment. Learning design on this model resembles a murmuration, shaping and reshaping itself in a self-organizing manner. The author recommends that students self-organize by 'reclaiming learning', that is, developing their own learning systems and working outside traditional institutions of learning.

Keywords: learning, networks, MOOCs, personal learning environment

Introduction: What learners Need

I want to begin with a story that came across the wires recently and I thought was very appropriate for this paper. (Inman, 2014) The story described a manifesto that was authored by economic students demanding that the way their profession be taught be changed. Here's what they said:

We, over 65 associations of economics students from over 30 different countries, believe it is time to reconsider the way economics is taught. We are dissatisfied with the dramatic narrowing of the curriculum that has taken place over the last couple of decades. This lack of intellectual diversity does not only restrain education and research. It limits our ability to contend with the multidimensional challenges of the 21st century. (International Student Initiative for Pluralism in Economics, 2014)

They made observations about things like the global economic collapse and global climate change and other things not really being addressed by current economic theory. They suggested, not so much that current theory is wrong, although current theory is wrong, but that they should be given alternatives or different ways of being able to look at the world. They wanted, in other words, from my perspective, more control over their education.

Professors, meanwhile, far from embracing this Renaissance of student-led learning, are sticking to the tried-and-true traditional way of lecturing in the classroom to the point where they want laptops banned from the classroom. Dartmouth professor Dan Rockmore said in an article in the New Yorker, "These digital assistance are more suitable for play and socializing." (Rockmore, 2014) This is not getting the point that learning today is about play and socializing. It's interesting to note the study he cites, which says, "Taking notes by hand creates better memory recall than taking notes by typing." (Talbert, Three issues with the case for banning laptops, 2014) This again misses the point of what learning is about. As I shall argue in this paper, learning is not remembering.

Active learning works better (Lederman, A Boost for Active Learning, 2014) than the lecture used and defended by traditional institutions. "Students in sections characterized by active learning scored 6 percent better on examinations than did their counterparts in lecture-only classrooms, and those who were in lecture-driven sections were 1.5 times likelier to fail than were their peers in active learning classes." (Freeman, 2014) It may seem odd, then, that I engage in lectures myself. But what I'm really doing to engage in the process of creating a learning resource that I hope will be used, shared, cut, clipped, and otherwise abused by people around the world through the years that follow. This isn't so much about the content of this talk and people remembering what I say as it is about creating the possibility, the potential for dialogue and interaction. As Iyadunni Olubode says, "Everyone knows that learning is growing at an increasing depth and an increasing breadth, so you need people who can constantly learn and bridge that gap, even when they're in their current jobs." (Olubode, 2014)

This is the shape of learning in the future. It is not learning where you go to a lecture, you remember the gospel wisdom that your professor has told you, and you go out forth in the world and propagate it. It's a world where a person is constantly learning before they get to university, while they're in university, after they're at university. It's a world where the content, the nature, and even the means of learning is changing almost on a daily basis. People are looking for learning that isn't so much the repetition of their professors' ideas, but learning that they can apply, that is a part of their life, whether it's part of their life in work, part of their life in their hobbies or their avocations, or part of their life just in what interests them. (Bolkan, 2014) They expect universities to be flexible. (Zogby Analytics, 2014)

This dichotomy between what universities provide and what students want becomes evident in conversations with faculty and staff. At the London School of Economics, for example, where I gave a talk on this subject, we were talking about how the university is structured Bachelor's, Master's, PhD, maybe a couple of other names for these degrees. That's pretty much it. That's not what people are looking for. In survey after survey, they want learning that is directly and immediately applicable to what they're doing. (AfricanEconomicOutlook.org, 2012) "Students expect universities to be more accessible, flexible and focused on jobs." (Zogby Analytics, 2014)



Figure 5. The shifting burden from government support to tuition revenue. Via *The Economist*, op. cit.

Economists, on the other hand, have their own view of what academia needs. (*The Economist*, 2014) We've been hearing a lot about it both in Europe as well as in North America. The economists are talking about these days is the destruction of the university at the hands of the massive open online course. "Universities are up against serious cost and efficiency problems, with little chance of taking more from the public purse." As one of the people who invented the massive open online course, I feel a little personally involved here. It wasn't our intent. I just want to be clear about that now. It was not our intent to destroy universities. That's not why we did it. We want to change universities, and we want them to work for the better.

Thinking in Models: for Design, for Learning...

A large part of this paper is about that change. It may be tempting to transition from people wanting universities to be relevant immediately to the idea that universities will be replaced without thinking about what we need to do in between, but we need to do this thinking.

What are models?

So what are some of the steps in between? We're told there will be tiered service models at universities. We're told there will be analytics and data-driven management. We're told there will be alternative credentials. (Sandeen, 2014) To a certain degree, all of these three things are true. But to a certain degree, none of these three things are going to work themselves out in the way that the economist or economists or education reformers predict.

When you look at that, basically it's like they have this model or design in their head of how we could rebuild the university system, wipe it all out, start over, and we'll have a new model.

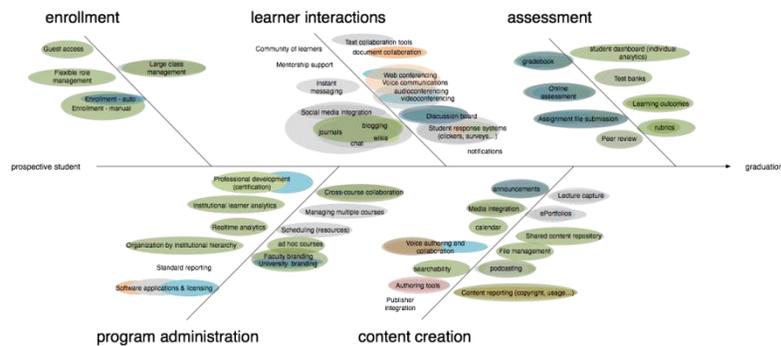


Figure 2 - workflow process employed to assist LMS selection

This model of accountability and cost frameworks and all of that will solve all the problems that the current system has. Models are popular in education too. Here's a model (Figure 1) of a workflow-processed employee to assist LMS selection. (Norman, 2014) You can't really read the small writing there but it's not important. Notice the flow from enrollment to program administration to learner interactions to content creation to assessment. It's a fishbone diagram. If you're in economics or business, you're probably familiar with it.

In addition, we have models describing how to select educational technology using customized lists of LMS features, a way of picking among those 305 features of a learning management system that you might want to solve the educational problems at your institution. (Wright, Lopes, Montgomerie, Reju, & Schmoller, 2014)

Models of how to do learning, learning design patterns: Grainne Conole has done a lot on this. Diana Laurillard, who I really wish had been there yesterday because I really wanted to have a chance to discuss some of this she's been working on. If you get the pedagogy right, that will solve all the learning problems. (The Learning Designer, 2014)

There are models for best practices for typical learning tasks, for example, a reference to a paper that talks about the conditional release of materials, or what we used to call back in the day programmed learning. (Fisher, Gardner, Brinthaup, & Raffo, 2014) You do some learning, you do a test. If you pass the test, you get to see the next learning. You still see the old professors with their overhead projectors and their slides and their little piece of paper that they slowly work down the slide. Goodness, you can't have people reading the bottom of the slide first. It would be just wrong.

There are even models of how to offer courses. There are numerous discussion like this in the literature, such as the way Brinthaup (et.al.) breaks the model of online, hybrid or traditional models into things like the types of tools, whether you're using discussion boards or white boards

or websites or videos. (Brinthaupt, Clayton, Draude, & Calahan, 2014) There's a selection matrix. Out the other end comes level two decisions. You have all of these inputs and outputs. It's very much a systems theory approach. If you get the system and the process right and everything flows out the bottom the way it should.

In these models, these designs are being implemented as educational technology. This is what education reform is about. "Wow," as I said yesterday, sarcastically. It's also about making a lot of money for some people. It's about standardizing and rationalizing the educational system to fit into a certain set of models or designs

There's more. For example, we have Google coming out with Classroom just as part of Google apps for teachers. (Google, 2014) It does all the really useful stuff that teachers need to do like marking and scheduling and assigning learning tasks and all of that sort of stuff. It's education done by software application, basically. It's being commoditized and being standardized and being packaged and delivered. This is education of the future.

The MOOCs that came out, not the ones that we did, but the ones that came out after us, are, again, very much in that same model. "Carnegie Mellon University received a two-year grant for research on and development of MOOCs platforms 'intelligent enough to mimic the traditional classroom experience.'" (UOIC UNESCO Chair, 2014) Get some videos, get some exercises, get some tests, and step students through the material week by week by week. You don't even need a professor. It's nice to have them to do the videos, but otherwise you just deliver this as a content package. (Caulfield, 2013)

Everybody gets the same thing. That's what works. It's Dan Willingham and Paul Kirschner and they say, "There are no individual differences in how we learn. The way we learn depends on the content, not the learner." (Clark, Kirschner, & Sweller, 2012) (Riener & Willingham, 2010) That's a pedagogical approach that I feel is incorrect. I think it is obvious that people learn differently. Learning styles, as a theory, and especially as a design theory, may be wrong. But people learn differently.

Models are not Reality

The fact is that people learn differently, that they have different objectives, different priorities, different goals, different times that they want to learn, different pets sleeping on their keyboard, all of these impact how people want to learn. That's immediately obvious to anyone who actually looks at people learning. Even as I look around the room, he's on an iPad, she's typing, she's writing on a notepad, he's asleep. Everyone learns differently.

As an example, Google has created a page called 'Apps for Teachers'. (Google, n.d.) These applications model the work of education, according to Google: creating and collecting assignments, making announcements, asking questions, and, of course, a folder, school folder for each assignment and for each student.

Of course Google will mine this data. They've said they will no longer mine student data for commercial purposes. (Hustad, 2014) They recently came out with that pledge. They did not say they will no longer mine student data. They just said they won't do it for commercial purposes anymore. Google knows people learn differently. That's why it's important to mine the data.

With models, again, maybe I'm talking to economists here, maybe I'm not. I'm not sure, but this was actually the subject of my Master's thesis, which maybe three or four people have read. The model is not the reality. That's my 235-page thesis in one sentence. The model is not the reality. The model has never been the reality, and worse, when you're doing any kind of research, if you use a model, typically the answer to the questions you're researching [have been defined](#) by the employment of the model in the first place.

That's what happens here. If we use these models, or other models, the design of the model predetermines the structure that defines how we will understand what learning is. We've predefined what the outcome will be. But learning needs to be open-ended. Learning needs to be an exploration and a discovery, not the output of predefined, standardized products. The adaptation of these models to computerized learning is no more effective than the use of these models in the classroom.

New Versions of Old Models

If your teacher walked in and spoke from a script and answered every question in the same standardized way, you would not consider that effective education. The same is true if it's done on a computer.

Again, we're told that these MOOCs are a new pedagogy. We're told that what's being done at Stanford, MIT, EdX, the rest of it, is going to change education, but it's a continuation of the same models and the same strategies that have defined education for decades, despite the fact that people are asking for something different. It's not even that the new models are the old models with new names. The new models that we're seeing today being done on a computer are the same models we saw being done on a computer a decade ago and two decades ago.

Audrey Waters, for example, talks about Fathom. (Watters, 2014) Fathom had a plan. What their plan was, to take learning materials, put them on a computer, and make them available, even openly, to people who wanted to learn. That was almost 20 years ago. People talk about EdX and Coursera and the rest of them as being new. It's like they've written off the previous experiences.

Interestingly, she notes, the president of Coursera is the former president of Yale who while there had the same wonderful idea of putting courses online and charging money for them. Guess what he's going to do at Coursera. It's the same model being repeated over and over and over again. *Universitas 21* was invented something like 15 years ago to monetize online learning. It's one of many initiatives to take a course, charge university-level tuition for it, and sell it online.

This is not what people want, and these initiatives continuously fail.

The same is the case in other areas of educational technology. The LRMI (Learning Resource Metadata Initiative) (Barker, 2014) is a system of standardizing the descriptions of learning resources, but it's a clone, in many respects (I'll talk about a way in which it's not a clone below) but it's a clone, in many respects, of the standards-driven efforts that have come before. The AICC, (Aviation Industry Computer-Based Training Committee) had a set of learning resource metadata standards in the 1990s. So did the IMS, Instructional Management Systems. So did IEEE, which is the IEEE, learning object metadata. So did Advanced Distributed Learning, with SCORM, the Shareable Courseware Object Reference Model. And of course all of these are based on card catalogue entries we would have found in libraries in our youth

Again, over and over and over again we see the same pattern: take standardized resources, create standardized descriptions, and create standardized search mechanisms. The standard is the golden standard of learning, it seems, and it's always thought that if we could just get this precise standard right, it'll all work.

The results have been, over the years, pretty much what you expect. Looking at LRMI again, Phil Barker can list only six or seven institutions using LRMI. (Barker, Who is using LRMI metadata?, 2014) As with all of these standards initiatives, the easy part is to define the standard. I've designed dozens of standards. The hard part is getting people to *use* the standard, because everybody does these things differently.

Even the terms within the standards are mostly the same from one standard to the next. Typically there is a URL, a title a description, an author.

Even the mistakes are replicated from one standard to the next. The 'author field', for example. You'd think, author, how could you go wrong with author? But in actual use we can see everything from people, lists of people, organizations, associations, sometimes pets, sometimes nothing at all. People put markup in what should be a simple string of characters. They put anything and everything inside the author tag. And this is because there shouldn't *be* an author tag; there should be a pointer, link or connection to an external entity.

New versions of old models don't produce new results. (Kelly, 2014) I'd like to go down to Canary Wharf and tack that onto one of the buildings so the economics, who use the same models over and over, can read it. If you do the same thing, even if you do it on a computer, you're going to get the same result. And the same result isn't sufficient.

The Right Model is No Model

I may criticize Coursera and the Stanford MOOCs, but when Norvig and Thrun launched their artificial intelligence MOOC, in the first week, 150,000 people signed up. Overall, I think it was something like 250,000 people signed up for one course, a really hard course that's really difficult to understand, in artificial intelligence. So they were doing something right.

Forget the fact that a lot of them dropped out. A lot of them didn't. Tens of thousands finished. This, by itself, indicates that the old model wasn't working. There was such a pent-up demand for upper-level university courses in artificial intelligence that, when one was finally made available, people knocked down the doors trying to get to it.

George Siemens and I launched MOOC on connectivism in 2008. It was focused on a niche subject, about as small a niche as possible. It was about an unknown theory in the field of educational technology. Try going out onto Fleet Street and advertising that. Nobody's interested. We got 2,200 people without advertising. That was our first MOOC, and that was when we realized we were onto something, because again, people were beating down our doors trying to get into it. Not as many people, but they weren't very big doors.

You can see that offering these courses to 10 or 12 people at a time in a seminar, whether it's online or offline, isn't going to work. Following a model – *any* model – of learning was not going to make our course a success. We had to work beyond models.

The right model is no model. The right model is to do away with the models. (Richards, 2014) Think of non-standard-based systems. Think of non-standard designs. Think of courses where there are no defined learning objectives. Think of a learning environment where there is no common core of content. Think of a conversation where you and I have not first established a shared understanding of the meaning of all of the terms.

That's reality. That's this paper. There is no model for what is being written here. If there is a model, I'm probably breaking it. When you say the paper followed a model, it's mostly after the fact - look at what I did, and say, "Oh, yeah, that's part of the model," and a new model is born, where there should be no model.

That's what happened to Sugata Mitra (who has almost been commoditized these days). The concept or the idea behind what he did was turned into a model. And *this fact*, and not what he did, became the basis for criticism. People went back years later to see these computers, and what they found were nothing but holes in the wall. Computers had been vandalized, the Plexiglas stolen. That happens. It doesn't mean he was wrong. It just means that that experiment for that time was finished. People were looking for a model that would always work, but things don't always work. They work for a time, but then we must move on to something else.

David T. Jones argues that "What's missing," he says, "in the standard-based models is what we used to think of as BAD." (Jones, 2014) BAD. (Bricolage, Affordances, Distribution). These are all, in a sense, anti-models.

- *Bricolage*: when IMS Learning Design was introduced they used, in their documentation and in their presentation, the metaphor of actors on a stage, and the teacher, of course, would be the director, and then everybody would play their roles. My objection to Learning Design was to ask, "What about improv?" You can't do improv. That's what's

missing with these models. You need to be able to assemble, create and improvise, as we say, on the fly.

- *Affordances*: When people built the Internet, they did not intend to design a system that would store 680 million cat photos. That was not their purpose, and had anyone anticipated in the 1950s and '60s that they were building a system for storing 680 million cat photos they would have thought, first of all, that it's ridiculous. Then they would have thought, "Who would want such a system?" That's the beauty of the Internet, is that, although it was designed for academic research and to survive nuclear wars and things like that, it turns out to be the perfect place to share your cat photos.

That's what makes it beautiful, the affordances, the possibilities of technology that come up that you didn't plan on ahead of time that you can use for other things. History is full of these things, from the first person to use duct tape for something other than to repair ducts to people using an Apple computer to hold a door open. The misuse of technology is what makes technology great.

- *Distribution*: The idea that you have to be a certain place to get wisdom is ridiculous. New technology and new learning allow for learning to be not only at the event, but also available online to web video-streaming people. The idea that things don't have to be in one place anymore, learning in one standard way.

Content

Too much content?

We need to question the presumption -- and it is a presumption -- that there's too much content, too much data. So much follows from this presumption. We have information overload. It has to be organized. It has to be standardized. It has to be categorized. Must be delivered in packages.

David Weinberger says, "We do not, interestingly, feel overloaded by the effects of 1.3 million apple pie recipes or 7.6 million cute cat photos" (maybe he was just referring to the subset of cat photos that is cute, but clearly, it's much larger than that). (Weinberger, 2014) We're not overwhelmed by it at all. We don't walk out in the world, wondering, "What am I going to do? I got so many cat photos."

When we talk about learning, by contrast, it's almost the first thing people say. When we started our MOOC, we got people to bring in content and suggest content to us. We brought in a lot content. And the first thing people said was, "There's too much content. How am I supposed to remember all of this?"

We told our students the same thing we'd say about cat photos today: you're not supposed to remember all of it. You're not even supposed to view all of it. That's the old way of thinking, the supposition that you're supposed to remember the content that the instructor is delivering. But in this course, we said, you're not supposed to remember it. The whole idea of our course (or any

course, this course, this paper) isn't to get you to remember what was said. It is to stimulate in you the sort of mental experience that will create in you the sort of mental structures that will, at some point in the future, be useful to you.

These mental experiences are created through environments and interactions. The goal of the course is to stimulate this environment and this sort of interaction. That's why we want questions and discussions after, and that's why we want the wine and cheese reception after a lecture. We're not expected to master every word of the lecture; we draw from it what we need, each one of us something different, to create the learning environment that follows as we talk about it.

It's like the pie recipes. We don't have to remember every one of the 1.3 million apple pie recipes. Mastering one will actually be enough. Mastering three to five will be more than most of us ever do. Actually, mastering one will be more than any of us ever do. The main point is we pick and choose them as we need. The interesting thing is take a room full of 50 people, and 1.6 million apple pie recipes, people will choose, not all the same recipe, but different recipes, because they look different. They seem different.

They appeal to us in different ways. I have a whole talk on this. How you will read "Perfect Apple Pie Recipe" from Pillsbury.com? This will set off one set of mental associations for you, while someone else will read it very differently. Maybe you have a favorable impression of Pillsbury, or maybe you think of the dough-boy and say, "No, that's not for me." Or maybe a different site, perhaps taste.com.au, appeals to the Australian nationalists in the room.

Personal and Personalized

I want to draw a key distinction here, and it's a distinction that the model builders don't get. It's the distinction between *personal* learning and *personalized* learning. It's the same difference as pretty much anything like this: custom tire versus customized tire; chocolate versus chocolitized. Something *original* versus something that has merely been adapted.

The idea here is that *personalized learning* is something that's off-the-shelf, where you tweak some variables in it, and you have thereby made it personal. That's what's offered in programmed learning. That's what's offered in customized learning solutions, personalized learning, adaptive learning. (Schuwer & Kusters, 2014) Any of these design-based systems, they're personalized. They are really all just one one package with a bunch of options that have been set.

Personal learning is made to order. Personal learning can be learning you make yourself. Personal learning is where you build your learning, not from a kit, but from scratch. There's a difference. People don't want customized, necessarily. Sometimes, they do, but typically they don't. They want something personal. They want something custom.

That's the expensive part of learning. Consider the Oxbridge model. "The Oxbridge model is so much better," said the Deputy vice-chancellor at Greenwich. Why is it so much better? He has a

point. It is better, in many ways, because it's personal. The problem is it's also really expensive. To provide that for everyone would cost more money than there is in the world.

But it would be nice having learning that's tailored exactly to each person's needs. If you can build it yourself, that's even better. If you can design your food or choose your food from an infinite array of choices, that's better than going to McDonald's. Even if they offer to take the pickle off for you.

Institutions, I would argue, understand personalized. They don't understand personal. There are so many ways in which this is manifest. Even in some of the discussions about personal websites by institutional staff, the first response that comes up is, "But will they follow institutional standards?" (Hannon, Riddle, & Ryberg, 2014) The answer, of course, is, "Well, no." There's the concern that widespread adoption of social media brings shared interactional practices that do not match university arrangements for learning.

When people from institutions talk about learning, they talk about classes. But when they talk about personal learning, they cannot talk about classes. If the class is like a box, the people who want personalized learning are outside the box. You can have a personalized class, but it's still a thing in a box. Something that's personal must go beyond the box.

Autonomy vs Control

Autonomy, for many reasons, rather than control, is essential in education.

This is a bit of a digression, but I want to be really clear about what I mean here. Autonomy does not mean no structure. It means choice of structure.

Think of touring a city. The way the autonomy-versus-control distinction is typically sketched is, if you're visiting a city for the first time, either you wander around with no idea of where anything is or where you are, or you're taken on a guided tour. If you actually want to get someplace in the city, you pretty much have to do the second. You can't do the first, because you'll just wander around aimlessly.

That is not a good distinction. Those are not the choices that are given to people. If you're visiting a city for the first time, you have a number of choices. You could -- and I do this frequently -- wander around, aimlessly, not knowing where you are. Or you could wander aimlessly around with a map on your phone. Or you could wander aimlessly around with a dead battery on your phone, but using maps that are put up in the city. Or you could ask someone for directions. Or you could take the train, which will drop you close to where you want to go, although you might have to ask for directions to do that, too. Or you could get on one of those hop-on, hop-off buses. Or you could get a friend to drive you around the city and show you things. They offered to do that for me in Greenwich. Or you could join a guided tour. That's

choice. That's autonomy. The other option is they kidnap you and take you around the city, no matter where you want to go. That's control. Those are the real choices.

Ironically, we do education the second way. Control, really, is an illusion. (Satell, 2014) Really. When you manage and control a work in order to attain certain outcomes, if the environment is at all complex the outcomes often fail to materialize. The reason is that the designs are really [abstractions](#) of the actual process. They are no more accurate than the false dichotomy between autonomy and control that we just sketched above. They're not useful as prescriptions of what should be done. If they're useful at all, they're useful as descriptions of what was done, but only partial representations of what was done.

The personal, by contrast, is not designed. It's based on -- and the photo of the murmuration shows this -- based on self-organization.



Figure 6 - Murmuration.

It's based on the idea that people can manage themselves and manage their interaction with others, including learning, for themselves. Consider the murmuration. (Mastrapa, 2010) They've done studies on the murmuration, and of course, there's no head starling. (Cavagna, 2010) What's interesting is there's no mass communication, either. It's rather more like a mesh network, in which each starling is reacting only to the seven starlings around it. Anytime a starling changes position, the seven starlings around it change position. That's what produces the cohesive movement of the whole.

It's interesting, because when you think of it -- and that's not even in this article -- when you think of it, a murmuration is a perceptual system for starlings. It's a way a whole flock of starlings can magnify the perceptions, say, of a hawk, by any individual starling.

Complexity, Cause, and Murmurations

What is interesting in this discussion is the way that design, organization, planning, et cetera, suggests that we can cause these events to happen. For anything that is even slightly complex, however, there is no cause, properly so-called, of the event.

We award prizes to the person who created a landmark idea, to a person who caused some significant change. But landmark ideas and significant change are created not by individual people, but by societies, by this large murmuration of people interacting with their community. (Mitteldorf, 2014) Not all of them, necessarily, but most of them.

The modern technological world is giving us new examples of that. The hashtag (Kricfalusi, 2014) is a way of creating self-organizing networks. They turn out to be an excellent way to organize the discussion at a conference. Imagine if we tried to plan the Internet so that we could account for and index and abstract all of the conferences that will happen from now on, before they happened. It'd be ridiculous. Couldn't happen. A new speaker series would be impossible to anticipate. Hashtag networks can be seen as self-organizing ideas. (Melcher, 2014) The hashtag is a murmuration of tweets.

Mary Meeker -- if you're not familiar with Mary Meeker, you should be, if you're at all interested in education technology and markets -- has observed (Meeker, 2014) the proliferation of apps, not just in education, in everywhere. What the app world does is facilitate this kind of network interaction. What she's noticing is that the edge, that is, the link between two nodes, is more important than the node.

In education the node is the person, the computer system, the learner, the starling, whatever. It's the connections that are interesting. That's what's interesting in education, as well. The starlings, in education, are the students. (Hill, 2014) The university, the learning institution, properly conceived, should be organized like a murmuration. Should be a self-organized assemblage of students. But then, of course, you don't need that institutional structure, at all, and it becomes really difficult to justify a \$20,000 or 9,000 pound tuition rate.

A Reclamation Project

Reclaim what?

It's happening. There was a critic recently who said, "Do you know there are no students involved in these conferences?" I did a search. The search for "student panel" actually yielded 199,000 results on Google. The search for "ed tech student panel" in quotation marks, so it's the union set of those words in that exact order, yielded 2,000 results.

The students are doing this. They are organizing themselves. Audrey Waters says (Watters, 2014) -- and I think she's quite right -- "The future of educational technology is a reclamation

project." The idea here is that we, the learners, the people who need to learn need to reclaim the management and organization of learning for ourselves.

The same thing is happening on the wider World Wide Web. Facebook, for example, has taken over conversations with our grandparents: we used to talk to our grandparents in person, but now we require Facebook as an intermediary. The managers of Facebook are using these interactions to run experiments, for example, to see whether they can influence our emotions by adding and removing content, the results of which will be used for marketing purposes. We need to reclaim our conversations with our grandparents. We need to reclaim our interactions of Plato, Socrates, and the person next door. We have to reclaim control of the data, the content, and the knowledge we create. The idea that this belongs to the university that it belongs to the institution is ridiculous. The idea that the university has any say over what students or even its professors would produce in this Internet is absurd.

Here's why: Lucy Gray does what I do. She puts her presentations up on Slideshare. One day, Slideshare deleted everything. (Gray, 2014) No explanation. No recourse. She couldn't even contact them. She had to tweet it to get any attention from them. No notice. They were just gone. That's why we have to be the owners of our own education. I read this morning -- I didn't have a chance to put it in the slides -- there's a guy who started a course, a Coursera course. Went two weeks into the course, and then he deleted the entire course. (Kolowich, 2014) It was, he said, "An experiment in causing confusion." (It's not the first time (Kolowich, Professor Leaves a MOOC in Mid-Course in Dispute Over Teaching, 2013) this has happened).

One of my colleagues, Ben Werdmuller, is creating something called Known. (Werdmüller, 2014) Known is an application where, as he says, you can still share selfies, make friends, listen to music, et cetera, or put up cat photos (very important). But in a space that's yours and that you get to have control over. Werdmuller, with Dave Tosh, built a thing called Elgg a while back, which is now widely respected as a social networking environment for learning. They also built something that really should have been much more successful than it was, called Explode, which was a similar sort of thing to Known, except I think Known will be better produced.

David Wiley gushed when he heard of the "publish on your own site, syndicate elsewhere" anti-model (it's called model in the article but I'm calling it an anti-model because it's not really a model). (Wiley, 2014) There have been (if you check out the #indieweb hashtag you'll see) indications of this, from Diaspora (disclosure: I invested a hundred dollars in it - that was my only investment; I'll never see a return on it) to App.net, which I actually pay money to as well.

Even to syndication itself, it's this idea that what's today a silo (which is learning) is going to become the syndication end point. These applications, these services, these resources, are the things we reach out and touch but not where we invest our entire lives.

[Reclaimed learning is network learning](#)

Jim Groom has been running something called, "Reclaim your domain." (Groom & Lamb, 2014) There have been various other wordings, "Reclaim innovation, reclaim learning." Starting now, he writes, "a technology that allows for limitless reproduction of knowledge resources, instantaneous global sharing and cooperation. All the powerful benefits of digital manipulation, recombination, and computation."

That was the potential of the Internet twenty years ago and it was basically stopped by the institutions that decided it should be organized a different way. The idea of "reclaim all of this stuff" is to bring back that idea of the Internet. That begins with personal control over your own resources and your own access to external services including leaning.

I've outlined the model in our discussion earlier today. It used to be the case that you would go to one institution, maybe two institutions and you did all your learning there. It's changing now so that you access learning from multiple institutions. Not just multiple universities, but multiple types of institutions, from colleges and universities, potential employers, current employers, past employers, to pet food stores, to friend networks, to special interest groups, to hobby groups, to the government, to whatever.

They're all sources of learning. The idea is, you are at the center of this network of learning. Reclaimed learning is network learning. (Laux, 2014) Reclaimed learning is having access to the tools and the mechanisms to freely author and create your own learning and share it with others and to access and use learning that was created by others and shared with you.

It's your mechanism for talking to the starlings that are nearby (I really love that murmuration example. I'll try not to beat it to death, but just happen to be beating a starling).

That's something like what we were building when we were building the first MOOCs. (Levine, 2014) Our MOOCs are called "connectivist MOOCs" or "cMOOCs." What makes them distinct is that the people, the individuals are at the center and the learning resources are all distributed.

You might think, "Well, how do you build a course where the center isn't your course?" What we did is, we pointed students to mechanisms on the current internet where they could each build a network where they are at the centre. We said, "Create a blog on Blogger. Create an account on Delicious and do that. Put photos on Flickr. Add videos to YouTube. Create a Google group." Do any of these things.

In the future we'd say, "Use your own personal web space to organize and coordinate your resources and then tell us what these resources are." You create your space, we'll create a space like this too, and then we'll join them together.

That's what we did. It wasn't a course where we had a pedagogical model in mind where we tried to step people through. It was this ridiculous no-rules mess that turned into a murmuration, that turned into a MOOC, that turned into something that can attract hundreds of thousands of people.

Technology Behind the Reclaimed Web

Some of the technology (for example, Farhi, 2014) behind the reclaimed web, technology that allows us to have comments on our sites without having to author a comment management system...

There's a tool set these days is called the distributors' developers stack, (Loukides, 2014) where you can build your own website and access external services like storage. The old stack was called LAMP - Linux, Apache, MySQL, and Perl. Perl's programming language. That would be where you manage all your data. Today, the stack is your website, but then all the remote system that you can access with your website.

Making it easier for search engines to index (and this is the promised clarification of LRMI) is Schema dot org, where you manage and create your own metadata. (Barker & Campbell, What is Schema.org?, 2014) You don't have to adopt and adapt IMS or IEEE or whatever. Schema is being set up by the search engines. The search engines are saying, "Here's what you can do. It's almost like tagging with tags for websites."

Applications

Bitnami is an app store for server software. Install your favorite applications in your own servers or run them in the cloud. Select one app to get started or learn more about what makes Bitnami special.

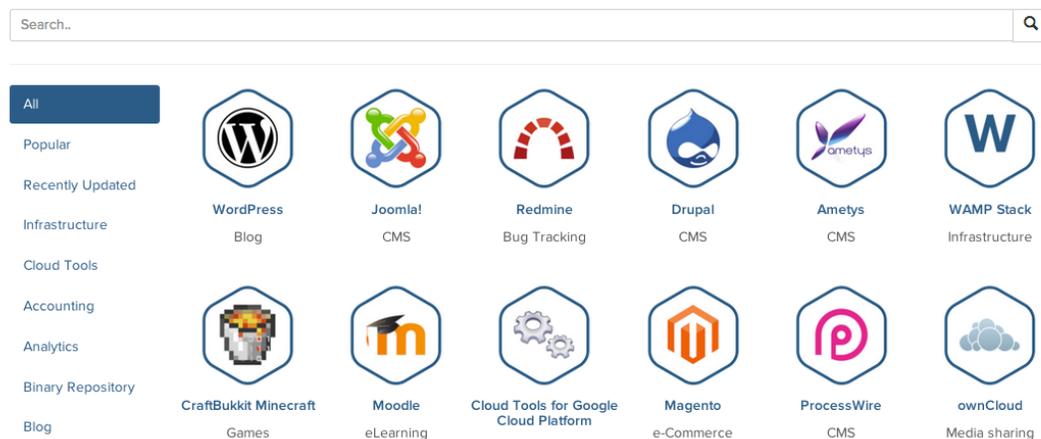


Figure 7 - Bitnami Apps

Or this is one called Bitnami, it's an app store for server software. (Bitnami, 2014) These are all different apps. Again, they're kind of hard to see. But Word Press, Joomla, Redmine (which I don't know anything about), WAMP stack (Windows something, something, something, probably Python) Moodle, Magneto, for e-commerce, just to name some of them. There are actually 50-60 different applications.

You want to run a survey. The old way to run a survey on your website is you download and install software like LimeWire, configure it, set it up -- and hope it works -- and launch your survey.

The modern way to do it is you get an account with Amazon web services or something that will give you some Cloud hosting. You use the app store you rent a LimeWire for \$1.99. It installs in Amazon web services, you put a link to it, you have a survey ready. You're not even using any disk space and Amazon is taking the hit for all the traffic. It cost you a little money but it so much better than Facebook.

Take your data back from Google. (Finley, 2014) This will be a thing, a personal web server, preloaded with open-source software that lets you run all of your web services from home, your home website.

If you don't think it's going to be a thing, think again. People use to go to the Western Union Wire Office to send messages to each other, then the fax machine was invented, and Western Union installed a fax machine on each one of their offices and figured, "This is great. Now, we can charge people for sending messages, and now they can send facsimile images too."

But what happened instead is, people bought fax machines and put them in their homes. You would think who would put a message sending device in their home? Now, we carry them in our pockets.

This is the future of this technology. The personal learning that I've been talking about isn't just personal learning in a conceptual sense, it is personal learning in a concrete hardware sense. Your university will be a box in your living room.

The modern web (Agarwal, 2014) is distributed, interactive, murmuration of services and people -- 2RCode, OpenSearch, Windows Live Tiles, touch icons, RSS and even a thing called human dot text. All of these are little pieces. Your flavors will all be different as they should be. The idea that every website must be exactly the same is absurd. Only an economist would come up with that.

Social Networks and Neural Networks

This changes learning. This is what George and I are getting at is of the theory of Connectivism. "Connectivism repositions media as type of content" (Buckreus, 2014) - but content is, remember, the McGuffin; it's the thing that gets us talking to each other.

We use media. We use our own services. We use our interaction with each other to create *links* with each other. These links with each other, these connections between people, between neurons, between concepts, between ideas. That's the actual learning. I could go on. I have two hour long talks about that, which I won't do.

One question that's always asked is what is the connection between social networks and neural networks? (Matthias, 2014) What is the connection between tweeting each other, or sending email, or skyping, and learning, where learning is the formation of connections between your neurons? Learning is, manifestly, the formation of connections between your neurons. What is the link between this and social networks?

There are two ways of looking at it. Connectivism embraces both ways. These are not alternatives, although they're alternatives, but they're not exclusive alternatives.

George's answer is that it's a multi-nodal extension. What that means is when you learn it's literally the formation of connections between your neurons. You have a network in your brain. This network extends out of the brain and into devices, into the Internet, and, eventually, through to other people. It's an adaptation of the old McLuhan idea that a communication system is like an extension of the body. An information system is an extension of the mind. Pretty smart.

My answer is just as smart. My answer is pattern recognition. (Vento, 2015) My answer is that neural networks and social networks are, in fact, ontologically different, and one is not an extension of the other, but they're related.

They're related by, first of all, a common set of underlying principles described in the mathematics and the methodology of networks. I talked about underlying network principles like autonomy, diversity, and that sort of thing.

The other aspect of it is that networks learn by pattern recognition. The learning in a network is literally the formation of connections. A society learns by forming connections between its people. A human learns by forming connections between their neurons.

What these connections are actually doing is creating a capacity on the part of the network, as a whole, to recognize characteristic patterns. Just like a murmuration of starlings can recognize a falcon. Not because it has falcon-like content in its collective mind (when you put it that way, it's pretty absurd, right?) but, because it, as a whole, is a system that can react to the presence of a falcon.

The same principles underlie social networks and personal networks. A social network is a perception mechanism for a society. A neural network is a perception mechanism for a person. Persons can recognize patterns in society. Societies can recognize patterns in persons. The interaction begins to flow.

You can see that the Downes answer and the Siemens answer are really two sides of the same coin. Different ways of seeing the same topic. That's really common in network learning.

Even if we're examining the same thing, we're all looking at it from a different perspective. Our understanding of it is never going to be the content of any individual's mind. Again, that would

be ridiculous. Rather, the combination, the pattern created by the multiple perspectives that come into play as we all look at this common object.

If I put a chair in the room, our understanding of the chair is the totality of our perceptions of the chair (which is why Wittgenstein was right and Moore was wrong).

Network Learning

Connectivism can be thought of as a learning theory. (Cain, 2014) Personally, I don't care whether you call it a theory or not. But, it accounts for existing theories, it explains where we are, and it we can make predictions.

One thing I do a lot of is make predictions. The predictions based on connectivism can be tested. I've got a history of making predictions, and I'll continue making predictions. One response of connectivism was the MOOC. (Cain, MOOCs and Connectivist Instructional Design, 2012) We built a course in this network style. What we discovered (and frankly, we *did* discover this, we did not know this going in this) was that building a course as a network allows you to accommodate a lot of people with very few resources.

We had a budget for our first MOOC of nothing, yet we still managed 2500 people. I shouldn't say nothing - George wrangled the free Elluminate account. What we were doing is we were testing connectivism by using connectivist theory to create a course, and that course resulted in the MOOC. My verdict is the experiment was a success. Participants seemed to agree.

Creating networks, developing professional connections, studies of MOOCs - This one is a study done by a couple of my colleagues, Helene Fournier and Rita Kop. (Fournier, Kop, & Durand, 2014) The people who actually took these MOOCs report that the really important part wasn't the content, because the content was just the stuff that George and I sent, but the creating of networks, the developing of connections, the networking, building on the affordances of this particular network. (Saadatmand & Kumpulainen, 2014)

Where are we going? Here comes the prediction part. Although, it's not just me anymore. I've been talking about personal learning and personal learning environments for a number of years ago.

The Aspen Institute - they're actually one of these right-wing think tanks, but we'll leave that aside - even they are saying learning has to be personal. (The Aspen Institute Task Force on Learning and the Internet, 2014) Learners have to be empowered to learn any place any time. The idea is to use networks to support and guide learners and, most importantly, build operability across learning networks. Grain of salt: they're thinking of this management design perspective. You can't do exactly what they say, but they have the right in saying learning needs to be personal. Learning needs to be connected. Learning needs to be networked.

Learning control is moving beyond computer-assisted programs “towards authentic learning context, mediated by technology.” (Buchem, Tur, & Hölterhof, 2014) If you think about it, if learning is a network and not an on-site event-based kind of process, it can happen anywhere. It will happen anywhere. It will happen and be managed and controlled by people using their own devices, wherever they happen to be. The devices that are implicated in learning will multiply.

This is an interesting one. (Poynder, 2014) I love this one. Reading and networking will become one and the same thing. This is not exactly what Steve Pettifer is saying. Steve Pettifer developed a program called Utopia. It's an Adobe Reader, but when you read it, a sidebar opens up and gives you all kinds of resources from other services.

We built something similar to that, called Plearn. It was an in-house proof-of-concept project that we did between 2010 and 2012. I've seen similar sorts of things in Microsoft Word. The norm will be to have, if you're consuming (terrible word) consuming content, the norm will be that you have a sidebar experience. Even watching television. It used to be you just sit there (and watch). Remember that? But now, we have what they call the second screen experience.

Reading, watching television, all of these things will be, are becoming networked experiences. In the workplace, connective learning is already changing the workplace. It is going to really change the workplace when our learning becomes present in our devices. (Hinchcliffe, 2014) I used to talk about the fishing rod that teaches you how to fish. Now, recently, I saw an advertisement for a tennis racket that teaches you how to play tennis. Somebody actually built it. It exists. I wish I had the link for it. You have internal sensors. The internal sensors know what a good swing looks like. Feeds back to your device. Your device says, "You really ought to work on that backhand." Or whatever.

Cooperation

Teams and collaborations will be transformed. The old way, the design way, the management way, the control way is to form teams and collaborations, and put people in groups and get them all marching to the same tune, singing the same song, et cetera. The new way is to connect, to interact, but to work autonomously. In software development, they're calling the oscillation principle, (Dixon, 2014) where you get together and connect, and go away and do your thing. Get together and connect, go away and do your thing.

Cooperation is basically defined as a set of interactions in a problem space. (Roschelle & Teasley, 1995) The problem space might be anything. The idea here is that you can achieve results without actually having all the overhead of a collaboration. A murmuration is cooperation. Each starling is autonomous. Each starling decides for itself where it's going to go. There's no shared vision.

"Hey, let's have this really neat kind of amorphous mass." It's like one starling's saying, "That's a falcon," and making its own decision. In cooperation, we don't share models. (Stoner, 2013) We

don't share designs. We don't share goals. We don't share objectives. Axelrod talks about cooperation. (Axelrod, 1984) All cooperation requires is a durable relationship.

All the overhead that we typically associate with managing activities on the web, including learning -- things like centrality, commonality, learning objectives, learning management, controlled outcomes, even trust -- all of these are unnecessary for self-organizing systems. They're overhead. They make the institutions rich. They don't do the kind of job that the students need.

Cooperation means working with others. Working with them directly, without the overhead. Doing away with the negotiations, the discussions, the accommodations. All you need is to be able to interact and communicate with people. That doesn't mean you can't have negotiations, discussions, and accommodations. A lot of people like that stuff, and it's OK. But it's like the guided tour. A lot of people like the guided tour. If you want to get on the guided tour and share an experience with people, you can. The point of cooperation is we can run a society where you don't have to be guided, where you can explore on your own.

The new skills, therefore, both in teaching and learning are network skills. The new skills, pretty much in any discipline now, are network skills. This is a reference to Coding For Journalists so that journalists will understand the real meaning of things like lists, loops, and application programming interfaces. (Bradshaw, 2014) The whole idea here is to understand the concept of how individual entities are related to form patterns, data structures, and entities.

People forget about things like Codecademy, which have proven, very successfully, through millions of users, that people can do things like learn to program on their own, without being told how to do it. (Griffith, 2014) It's like I mentioned at the beginning of the talk. The model for learning is like socializing and playing games.

A New System of Learning

If you've ever been to the media center, I visited the media center once at MIT, the Media Lab - it was a really interesting experience, because the place is a mess. It's utter shambles. (Resnick, Minsky, Kay, & Negroponte, 2014) It's probably a fire trap. But it's brilliant because people can interact any way they want, using whatever kind of device they want. If you want to build a robot, that's cool. It's all play, but I'm sure it's not all play.

We have these models. One model is called the super-university. (Cape Breton University, 2014) It's going to respond to government directives or commercial imperatives. It will be designed. It'll produce outcomes. It'll create jobs. Economic development. Employment for graduates. Even manage immigration. Commercialize research. This is a line; people have told me this: "It isn't innovation unless it's been commercialized."

Again, if you're in economics or business, you've probably heard this. I really don't think that's true. You might say it's not innovation unless it's used, but that's something distinct. That's the one model. That's the kind of thinking that (is typical of) the people's that are saying, "There will be 10 universities left in the world." That's the kind of thinking that goes into that sort of model, that sort of design.

They talk about the importance of universities because we need them. They don't talk about what it is, in fact, we need. Think about the topics I've talked about in this presentation. Do we need more models and more designs? Does the world really need another theory of learning, honestly?

Do we need more standards and more measurements? I showed you half a dozen ways of standardizing learning resources. I could go on about standards and measurements. Do we need more centralization and control? Are the people out there yearning, "Control me! I don't know where to go." Do we need, quite frankly, the same mistake repeated again?

We're able now to rebuild our system of learning. Why on earth would we do it the old way? What is it that we need? What we need is the mechanism to support learning itself. When you ask the people what they want, they don't want immediate economic development. They want better lives.

They see things like learning - All of those people who went to the artificial intelligence course, all of those people who flooded into our MOOC, they're doing the same thing that the people of Leiden did when they opted for a university instead of lower taxes. They're doing what the people of Tublingen did, when they said, "We want a university, not industrial development."

We have an [alternative](#). We do have an alternative. There is a model. It's not a model. I shouldn't call it a model. We have an anti-model. Maybe I should be anti-anti-model and call it...Never mind. I won't go there. We can, as they say, reclaim learning.

We can have a way of looking at learning where learning is not structured, designed, and set up to create outputs, but rather run, operated, and controlled as an unorganized, unmanaged system by individuals. I say we're moving beyond institutions in learning, [toward a cooperative model](#), toward a society based on network knowledge, which we can call a 'knowing society', because the society as a whole, as well as the individuals within it, can learn and know new things. That's the model of the future.

It'll be based on software, technology, resources, systems, interactions, communities, and the rest that take learning well beyond formal education. People talked about, "What is the role of formal education and institutions in all of this?" It (the role of formal education and institutions) is to serve that.

Institutions need to adapt and get out of the mindset that they control and manage learning, and now think about how they can serve many different people in many different ways, with the resources, the learning, the coaching, the mentoring, et cetera, that they need when they need it.

We're going to [get the opposite](#) of these large, control-based universities. People say, "This is the death of the university, these MOOCs." It's not. This is the beginning of the university. The shift of the university from something big and large and available only to a few, to something much smaller, much more nimble, much more independent, a lot like community music artists -- that line was for George Siemens -- that will cater to specific learning needs. They will number in the hundreds of thousands, not the tens. They will be everywhere.

I thank you for your time and your attention. We do actually have a little time for questions, but I won't say how little. Thank you.

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Beyond Assessment - Recognizing Achievement in a Networked World

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ePortfolios and Open Badges are only the first wave in what will emerge as a wider network-based form of assessment that makes tests and reviews unnecessary. This paper discusses work being done in network-based automated competency development and recognition, the challenges it presents to traditional institutions, and the opportunities created for genuinely autonomous open learning. Through an exploration of the ethical issues related to analytics and assessment and the development of alternative credentials, the paper proposes a mechanism for personal learning assessment based on production in social and community-based environments.

Keywords: networks, learning, assessments, social media, analytics, ethics

What constitutes success?

There is a case of a woman who was a dean at MIT for decades, receiving the institute's highest honor, the MIT Excellence Award for Leading Change, and it turns out she didn't have any degrees, not even a bachelor's degree. (Lewin, 2007) Obviously she has been disgraced and she should not have done that, but the interesting thing is that she can do an excellent job and be recognized for this, by a major institute of higher learning, and yet not have a degree. It raises the question of the value of the degree itself.

On the other hand, we have the possibility that many of us are just faking our way through. (Tremonti, 2014) It's not just faking our way through doing jobs without degrees -- although I do wonder how many other people are out there doing that. It's faking our cultural knowledge generally, for example, people acting like they've read "War and Peace" when they really haven't read War and Peace, or people referring to plot elements in "Moby-Dick," like I do, without having read Moby-Dick, which I haven't.

When we get into this sort of discussion, we wonder, is there a core, a common heritage, which we each share, or rather is each individual, as we just heard, a strand running through the fabric of culture? What is it that can be faked, and what is it that, like being able to speak Urdu, can't be faked?

It's interesting to think of culture in this perspective, as a type of language -- culture as something that helps us communicate with each other. (Hereford, 2014) It's like a speaker at a

conference referring to a science fiction novel by Greg Egan to make a point. I can nod at this because I'm familiar with Greg Egan, thus faking cultural fluency. Unfortunately I hadn't read that particular book so I lost the context of the example, and wouldn't be able to discuss it. Cultural knowledge can be faked, but cultural interaction cannot.

When we talk about knowledge and language in this way, we sometimes have this sense that we're talking about knowing a language, knowing a culture, knowing a whole set of facts, and if we could just get all these facts, then we'd know what people know. But, in fact -- Wittgenstein here is the expert on this -- a language isn't just knowing a set of facts or knowing a set of rules. A language is something much more dynamic, much more behavioral and complex: not a set of facts, but the embodiment of a skill, like playing a game, like a way of life.

Looked at from this perspective, what constitutes success? (Thomason, 2014) Playing the game of being a good MIT Dean of Admissions constitutes success, while a demonstration of recall of a set of facts does not. What is it for one of us to be a success? Do we count our citations? Do we count the impact factor of the journals that we're writing? Probably we shouldn't.

This raises a lot of serious questions about assessment and about understanding what constitutes success and what constitutes learning.

Here's one question: we have many more ways of finding work today, but it seems harder and harder to find a job, harder and harder to match ourselves to a position. (Young, HR tech, 2014) Why is that the case?

Here's another question: today's students leave a lot of data traces, as we've just heard, from demographic information to how they read and highlight eBooks, et cetera. What are the ethics of using this for the purposes of assessment? (Young, Personal education, 2014)

Here's another one: everybody's learning experiences are customized. Everybody is, as my wife likes to say, a special snowflake, where their experience exactly matches who they are. They study exactly what they best comprehend. So does this mean everybody gets an A?

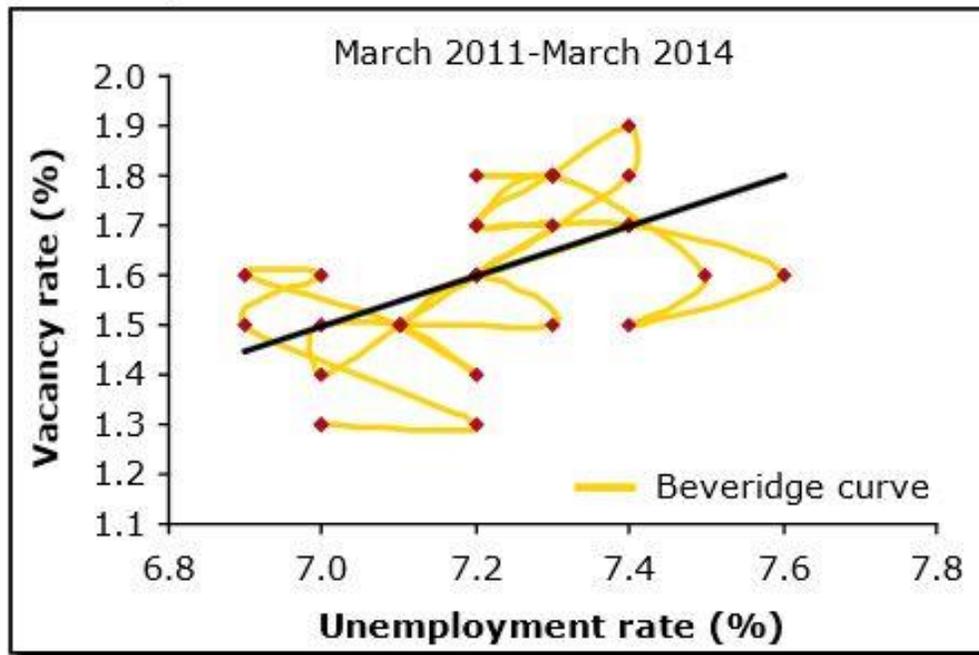
And another: is open online learning or the MOOC, the massive open online course, or informal learning in general doing the sort of thing that we need? According to the traditional metrics, it's not. (Moe, 2014) People aren't completing their courses. They're not amassing these sets of facts. They're not proving their knowledge by taking tests and getting degrees.

MOOCs and open online learning generally are shifting the definition of education away from its historical roots to a skills based, instrumentally defined enterprise -- in other words, very much like speaking a language.

What We Need

What is it that we need? What is it that we're after? What are we trying to get at when we're doing assessment?

Positively Correlated Vacancy and Unemployment Rates Implies Some Labour Market Mismatch



Source: CIBC calculations based on Statistics Canada's tabulations

Figure 1. Skills Gap

One way of looking at it is the skills gap. As widely discussed in Canada, a skills gap exists when the set of unemployed people and the set of employment opportunities don't match. The skills the positions need aren't the skills that the unemployed people have. So we're trying to bring people to the point where they can qualify to fill the jobs. That's one way of looking at it.

Or look at it this way: it would make sense for employers to just go out and say "we'll educate people for the skills that we need, and then we can hire them," but this isn't happening. (Munroe, 2014) One of the reasons, I think, is employers don't actually know what these skills are that they need.

They know that they don't have the people. They know that the unemployed people don't qualify for the job, but they don't know exactly what it is that would qualify for the job. It's just when they do the interview, when they have a conversation with the person, it becomes obvious to the

interviewer that they're qualified or not qualified. This is an interesting and remarkable phenomenon.

What's being recommended? What has our government and business community come up with? Well, in Canada we have something called Canada 2020. It's a business oriented group. They're recommending a learning outcomes assessment program, a council on skills and higher education. We actually used to have one, called the Canadian Council on Learning. Now they want it again.

They want education and skills for aboriginal peoples, whatever that means. They want to "narrow the skills gap between men and women," again, whatever that means. They're looking for credential recognition and skills training for immigrants. (Munroe, Skills and Higher Education in Canada, 2014)

I don't think any of these addresses the point. I don't think any of these addresses the problem. The problem is how do you recognize, first of all, what you need in society? And secondly, what people actually have in society. We need to be able to, on a society-wide level, to be able to do the job of the interviewer.

Traditional approaches to assessment

Confusing the outcomes of education with the process of education

This sort of approach being recommended by Canada 2020 and other business groups isn't addressing the problem head on, but instead is trying to cover the cracks with committees and lists of skills and competencies. But it doesn't get to the core of the problem.

What we're doing now is compiling learning task inventories (LTIs) to define sets of learning activities related to skills. (MacNeil, Wood, Zivcakova, Glover, & Smith, Learning Task Inventories (LTIs). Exploration of Optimal Conditions to Help Students Develop, Improve and Sustain Good Study and Learning Practices, 2014) It's [the basis for instructional design](#). (Quinlan, 2014) You start with what you want them to learn, design an experience, cause them to learn it, build in some checks, and see that this has all happened in the end.

That's basically what these councils and these skills programs are going to do. That's what PISA did. That's what PISA did for 15-year-olds. The PISA test, for those of you who aren't familiar with them, is to take 15-year-olds around the world. You give them a standard set of test questions (interestingly, test questions not based on the curriculum of what they learn but rather test questions based on some definition of what the organizers of PISA think they should have learned by the age of 15). Apply these tasks, and then you get a league table. You have Finland, Shanghai and Singapore at the top, all the way down to "not us" at the bottom half of it.

It's a very traditional approach. LTIs detail the learning tasks students are expected to master during the course. They are represented in, for example, standardized curricula such as the Western protocols in Canada or the Common Core in the United States. The intent is to improve learning outcomes; "It is well known that distributed practice, the technique of dividing study efforts into frequent, relatively short study sessions, is more beneficial to student learning than is massed practice." (MacNeil, Wood, Zivcakova, Glover, & Smith, 2014) But while making it clear to students what they don't know, it is not clear that LTI's actually help them learn. "Only 10-20% of students believe this contributes significantly to making course material easier to learn or to their final grades."

So creating lists of learning tasks students are expected to master creates significant extra work on the part of designers, but it's not clear it results in more work or improved outcomes on the part of students. It's a long process of identifying and testing for skills gaps that doesn't seem to have any beneficial result. And interestingly, the countries that are doing well in PISA are beginning to doubt the whole program. Countries like Finland probably always doubted the whole program. We have Shanghai, and China generally, looking at whether they really want to focus their efforts on this anyway. (Zhao, 2014) Their skills and qualities, they say, should also be acquired from a variety of activities, not just studying specific ('core') skills and testing for them. They consider things like play, online activities, and games to be equally important because they understand that knowing isn't just about getting a set of facts that you can measure on a test.

Why are we emphasizing the test? Here's one theory. This is the slide for any who are skeptics. The per-student cost for testing is currently about \$31 a student. Multiply that by 50 million students in the United States, and you get lots of money. (Heick, 2014) Interestingly, organizations like "The Washington Post," who promote testing, also run testing agencies like Kaplan.

Yet, education is still crucial for economic development, for personal development, and there is this sense in which skills build on skills. (Pearson, 2014) There is this sense in which education is kind of cumulative. It almost feels like we're piling facts on each other, even though we know it's not.

We have reports saying the time in school spent by a country's children is directly related to the productivity of its workers. That appears in the publisher's Pearson's White Paper. I'd probably say it differently, to focus on the health and welfare of the population. The point nonetheless remains the same -- more education means happier people and a more developed society.

In my opinion, the problem is that we're confusing the outcomes of education - the test results, etc. - with the process of education. That's why it's significant and that we talk about the time in school as opposed to, say, the test grade, because if people said the test grades are proportionally

related to economic development or productivity, I think they'd have a much harder time making their case.

As opposed to test grades, which are easy to measure, outcomes are hard to measure. As Pearson's 2014 report, 'The Learning Curve', argues, "You can be certain and vague, or you can be precise but not certain. You can't be both." (Fallon, 2014) The really interesting, useful outcomes like "understand" and "appreciate" are almost undefinable. (Talbert, 2014) They are, in a certain sense, ineffable. We could not really express what we mean.

This is what the representation of culture as a type of language appeals to, the ineffability of learning. We cannot express in language what it means to learn a language. Language limits us to describing learning in terms of as a set of facts, structures, rules, et cetera, and this doesn't work. There isn't a nice and neat set of concepts and principals linked to what we mean by "understand," so you get behavioral outcomes, "display," "recite," "define," but these are based in rote.

That's the problem with these tests -- you can fake them.

"The complexities matter," says Gardner Campbell. "When confident, simple, plain orderly advice is given about a subject matter I hear the sound of the hatchet replaced by the sound of wood snapping as the branch I'm sitting on gives way." (Campbell, 2014) It's easy to recommend simple test-defined outcomes-based ways of developing education, but as soon as we begin to do that, we're undermining the foundations of the educational system.

Making Stuff Up: Mental Processes

This is the dilemma. We can't depend on the test. But on the other hand, our knowledge is in our heads, and what's in our heads is incredibly difficult to access. Even if you slice open the brain -- and people have. I've heard this -- you still don't see knowledge. You see gray, messy, gooey stuff.

What are we going to do? (Watters, 2014) Do we continue using the black box approach (McLeod, 2014), which is based on "recite," "define," et cetera, or do we start making stuff up, using what Hume would call 'convenient fictions' to explain away that which we do not know.

Here's an example of what I mean by "making stuff up." This is someone who I won't name for his own protection: "Our brains need some way of deciding what to encode and how to encode it, so as to retrieve it in a way which is useful. Our minds solve this problem by encoding

information along the affective context.” (Shackleton-Jones, 2014) No doubt you have studied many papers that sound like this.

This is made up stuff. It seriously is made up stuff. What is the “affective context”? Even if you can give me a definition, can you give me a definition that is operationalizable in any meaningful way? Can you give me a definition which is observable in any meaningful way?

When you start saying things like "the brain needs some way of deciding," how do you know this? Is the brain sitting there and saying "oh, my, I need to find some way of deciding how I know?" No. It's a hypothesis. It's making up some kind of activity the brain is doing, but the brain is not actually doing it.

Stephen Talbott argues that we have this tendency to represent the human body and human systems, including thought and even things like the circulatory system, as though they were machines, when manifestly they're not. (Talbott, 2014)

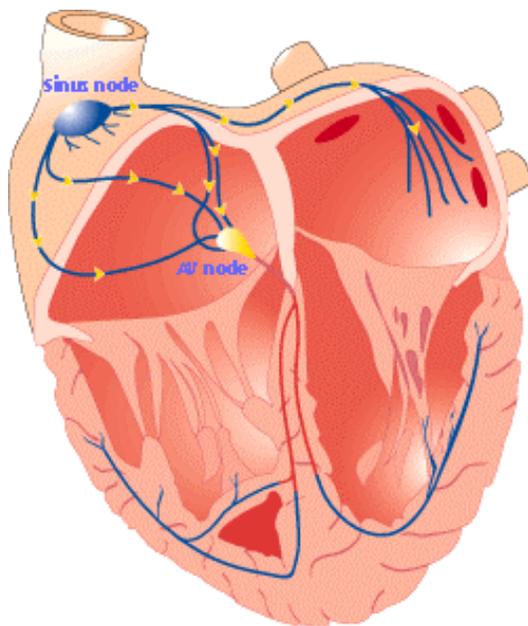


Figure 2: The Heart as something other than a pump. Image: <https://emedtravel.wordpress.com/page/16/>

For example, we typically (and habitually) think of the heart as a pump. So we say the heart pumps the blood through the circulatory system. But, as he argues, if that's really what happened, the amount of pressure that the heart would have to exert on the blood would explode the tiniest veins and arteries in our bodies. Rather, our circulatory system is less like plumbing and more like the tides. It involves some liquid in the blood system but other liquid elsewhere in the body. It's like the tides that sway back and forth.

On this picture, the heart is a regulatory mechanism, not the sole thing that makes the whole thing work. Other things are involved; the veins in your legs actually play a role in moving the blood back to the heart. The whole body works in this way. The whole body works together as a system for making the blood move. It's not simply the heart. The heart is just one part of it. It's a complex, messy -- really messy. Open a person and you'll see nothing but messiness -- totally integrated organic system, not a machine.

Making Stuff Up: Competencies

That takes us to the next part of our discussion, competency-based education, which is a major trend in modern e-learning. (Tamburri, 2014) In competency-based education students are granted credentials (Eduvation, 2014) based on demonstrated proficiencies. (Shapiro, 2014)

Critics argue that it seems too much like training and it focuses too much on outcomes. That may be. My response to it is it takes a hard problem (of deciding, for example, whether somebody is a dentist) and breaks it into smaller problems, each of which is just as hard as the original problem. We had one hard problem. We've created 10 hard problems.

I wonder, indeed, whether personal learning even requires competencies. Do we need to break down our domain of study into a set of clearly defined competencies in order to be able to master the domain? Is a discussion of our learning a domain at the same time a requirement for a discussion of the competencies that we've acquired in that domain? For example, is being a physicist the same as having acquired all the competencies we take to define a physicist?

In one sense, yes. (Mind/Shift, 2014) You can't really do personalized learning without common expectations about competencies. You need to know, for example, what a physicist knows. But what is that? What defines what a physicist knows? This is where the competency-based approach begins to break down, because it is extraordinarily difficult to define the full set of necessary and sufficient competencies that define 'being a physicist'. Only under certain circumstances, where we know and require a common and core set of competencies, are competencies required to support personal learning. But this may well prove to be the exception rather than the rule.

And this seems to be the result we are obtaining in practice. According to a study (Abner, Bartosh, & Ungerleider, 2014) on competency-based education from the Higher Education

Quality Council, there's no systematic comprehensive study indicating that the specificity of skills from competency-based education translate into performance. As Charles Ungerleider asks, what are the competencies underlying performance in anything? What are the competencies underlying a satisfactory high school education, even?

We think we've got a good handle on what these basic competencies are, but we don't. We think we do, but it's an illusion. We make stuff up, and we say it's foundational, without any good ground for saying so.

Alternative Credentials

What's happening now? What are we getting? We are getting alternative credentials. We used to have a system where we had high school diplomas, bachelor's degrees, master's degrees, PhDs, and a few professional certifications. Now, because there's so much information out there and so many ways of interacting with people, we are getting a ton of alternative credentials.

As I say here, a veritable slew -- Qualt, (<http://www.qualt.com/>) for example, based on courses developed by the Association of Accounting Technicians, et cetera, and brought to us by the good people like Google. Harvard has created the Credential of Readiness, which means that you are ready to take a Harvard education, I guess. (Useem, 2014)

ALT, the Association for Learning Technology, in Britain, is designing and creating badges as part of its ocTEL MOOC. On top of that, the badge issuing system, which can establish whether the badges you are issuing are compliant badges. So we have a credential for a credential. (Hawksey, 2014) (Levine, 2014)

Udacity, Sebastian Thrun's company, together with AT&T and 1.5 million of their dollars, is launching something called nanodegrees. (Shen, 2014) In Europe, the European Commission has the VM Pass (Knowledge Innovation Centre, 2014), a validation process based on a combination of peer review and crowd sourcing. (Creelman, 2014)

Condé Nast - yes, the magazine publisher - is issuing college credentials. (Lederman, 2014) The experts are going to be the writers and editors from various magazines. Of course, the publisher will provide some financial backing. It actually convinced some colleges to go on with the scheme.

The Achievement Standards Network is offering "open access to machine-readable representations of learning objectives published by education agencies and organizations including the Common Core State Standards." (JES & Co., 2014) It was recently acquired by Desire2Learn.

Learning Locker (<http://learninglocker.net/>) is an open source Learning Record Store for tracking learning data. (Betts, 2014)

What Are We Validating?

Understanding

What we are seeking is a sustainable and reliable method for the validation of learning. But, let me ask, are we validating the learning, or are we validating the person? Who are they hiring when they hire someone, the learning or the person?

The objective was, remember, jobs, skills, gap. They don't hire learnings. That's why they don't just use the CV when they're hiring people. They're hiring the person. You wonder why they would do this. They actually go through a process of selection, where real people sit down and talk to job candidates. Why does that happen?

We need a basic understanding of understanding. (Stanley, 2014)

When you're trying to show that you understand something, the answer to that isn't really "let me demonstrate." The reason why "let me demonstrate" isn't the reason is that it's too easy to fake. If you just show a production of some sort and say "this proves that I know of quantum physics, because look," people aren't going to believe that.

This is because there is a sense in which understanding quantum physics is more about being immersed in a culture or like learning a language than in possessing some set of facts and principles in the brain.

To know something, in this sense, is to *recognize*. (Wilkins, 2013)

This should be thought of in a very precise sense. What is it to know something? Consider the books, "Where's Waldo?" (or "Where's Wally?" in Europe). (<http://whereswaldo.com>) Open up "Where's Waldo" and look and search for Waldo. Finally, you see him. You recognize him. The next time you do the same thing, it takes you no time at all. There he is.

Knowing is like finding Waldo. It's being able to recognize him in the sense that you can't un-know it once you see it. Knowing is like picking out the face of your spouse or your close friend in a crowd coming over in a train. Easy to do. It's an incredibly complex process, but easy to do. You can't not do it. That's the key.

It's a physical state. It is quite literally the organization of the connections in our brain. Our brain is a perceptual mechanism. It's a perceptual mechanism such that if we see something that we recognize or we know, we get a cascade of neural activation, and we get this characteristic "Ah, there's Waldo. Ah, there's my wife. Ah, there's a tiger." You can see how it would be useful.

Knowing and Doing

Learning, in an important sense, is learning how "to do," in other words, rather than "to know." (Ferguson, 2014) This is important.

When we're doing these assessments, when we're doing these measurements, we're after facts and principles and things like that. Theories. Even language. Even a definition or description. This is a representation or a model of what we know, rather than what we do. It's a tool, an aid to learning, an aid to understanding and comprehension, but it is not literally the thing that we know.

The thing that we know literally is this recognition process. How do I know that? I know, because our brain is a pattern-recognition machine, not a digital computer. It's not even a pattern-recognition machine. It's a complex biological stuff, interconnected neurons that collectively recognize patterns, and not a digital computer. The digital computer analogy is simply wrong.

How do you show what you've learned? Do you demonstrate, or do you do? A demonstration is a requirement intended to satisfy a specific set of criteria. That's the formula. (Kuhlmann, 2014) How do you become, or establish yourself, or show that you are an e-learning professional or anything else? First of all you practice what you do. Secondly, you show examples of what you do. Thirdly, you show what you do and what you learned.

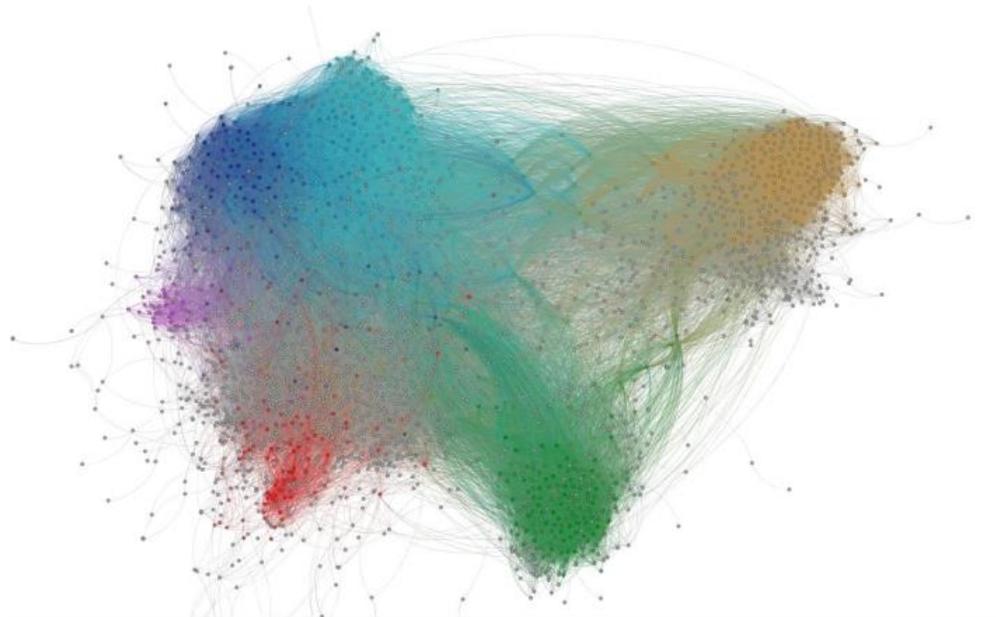


Figure 4: My LinkedIn Network

You don't just show the examples. You show the process. You show the thinking. You show what goes on behind the scenes. And this is what a modern learning network enables. When I work on the network, I show what I know by being on this network doing what I do, whatever I

do. All of those people see it, and they talk about it. Maybe they talk about it, or maybe they ignore it. Who knows? They do what they do.

For example, I show what I know with my LinkedIn network, (Downes, 2014) and it shows a lot of connections. The connections are mapped and organized by the computer, which also adds the colours. You can actually analyze what the different colors mean; they represent clusters of contacts. The computer autodetects these clusters; to a certain degree, you could find out what I know by looking at the set of people who talk to me.

This is the wave of the future. There's a system called SCROLL, a System for Capturing and Reusing of Learning Log, and basically it's capturing your learning as you go along. (Ogata, Hou, Li, Uosaki, Mouri, & Liu, 2014) This learning, just like a LinkedIn network diagram, can be analysed by computer and clusters – which in this case would be key areas of learning – can be identified.

Think about what happens when we add learning to the Internet of Everything. (Jarche, 2014) The Internet of Everything is the Internet of people, of resources, and of things. We're hearing about the Internet of things, but what's really interesting is the Internet of everything. We interact and communicate not only with each other but with our devices and our tools.

I used to talk, many years ago, about this fishing rod that teaches. (Downes, The Buntine Oration: Learning Networks, 2004) You take your fishing rod and go out and fish, and the fishing rod has internal sensors that detects how you cast. Then it remarks to you, "You've never fished before, have you?" or something like that. The fishing rod gradually teaches you, but what's more interesting is that the fishing rod and you are interacting together. It has sensors. It's detecting what you're doing, and it's using that feedback to help you learn. It was always theoretical, but a month ago I saw a TV show. They didn't do a fishing rod. They did a [tennis racket](#). (Diallo, 2014) People who buy a tennis racket will pay more than people who fish, I suppose.

The idea here is that as time goes by, we and the machines have to get skilled, are getting skilled at lumping data and things together and then filtering and understanding the language. You can't fake playing tennis. You can't fake fishing. The totality of the practise represents the learning. All of this data basically tells, as Samuel said, the story of who we are. The story of what we do.

It's assessment based on public performance. It's like an essay, and it can be assessed in exactly the same way an essay is assessed. The way an essay is assessed now is a person reads it. Sometimes they'll use a rubric but again, that's taking one hard problem and creating 10 hard problems out of it.

Other times they'll look at it, and the mechanism by which they determine whether it's an A or an F -- and they've decided that probably very quickly – maybe even after the first few paragraphs.

Certainly when I read papers -- and I read lots -- I force myself to read the rest of the paper, but really I know.

You know because you can tell. You can recognize it. See how the words are used? See how the sentences are constructed? Are they even addressing a real problem? All of these things are in a certain sense ineffable.

Like Dreyfus would say, "The knowledge of an expert is intuitive. It's recognized." (Lester, 2005) The machines are getting smart enough to do this themselves. Neural-network software is getting smart enough to do it itself.

That's how computers are used to mark essays. They don't mark essays using key words or grammatical constructions. That's a popular fiction. (Kolowich, 2014) If you look at the actual way they do automatic grading of essays (Paruchuri, 2013), they give a neural net a training set of five, 100, 1,000, whatever essays all previously marked, and then that creates the recognition mechanism in the neural network, specifically the pattern and connection. Then when they put a new essay into the system, it comes out with a grade based on that previous experience.

Grading/What is assessment?

A Recognition Task

Combine two things, the mechanism that creates clusters like we saw on LinkedIn and the mechanism that can automatically grade essays, and you have the potential for a system that doesn't actually need to be trained. You just let it out there into the world, let it find expert discourse for itself, and then it can associate new discourse with the expert discourse.

I've just waved my hand here at what is in fact a very difficult and challenging problem. We have researchers and engineers working on this problem...Not easy. But we know the machines are getting closer.

We know this because machines are passing the Turing test. (Baraniuk, 2014) They have been improving since the development of the chatbot, for example, which has been going on since the 1990s in MUDs, IRC, which systems like the one called Julia, (<http://www.lazytd.com/liti/julia/>) where people would have conversations with these bots. That's been continuing since then.

Grading is a recognition task. It's what neural networks do, and it's what we design and build interfaces for ourselves to do. It's how we'll respond to the Internet of things. (Lockton, 2004) We're not going to examine all of that data personally. If we could, we'd design systems that present to us maps, graphs, dashboards, things like that. It's how we're beginning to understand the world now.

Sometimes it's talked about as intuitive. Sometimes it's talked about as a language. Sometimes, Don Tapscott, Marc Prensky, and the rest would talk about it as a culture and a generation in that. (Tapscott, 2013) But what they really mean is that we are beginning to understand the world through this process of pattern recognition in complex data. Preskett and Prensky might know that this is what they're saying, but this is what they're saying. It's not a generational thing. It's not a "ooh, we can all multitask." It's that if you look at this wide set of data you can see. You can look at multiple thread streams, multiple Twitter feeds at once, and see the pattern.

How do you see the pattern? Because you train your brain over time. You have been exposed to this data in the past and it creates a set of connections. Your brain is a pattern-recognition machine. You see Tweets, LOLcats, whatever, and you recognize them like you recognize Waldo, like you recognize a pattern. It's an instinct of knowledge. It doesn't have a name. It doesn't have a word. It doesn't have a concept. But it's a thing. People know what it is.

What We Reveal

Our reaction to some of the stuff that goes on online is proof of our recognition of some of the stuff that goes on online. We're beginning to become sensitive to these tunes, to these signals, sometimes even overly sensitive, sometimes even hypersensitive. (Flaherty, 2014)

On the one hand, we reveal ourselves in our messages. (Tyson, 2014) We reveal our thoughts, maybe times a lot more than we intended. Sometimes these assessments, what we reveal, what other people look at, can be very personal, can be very uninhibited. (Rose, 2014) I think we know this.

We're getting sometimes some very brutal -- not necessarily honest but nasty -- assessments online. There's the whole range of reactions. The range of reactions is from the very positive to the oh-so-very negative. I've had both, and I think we all have had both.

We're seeing all of this in other areas first. (Dyens, 2014) We're seeing big data used to analyze all of these Internet reactions. We have a project (Mechanical Turk, 2013) at the National Research Council where they looked at the emotional significance of Tweets. You have an event. You look at all the Tweets. Are people generally happy with it? Are they upset with it? et cetera. It's a project. It's done all by neural network analysis of this published data. Sometimes what we reveal is very involuntary. You can sort of get this reaction. You may see a cat with the cone on its head and say "aw." This "aw" sensation is revealed in your later communication. Sometimes you actually type it out, "Aw."

It's interesting because it's not just a one-way thing. There's a dynamic interplay. I was thinking about this. There's of course this whole literature about violent video games and that. I've played violent video games. I don't think that they desensitize you. The reason that I don't think they desensitize you is that there's no real emotional attachment to the figures in the game in the first

place. (Bilton, 2014) It doesn't trigger the apocryphal mirror neurons. (Winerman, 2005) They're maybe not that apocryphal, but you know what I mean.

But I'm also a devotee of fail videos. That's a little secret. But I love them because I see myself in those. You see somebody on the bicycle going over the handlebars, and you go "ah." You do have that feeling. That feeling is what comes out, and that feeling does get reflected. Then Facebook analyzes it and monetizes it.

Ethical issues

These assessment mechanisms are being built into the LMS. (Petropoulou, Kasimatis, Dimopoulos, & Retalis, 2014) You require your students to use an LMS. They use an LMS. Your system now begins to analyze them in more and more and more detail over time. They probably won't stop at the LMS, will they?

People are beginning to raise questions about this (Association for Learning Technology, 2014), and I think these are important and good questions. They're asking about the methods of exploring the types of data. What kinds of data is appropriate for an institution to collect? Should an LMS be collecting information that reveals your emotional state? They're asking about data fishing. "Let's see what's there."

The worlds of privacy and the worlds of analytics interact (Heath, 2014). This is the problem with traces. You leave these traces, and they're analyzed. People see into your soul -- or other non-made-up thing -- do we have the right to do this, or do we have the right to, as Samuel said, take back our traces, take back our digital presence?

In a certain sense, that's impossible. It's like me trying to take back the fact that you all saw me 10 minutes ago -- "I'd love to take that back. It wasn't one of my better moments" -- but it's not possible.

You have heard about this: Facebook was doing an unannounced experiment on the emotional reactions of 689,003 of its users to show that emotional states can be transferred to other people. (Kramer, Guillory, & Hancock, 2014) They messed around with the lists of stories displayed in their news-stream or their feed and then measured the responses to detect emotional responses to that. Intuitively it's measuring something that we understand does exist.

If you show people nothing but stories of crime -- and there have been studies on this -- and they think there's a high-crime rate. Even though the crime rate is going down, because all they see is crime, they think it's going up. Facebook was doing the same sort of thing, except they didn't tell anybody they were measuring this.

You've probably heard about the reaction. (Globe and Mail, 2014) People want to get out of Facebook, and they'll jump to Twitter. But it's not just Facebook. Yahoo -- among others, I think Google is the other one -- is dropping the do-not-track mechanism. (Marvin, 2014) That's a

signal you can put in your browser so that people don't track you (They're saying that it's too confusing, but they're the ones who made it confusing).

Google announced (Molnar, 2014) last April that they had halted the practice of scanning student Gmail accounts for potential advertising purposes. (Bout, 2014) But that means they were scanning student accounts for advertising purposes. They've decided to stop acting like your creepy uncle.

Sometimes it's accidental. (Biemiller, 2014) Sometimes the data just gets out, but when it gets out it can be a bombshell. Like this one, "University of Virginia Law School collecting and distributing to potential employers information about grades," OK, "class ranking," I don't know, "political affiliation, work experience, recommenders, information about where their girlfriend lives." (Zaretsky, 2014) This is secret data. Students don't know about this, the employers do.

Options

What do we do? One option is to delete all of our social media accounts (Suarez, 2014) (Bussing, 2014), but we're not going to do that, are we? People are not leaving Facebook. (Elliott, 2014) They're not leaving Google. They're not leaving LinkedIn. It's not going to happen. These services are too useful.

We learn about our friends. We learn about ourselves. It gives us this mechanism by which we can recognize what the state of affairs of the world is. So we're not going to leave the system. At the same time, companies are beginning to feel the heat.

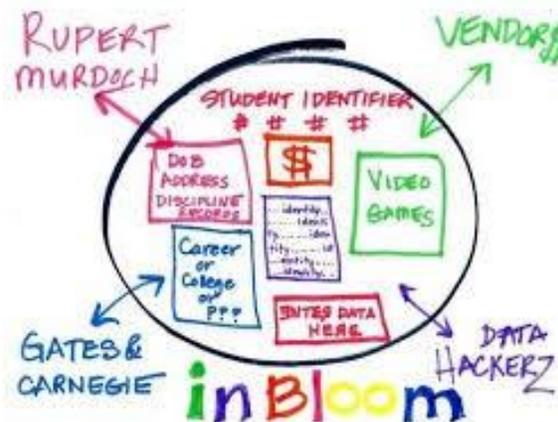


Figure 6. InBloom. Source: *op.cit.*

Gates funded a thing called inBloom. (Thompson, 2014) It was based in Atlanta, and basically it was "we will centralize and store all of your student data for you." Well, we know about that sort of practice, and we have Rupert Murdoch on the one hand, Gates and Carnegie on the other hand, and Joe Hacker on the other hand all accessing this data.

Of course it raised a substantial response, a substantial reaction, and inBloom was eventually shut down, (Korach, 2014) as it should be. (Daniel Solove, 2014) Ironically the new concern about data is called the Snowden Effect. (Grealish, 2014) That's what you classically call shooting the messenger.

But it's true. Canada just passed an anti-spam law, which I can report in my case did not change the flow of email into my inbox. (Davison, 2014) There was a surge before the law was passed of people asking whether I gave them permission to continue sending messages to me. I took great delight in not giving them permission.

As of July 1st, the same messages, the same companies...The flow continued uninterrupted. But there are laws in place now.

This whole concern about privacy is spreading -- and quite rightfully so in some cases, wrongfully so in other cases. For example, lecture capture... (Opidee, 2014) you'll notice I did advise everyone that I was recording this ahead of time. I hope it's still recording. Oh yes, it's still chugging away there.

People are demanding that the classes they attend not be recorded because they think that the classroom is a space where you expect privacy. It's an interesting question.

But it's also becoming more and more the case that when you attend a class, cameras will be on, if not officially at the front of the room, unofficially in the back of the room. I could give you a whole bunch of neat little examples of teachers rampaging on, but I won't.

One proposal -- and this comes from Doug Belshaw with Mozilla (Belshaw, 2014) -- is to ensure that common spaces are public spaces and not privately owned. There's one weakness in that proposal -- our public spaces aren't very private either; no matter where you work, it seems, there will be both government and corporate surveillance, turning your private conversations into products or commodities.

Personal Privacy

It's not simply the case that we can take these services out of the hands of the billionaires because if we put it in the hands of the government, we get, again, the Snowden Effect. The real answer here, I think, is personal privacy. Personal privacy and informal assessment are going to go hand in hand. They will necessarily go hand in hand.

The schemes -- and you will hear a lot more about these -- big data and learning analytics are going to flounder on the rock of personal privacy. There's clear indication that people want this. One example is on a crowdfunding site called Seedmatch raising money for an NSA-proof personal server. (Russia Today, 2014) They asked for €75,000. In 89 minutes, they raised €750,000.

People are moving to privacy securing personal networks. There are a whole bunch of them. Privatext, TigerText, Whisper, Cyber Dust, Ansa, Omelette, and Diaspora. (Bourne, 2014) Personal disclosure, I invested in a whole 100 dollars in Diaspora.

A New System of Assessment

How does it work?

Let's put all of this together. The elements within your system of assessment are going to involve personal servers. (BCNet, 2014) Not stuff you store on the learning management system, not stuff you store on Facebook or LinkedIn, but stuff you store on a network you control and own.

There's going to be a public space, the information you are willing to share with other people, your friends, the assessors that are out there in the world. That'll be your public face. It'll be the clothes that you put on.

There will be identity management. But individuals will take control of our own identity. Facebook that's depressing insists that each person will have one and only one identity. But instead, one of the things we will see is people can have multiple identities. They can present themselves in different ways to different audiences (just in the same way an athlete is one type of person while playing the game and a very different person when caring for his daughter).



Figure 7. Personal Production

The things we do online publicly feeds into these content networks. This is known as personal production. (Waters, 2014) These content networks act, in the first instance, as a global content filtering system, a global perceptual network. You think of the social network as an interconnected network of people. It functions in the same way as a neural network, in the sense that it is a pattern recognizer.

One might ask, who are the curators? The answer is: everyone else. They interpret, revise, remix, re-purpose, spin-roll, fold, et cetera. This is more than just curation, although curation is a word a lot of people like to use. It's people, right? It's one person doing things, whatever they do, and these things are seen, recognized, passed on, commented on, et cetera, by other people.

The first layer here is the social network. (Andrade, 2014) That creates the mechanism for assessing the qualifications of the individual. One can imagine a social network of quantum physicists. We know all the major quantum physicists know each other. They communicate with each other, respond to each other's papers, go to the conferences, call each other names, et cetera. There's this cluster, just like the cluster of green people in my LinkedIn network, except they're quantum physicists and therefore have no color. They're linked to each other.

My qualifications, as a quantum physicist, can be mapped and understood as my positioning in this cluster. If the other quantum physicists talk to me -- this is putting it very crudely, of course - - I rate as a quantum physicist, but I can't fool the other quantum physicists because the one person who recognizes a fake quantum physicist is a quantum physicist.

This human network acts as a perceptual mechanism for filtering the qualifications of people. That's why the person could fool MIT staff. The degrees actually don't matter. But the way you relate and interact with other people: that does matter. That's what's happening online today. And as an aside, it has always happened. That's the way it's always worked except we didn't have a global communications network to pull it off before, so it was always very local, very individual, very personal.

Professions will coalesce around this. They're online communities. They're open ended networks. They're similar to vendors' communities in practice, but they're not just that. They might be gaming communities. (Nisnevich, 2014) They might be hobby communities, they might be neighbourhood communities. These already exist, and we already use them. And the artifacts of our interactions with each other in these communities can be measured and understood in terms of their impact on our qualifications and credentials. (Salmons, 2014)

Interviews. Instead of a person interviewing with 10 different companies, a person does an interview with a professional interviewer. The video and transcript are made available online, and then these 10 companies can look at that interview, use their system to assess that interview according to their internal criteria, and determine whether or not you get the job. It's a first-order screening , but it's a very effective one.

Would you hire him? Could a machine detect whether you would hire him?

Assessment of the future will basically redefine what we mean by a body of work. (Bentley, 2014) It used to be that one's work was one's formal publication, books, paintings, films, whatever. Now it will be the mass of communications, my mass of activities, whatever we do on the public Internet. That will be a good thing because it will mean that we're able to obtain a much more accurate, much more precise assessment of people and it will help to map, first of all, the gaps in knowledge that need to be filled by learning, which is one of the purposes of assessment.

How Do We Know This Will Work?

It is arguable that such a solution is no better than the competency maps we have now. We could simply say, "We need maps." There is nothing wrong with the map. The question is the place of the map within the educational system. The competencies we develop today are just a guide – they help us understand what we need to perform our work, but they don't define it.

The map analogy is useful because there are different ways to create maps. One way of doing a map is to send a guy on a ship out with an astrolabe and a compass, and to draw pictures of the shorelines. That's what people used to do. But this is a bad idea, first of all, because it's really expensive, and second, because the maps aren't that accurate.

A better plan is to launch a satellite and take pictures. That is still not going to be the best map in the world. We could probably still do better, and it's still only going to be a map. But it's going to be a lot more accurate and a lot more useful. When we use a GPS, we use one of the picture kind of maps, rather than one of the hands-made kind of maps because it's more accurate. It's not perfect -- people have driven into rivers following on GPS. They really shouldn't depend on them and believe that they are reality, but they're better.

We have the same story here with competences. Right now, the enterprise of sending people out and drafting lists of competencies by hand, is too expensive and almost certainly inaccurate. We want the alternate mechanism of automatically recognizing competencies.

We actually have a project in our program called Automated Competency Detection and Recognition. The idea here is it's like a satellite photo of an environment -- in this case a social infrastructure -- taking pictures, understanding the connection, et cetera, and that gives you your map. But it's just a map. Once we understand that it's just a map and that it's based on what are actually real human performances. And it's the real human performances -- and responses to them which are equally important.

We may maintain that we need to have the human support to ensure that it's accurate, but in fact the reliance on humans makes it less accurate. For example, we have the choice between OpenStreetMap (<http://www.openstreetmap.org>) versus Google Maps. OpenStreetMap is created

by people who map their own communities. But I use Google Maps. The reason for that is OpenStreetMap is really detailed in some areas but not too detailed in other areas, because there are no people there, like places where I live.

I live in a province the size of Belgium with a population of one of its smaller cities. There is a lot of room, and there are very few people driving on the roads. None of them are mapping them. That's the problem. Meanwhile, the Google satellite, or whatever it is, passes over once, takes a picture of the province, and we've got our map.

Yes, machines may have blind spots, and the design of the analysis may create some blind spots. Human perception works basically on the same principle, and human perception sometimes goes wrong. Sometimes we're color blind. We only see what we're expecting to see. We don't see the gorilla walking behind the crowd. Perception is not a perfect mechanism.

I think we need as a society to understand we've always had these mechanisms. We're describing a system for analyzing social networks, but it's just describing a giant version of a much richer and complex network of social perception that adds to what we've always had in the past. The perceptual mechanism we had in the past was composed of scholars and reporters going out, watching things, taking pictures, and writing about them, publishing in newspapers, and things like that.

It has on the whole functioned pretty well, but there have been some glaring weaknesses, for example, weaknesses created by corporate control of newspapers or influence over research results. The system being proposed here is probably better than that, but it's not perfect. One of the useful things about the new system is that it's forcing us to question whether our understanding of the world is correct. That isn't something we've been good at in the past.

It is hard to be self-correcting. We need to develop the global mechanism of self-awareness, of reflective reflection. One of the reasons why I favor a neural network approach is that in the neural network, the quality, if you will, of the inference is described in terms of the structure and the properties of the network. For example, one of the properties of the neural networks is to seek the set of connections that expresses the lowest potential level. It's a methodological principle. It might be overall good or might not be overall good, but as a methodological principle, you can apply that and test whether or not it is.

Who Pays?

Finally, I would like to address some practical considerations, such as the question of who pays. The "who pays for it" is us because we've always paid for it. Facebook offers a free service, but as everyone knows you are not Facebook's client. You are a product. You are what they sell to their real customers, who are the advertisers, marketers, and corporations. That's who pays for it ultimately.

We could approach this in different ways. One way is to view it as a technological problem, a question of designing self-organization in such a way as to distribute revenue and work equitably through the system. The other way is to attempt to make the same determinations through social processes. There can be work and revenue for all if we view this from the technological perspective. But the social processes could go in any direction, leaving us without a means to pay for the system, and ultimately, without a system at all.

Those of us who are good at negotiating deals will get our employers pay for some of it. You might get a computer from that. You might get a service from them. Just like my employer pays for my computer in my office, my employer also pays for laptops. If I want a better one I can configure on my own, I pay for it myself.

The more significant issue after 'who pays' will be 'who is in control'? We've got to come up with some sort of accommodation. There are voices even in my own company, the National Research Council Canada, which is a government agency, saying "there should be no data whatsoever that goes outside the corporate infrastructure," but from a practical sense that's impossible.

The world is more permeable. The world must be more permeable than that because you can't run in a completely isolated network and expect to communicate with the rest of the world. It can't happen. There isn't going to be an easy answer to your question. Ultimately it comes out to power. The power relations are shifting. It's outside the scope of this talk, but the power relations between individuals and employers are shifting.

What's going to change things is the capacity for people to organize themselves, to quickly and efficiently find people, individuals, and contractors to fill individual positions. People will be, because of something like this, more mobile, more able to market their works to a wide variety of employers worldwide as opposed to just in your own city or your own plot. That changed the dynamic.

The relationship between employer and employee becomes one more of a negotiation between equals rather than the exertion of a corporate dominance by one over the other. This is the technological solution. That's what allows for the negotiations to take place regarding the ownership and the management of the data. But social forces push back. I know employers don't like this. People in power never do, and they will resist this -- count on it.

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Grenwich, United Kingdom, July 11, 2014

Moncton, Canada, January 15, 2015

The Chinese Test Example

I'm going to quote at some length from [David Wiley's Facebook page](#)³⁵⁵ to set this up (so you don't have to go get a Facebook account to read this), and then offer my comments below.

This is a *perfect* parable for the way math has been taught for decades:

"A person lives inside a room that has baskets of tokens of Chinese characters. The person does not know Chinese. However, the person does have a book of rules for transforming strings of Chinese characters into other strings of Chinese characters. People on the outside write sentences in Chinese on paper and pass them into the room. The person inside the room consults the book of rules and sends back strings of characters that are different from the ones that were passed in. The people on the outside know Chinese. When they write a string to pass into the room, they understand it as a question. When the person inside sends back another string, the people on the outside understand it as an answer, and because the rules are cleverly written, the answers are usually correct. By following the rules, the person in the room produces expressions that other people can interpret as the answers to questions that they wrote and passed into the room. But the person in the room does not understand the meanings of either the questions or the answer." (From Searle (1980) via Greeno (1997) via dy/dan today ³⁵⁶).

It's encouraging to see recent trends in math instruction trying to move beyond the "Old Way" - that hallowed, relentless focus on the process of performing calculations without ever helping students see what the calculations *mean*. In addition to being able to calculate, people need to actually *understand* math. If they don't understand it, the only times in their lives that math will ever be useful to them is when they're confronted by a textbook.

It's a total crime when you think about: 10 or so *years* studying the subject, and all that many people have to show for it are the most utterly banal applications of addition and multiplication. Maybe some subtraction. (Division is way too complicated.) Certainly nothing taught after elementary school.

I continue to be completely amazed - absolutely stunned - at how vehemently many in Utah and around the country are fighting against educators' efforts to help students learn math in a way that teaches them both to calculate *and* to understand. Why don't they

³⁵⁵ <https://www.facebook.com/opencontent/posts/10153381263483475>

³⁵⁶ <http://blog.mrmeyer.com/>

want them to understand? Why do they want to sentence their child to life in the Chinese Room?

I have to add, too, that I'm increasingly confused by the popular fetish with the algebra, trigonometry, and calculus pathway. When's the last time you read a news story involving polynomials? Or heard a piece on the radio involving the law of cosines? Never. But when was the last time you were manipulated by a media conglomerate, or a government agency, or a news outlet, or a campaign ad because you don't understand statistics? Sadly, it was probably earlier today. Normal people have infinitely more opportunities to use the concepts taught in statistics in their lives than they do the concepts taught in the traditional math sequence. How about some love for statistics?

That's a really interesting use of the Chinese Room example (it is well known as such to philosophers). <http://plato.stanford.edu/entries/chinese-room/>³⁵⁷

The example was originally intended as a response to the 'Turing Test' model for evaluating artificial intelligence. <http://plato.stanford.edu/entries/turing-test/>³⁵⁸ The idea of the Turing Test is that a machine could be considered intelligent if its responses are sufficient to fool a human interlocutor.

One response to the example suggests that a machine could not actually succeed in responding without actually understanding. It would need to form models and comprehend principles in order to anticipate the variety of comments and questions thrown at it.

Another, related, response is that the example appears to an intuition that has not itself been validated. If we did not believe a priori that the combination of person and machine did not understand, would the example convince us that they don't? (This is sometimes called the 'systems' response.)

My own take is that the example, if it succeeds, succeeds because of oversimplification. Our interactions are not in fact composed entirely of conversations in words. If the understanding of the Chinese Room is inadequate, it is because cognition thought of as interaction via text is inadequate.

The same sort of responses could be offered with respect to testing. First, the student could not really succeed in the test without actually understanding (call that the 'Brainbench' example. Second, the capacity to respond to these tests is itself a form of understanding (call that the

³⁵⁷ <http://plato.stanford.edu/entries/chinese-room/>

³⁵⁸ <http://plato.stanford.edu/entries/turing-test/>

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cognitivist response). Third, appropriate testing would go well beyond text-based questions and answers (call that the recognition response).

p.s.

I would also add that despite the weaknesses of the algebra, trigonometry, and calculus pathway, the suggestion that people learn statistics instead is not a viable alternative, for the primary reason that it is not an actual alternative.

Once you get into the study of anything beyond simply statistics, you are going to be involved in the study of algebra, trigonometry, and calculus. Statistics is the study of change, and change can come in pretty much any mathematical form. ³⁵⁹

*Moncton, Canada
August 3, 2014*

³⁵⁹ <http://www.downes.ca/post/53662>

Bader A. Alsaleh, Summary Notes

Bader A. Alsaleh (Professor, Instructional Design and Technology, King Saud University)
@ba_alsaleh

In 40 minutes, will present a number of ideas.

Why are we interested in social media? What is the importance of talking about it? What is the relation to education? And what are the implications on pedagogy?

Pedagogists have spent the 20th century asking about these questions, but in the 21st century everything has changed. Now social media is playing a major role, with implications to e-learning environments.

Why are we talking of a second generation of pedagogy - Pedagogy 2 - and what are the paradigms of this shift in education?

I have to assign some blame to pedagogists; we are using smart phones, etc., but does this mean the relation between teachers and students have changed? There are complex drivers for a paradigm shift: educational crises, learning reserach, tech affordances, 21qst century skills.

Crisis - if we were accomplishing everything we wanted, there would be no need for changes.

Research - speaking of a number pf philosophers talking about the type of education people get in the 21st century. In the 20th century they received 'inert knowledge' - it was not related to the social development of a country. It does not lead anywhere. Why Don't Students Like Education? (book - weapons of mass instruction).

Characteristic of learners: hope that lectures to follow will focus on that research

What is the purpose of social media? Collaborative or cooperative learning - they want cooperative or interactive types of media (aka social media). They want a digital bridge. www.tomorrow.org - Speak Up 2009, FETC.

Oblinger & Oblinger - characteristics of students in the digital age. Transformation in the relation between the teacher and the student. Gates: will there be a change - the change will be remarkable. Social media - necessary for the spread of digital knowledge. Students have remarkable expectations.

Two main pedagogical models:

- instruction or acquisition paradigm (transmission, outcome based)
- learning or participatory paradigm (transformative, process-based)

The third type depends on practical application. It is based on innovation. We learn through our life. It is about shaping and reshaping knowledge. It is related to the exploitation of network advantages. Teaching and learning is effected by the new technology.

Bahrain, 2003 - students were prepared to work on a specific type of project. We can ask, why aren't our children similarly able? So we have two objectives: to improve the ability of students, and to support social interactivity between students.

The lecture may appear to be academic, but this does not mean things have changed much. Electronic, on the board, but I am talking to you. But the second level of technology is to bring about the participation of students.

Calling for change in educational environment should result in a change in technology. Pedagogy 2 is a reaction to the remarkable failure of the provision of funds to education technology. In most parts of the world there is a backwardness in the use of technology. Technology integration today means that tech should be part and parcel of the educational activity. There is an indispensable link between education and tech, without that link we will still be backward in that field.

Social media is particularly important in the field of teaching. Education should be part & parcel of our activities; the learner should also be the producer.

Social media lies at the intersection of social constructivist, connectivism.

Social constructivism - Vygotsky - Wheeler also mentioned him - the teacher should provide the necessary help that the student needs. This also applies to the students.

Connectivism - as educators in the Arab world we have not even reached agreement in such theories. Links to computer science; this could be much more useful than the role played by the teacher. Learning should actually focus on plurality and differences. The ability to know, to learn, is interdisciplinary. The types of information should be linked together.

Related: collective intelligence and distributed cognition. Wheeler referred to that also. This type of information actually exists in the mind of others. Reynard (2008). Collective intelligence (Rogers, 1997; Bruse, 2012). This could not actually happen in the 20th century.

(Overview of major pedagogic models)

- e-learning 2.0
- connectivism
- communities of enquiry
- etc

Key elements of pedagogy: personalization, participation, productivity. These together create Pedagogy 2.0.

The necessity that future programs should be cumulative in the sense that they should help interdisciplinary things. The program must include various items of knowledge, each of which could help the other, and each belonging to a different area of knowledge.

The teacher should contribute to an environment of e-learning in which the students can work together. And learning should continue outside the learning environment. This is called 'meta-learning'.

The necessary skills we should try to create: interaction, participation; self-reliance; making decisions; We should create authentic learning environments and preserve interactive educational environments.

Future e-learning environment is the intersection of pedagogy 2.0, w1st century competencies, and technology affordances. Mishra, Punya, Koehler, 2006: intersection of content, pedagogy, technology.

Cycle of training: pre-activity, initiation (social media), collective knowledge, summation (fine-tuning), reflection (re-evaluation, or assessment).

Denver - importance of information. Florida - video clips. Students try to listen to the ideas of others, given a chance to reflect about what others have done. If they are given such chances, they will begin to like or love those schools.

PLEs: interoperability, openness, learner-centric. Challenges that face pedagogy 2.0 in the field of instruction. The necessary types of training, not just confined to the educational environment in an institution - these institutions have many routine restrictions; there is a need for a gradual transition.

We should learn with technology, not from technology. It's more than having classes full of technology; we should actually be able to use technology.

*Riyadh, Saudi Arabia
September 17, 2014*

MOOCthink

Responding to Linda Harasim's comment, [here](#)³⁶⁰:

To Mohsen Saadatmand: there is indeed significant overlap between communities of interest and cMOOCs and the underlying mechanisms are the same. The difference between the communities and the MOOCs is that the former are persistent while the latter are occasional. Thus, the two play different roles: the communities embed knowledge and standardize practice, while the MOOCs disrupt existing patterns of thinking and introduce people to new connections and new ideas.

To Linda Harasim: interesting and engaging comment. I do not think that artificial intelligence will be in any particular way better than human intelligence. But I think that anything that is a network – and this includes networks of machines as well as networks of humans or networks of neurons – can develop intelligence. There is substantial evidence to suggest that this is true, and I think it is no longer sufficient to suggest that the theory is simply an instance of “magical thinking.”

Take one particular point you make, for example. You write: “Siemens and Downes expected that somehow 2,000 participants should self-manage their learning by forming interest groups: how would or could 2000 strangers meet and self-organize into functioning learning groups? How would each individual know how to identify their interests?” The suggestion that this is impossible, that strangers could not self-organize, is refuted by reams of evidence. From tag-based communities to clusters on interest groups on Google Groups to the threads in Metafilter and 4chan, people have shown a remarkable ability to self-organize. And the research on our MOOCs (and even some xMOOCs) shows that this happens in MOOCs as well, and that these self-organizations have a learning focus.

But I also think you misunderstand the role of technology in cMOOCs. You write, “the ultimate organizer and decision-maker in the learning network (whether formal or non-formal) is that artificial intelligence (neural networks) replace the teacher or the moderator or the organizer. Technology replaces the human who is making the decisions and organizing the interactions.” This is simply not true, and nothing I have developed or advocated leans this way.

Technology makes learning networks possible; technology creates the channels through which people can interact, but it is people – each one of them making their own decisions – who choose

³⁶⁰ <http://www.tonybates.ca/2014/10/01/the-role-of-communities-of-practice-in-a-digital-age/comment-page-1/#comment-920867>

what to read, what to link to, what to create, what to say. The ultimate organizers and decision makers in the learning network are students.

Can machines learn? Sure they can, of course they can, anything that is networked can learn. Simple stupid neurons, when joined together, can learn. So can simple stupid computers. But the most interesting results happen when you take networks of humans and, instead of telling them what to do, enable them to make decisions for themselves. Now you have networks of learning networks. You get remarkable results, like memes, cat photos, and maybe, global democracy. And it's not magic. It's the simple, observable, science of networks.

*Moncton, Canada
October 6, 2014*

Positivism and Big Data

This is an outcome of a conversation with Rita Kop regarding the article [The View from Nowhere](#)³⁶¹.

She writes, data scientists use their quantitative measure, as positivists do, by putting a large number veneer over their research

This misrepresents positivism, just as Nathan Jurgenson does in his original article.

The core of positivism is that all knowledge is derived from experience. The core tenet of positivism is that there is a knowable set of observation statements which constitute the totality of experience. The number of sentences doesn't particularly matter; in some cases (eg. in Popper's falsifiability theory) even one such sentence will be significant.

Quine's "Two Dogmas of Empiricism" most clearly states the core of positivism in the process of attacking it. The two dogmas are:

1. Reductionism – that all theoretical statements can be reduced to a set of observation statements (by means of self-evident logical principles);
2. The analytic-synthetic distinction – this is the idea that observation statements can be clearly and completely distinguished from theory, which of course, turns out not to be true (because we have 'theory-laden data'.

We can apply these principles to big data analytics, of course, and we can use the standard criticisms of positivism to do it:

1. Underdetermination – this is the 'problem of induction' or the 'problem of confirmation'. Theoretical statements cannot be deduced from observation statements, hence, we rely on induction, however, observational data underdetermines theory – for any given set of observation statements, an infinite set of theoretical statements is consistent with each statement equally well confirmed;
2. Observer bias – the language we employ in order to make observation statements must exist prior to the making of the statement, and hence, adds an element of theory to the statement. This language is typically a product of the culture of the investigator, hence, language introduces cultural bias.

To Quine's two objections I am inclined to add a third: logicism. This core element of logical positivism in particular in general escapes challenge. It is essentially the idea that the relation

³⁶¹ <http://thenewinquiry.com/essays/view-from-nowhere/>

between data and theory can be expressed logically, that is, in systems comprised of statements and inferences.

It's not that data scientists put a 'vener' over their research by virtue of large numbers. Rather, it is that, by virtue of following positivism's basic tenets, they subscribe to one of positivism's core principles: a difference that does not make (an observable) difference is no difference at all. The contemporary version is "You can't manage what you can't measure."

Flip this, and you get the assertive statement: if there is anything to be found, it will be found in the data. If there is any improvement to process or method that can be made, this will result in a change in the data. It is this belief that places an air of inevitability to big data.

We can employ Quine's objections to show how the data scientists' beliefs are false.

1. The same data will confirm any number of theories. It is not literally true that you can make statistics say anything you want, but even when subscribing to Carnap's requirement (that the totality of the evidence be considered; no cherry-picking) you can make statistics say many different things. This will be true no matter how much data there is.
2. The collection of the data will presuppose the theory (or elements of the theory) it is intended to represent (and, very often, to prove). I've often stated, as a way to express this principle, that you only see what you're looking for.

In my own epistemology, though I remain unreservedly empiricist, I have abandoned Quine's 'logical point of view'. In particular, I propose two major things:

1. Theory (and abstractions in general) are not generated through a process of induction, but rather through a process of subtraction. These are not inferences to be drawn from observations, but rather, merely ways of looking at things. For example, you can see a tiger in front of you, but if you wish, you can ignore most of the detail and focus simply on the teeth, in which case we've generalized it to "a thing with teeth".
2. Neither observations nor theories are neutral (nor indeed is there any meaningful way of distinguishing the two (which is why I don't care whether connectivism is a theory)). Rather, any observation is experienced in the presence of the already-existing effects of previous observations, which is the basis for the phenomenon of 'recognition', which in turn is the basis for knowledge.

These constitute a consistent empirical epistemology, however, they are in important ways inconsistent with the core tenets of big data analytics (but that said, this depends a lot on how the analytics are carried out).

In particular, it conflicts with the idea that you can take one large set of data, representing any number of individuals, and draw general conclusions from it, because these data are embedded in

personal perspectives, which are (typically) elided in big data analytics. Hence, big data is transforming deeply contextual data into context-free data. Any principles derived from such data are thereby impacted.

Moncton, Canada

October 13, 2014

Constructivism and Eliminative Materialism

A few months ago Fred M Beshears and I [discussed](#)³⁶² Constructivism and Materialism. He compiled the conversation and [posted it here](#)³⁶³.

Stephen Downes

We don't reason over perceptions or construct meaning, etc- there's no mechanism to do that - rather, we gradually become better recognizers.

The basic constructivist premise (and I mean constructivists generally, not just those working in education) is that learning and discovery proceeds by the creation of models or representations of reality, and then carrying out operations in these representations. Usually these representations are created using a symbol system - language, mathematics, universal grammar, etc - composed of signs and rules for manipulation.

We create meaning or sense in these representations by means of a semiotic system - a way of assigning meaning to individual symbols, phrases, groups of symbols, or entire models, sometimes by reference, sometimes by coherence, etc. (note that there are **many** different variations on this common theme).

These representations are easy to find in the world - we can see instances of language and mathematics, for example, in any book. But the theory argues that we **also** have these systems in our minds - that we actually reason in our heads by means of these representations, and hence that learning means constructing these representations and assigning meaning to their symbolic entities. Cf. for example the 'physical symbol system' hypothesis.

What I am arguing is that this position is wrong. That even **if** we construct representations in our mind, there is no distinct entity over and above the representation that does the constructing, manipulation, or sense-making. Therefore, we do **not** learn in this way.

Fred M Beshears

³⁶² <https://www.facebook.com/downes/posts/10153942292095083>

³⁶³ <http://innovationmemes.blogspot.ca/2014/10/constructivism-and-eliminative.html>

It depends on which level of description works best for the problem at hand. To describe the workings of a computer you could pick from the following: logic gates, machine language, assembly language, a high level programming language (e.g. Lisp), or the user interface.

Similarly with humans, you can pick from the following: an individual neuron, a group of neurons (e.g. Kurzweil claims that it takes an average of 100 neuron in the cerebral cortex to form a pattern recognizer), or groups of pattern recognizers (Kurzweil claims there are around 300 million pattern recognizers in the cerebral cortex), or one's 1st person account of one's stream of consciousness (which for many of us comes in the form of a sequence of words).

Of course, animal consciousness is probably very different from human. And, with computers, we know how to map from one level of description to another. But, with biologically evolved brains, we still have a long way to go before we've completely reverse engineered the brain.

As for educators, I don't know if there is one "correct" level of description. Some may prefer folk psychology, others neuroscience.

Stephen Downes

Not all descriptions are simply 'levels of description'. Some are simply wrong and should be eliminated from the discourse. For example, discussion of 'phlogiston' was not just some level of description, it was just wrong. If you say that your computer has a soul, it's not just a level of description, it's wrong. And when educators use 'folk levels of description', they should be aware that their discourse is no more reliable than phrenology or reading the Tarot. I don't think that being an educator is a license to use whatever terminology and ontology they please.

Fred M Beshears

There may be some eliminative materialists out there who have jumped the gun and are now starting to claim the folk psychology has been successfully eliminated by neuroscience! Eliminative materialism may someday turn out to be right, but it would be very wrong for them to claim that they have proved their case as of today - especially if they try to do so by simply making selective references to physics.

Some folk theories of science - such as phlogiston - have been eliminated and have been consigned to the history books. And, some eliminative materialists working in the fields of cognitive psychology and neuroscience selectively refer to these examples to bolster their case. In the case of cognition, the eliminative materialist believes that since this has happened in some cases in physics it will someday happen in cognitive psychology, too. In other words, the

eliminative materialist believes that neuroscience will someday eliminate folk psychology; it will not simply match up with folk psychology categories.

But, there are at least two other materialist schools of thought that we should also consider: reductive materialism and functionalism.

Reductive materialists (aka identity theorists) believe that someday folk psychology will be reduced to neuroscience. In other words, they believe that each mental state of folk psychology will be found to be in a 1-to-1 relationship with physical states of the brain. They, too, try to support their theory by making selective references to physics. So, the identity theorist will say that in the case of sound we know that as a train compresses air it creates sound waves, and that high pitched sounds are the property of having a high frequency of oscillating waves in air. We later learned that light was an electromagnetic wave and that the color of an object is related to the reflective efficiencies of the object, much like a musical cord. But the notes in the case of light are electromagnetic waves. So some reductive materialists in the field of cognitive psychology (like some eliminative materialists) use selective references to physics to bolster their case - i.e. that someday there will be an intertheoretic reduction between folk psychology and neuroscience.

Functionalism is yet another form of materialism. According to Paul Churchland, the functionalist believes the "essential or defining feature of any type of mental state is the set of causal relationships it bears to (1) environmental effects on the body, (2) other types of mental states, and (3) bodily behavior." (p. 63 of *Matter and Consciousness* 2013) Unlike the behaviorist who wants to define mental states solely in terms of inputs from the environment and behavioral outputs, the functionalist believes that mental states involve an ineliminable reference to a wide variety of other mental states, which makes impossible the behaviorist game plan. Functionalists are at odds with reductive materialists, too. So, the functionalist would argue that a computer or an alien from another planet could have the same mental states that humans do (e.g. pain, fear, hope) even though they implement these mental states in a different physical substrate. According to Paul Churchland: "This provides a rationale for a great deal of work in cognitive psychology and artificial intelligence, where researchers postulate a system of abstract functional states and then test the postulated system, often by way of its computer simulation, against human behavior in similar circumstances."

But there are arguments against functionalism, too. For example, many functionalist AI researchers try to model thought as "an internal dance of sentence-like states, a dance that respects the various inferential relations holding among [propositions]" (p. 80 in *Mind and Matter*) But although humans do have a command of language, and most 1st person accounts of human thought do involve language, there are obviously other creatures with brains that do not.

Churchland provides a very balanced presentation of these three perspectives. And, he doesn't try to make the case that eliminative materialism has triumphed over the other two perspectives by

simply making selective reference to the cases in physics that support his view (which is a moderate form of eliminative materialism).

Stephan Downes

Hiya Fred, I am of course familiar with identity theory and functionalism (you can see references in my latest presentation) and I am of course familiar with Paul Churchland. Your overview is quite correct as a broad account of some major recent theories in the philosophy of mind.

Now of course I am not going to claim to have defended eliminative materialism in one or two paragraphs (or even in my recent talk, in which I discuss both identity theory and various forms of functionalism, as well as Thomas Nagel and the cognitivist position of people like Fodor and Pylyshyn).

My response to you was to indicate that folk psychology is not automatically correct, and that something akin to Dennett's 'intentional stance' might not be reasonable if in fact the position I argue for is correct. Indeed, I think that folk psychology is deeply flawed (cf Steven Stich 'From Folk Psychology to Cognitive Science'). In particular, if the claims made by folk psychology (and for that matter constructivism) are literally true, then we descend into nonsense and contradiction.

But what I would also like to be clear about is that in this case as in all cases I am explaining my line of reasoning. This is where my thoughts have led me. I'm pretty sure I'm right, but I don't expect anyone to be swayed by my arguments (this makes me quite unlike most theorists in education). I develop learning systems based on my theories, and if they work, that is my argument.

Fred M Beshears

Thank you Stephen. If the eliminative materialists are correct and neuroscience advances to the point where we can replace folk psychology, then the effect on education may be far more radical than even the cMOOC.

In anticipation of this coming revolution, I've started writing a book. It will be called: What color are your neural implants, a guide for post-singularity job seekers.

:-)

*Moncton, Canada
October 15, 2014*

More Than Apps and Gadgets

Published as *More Than Apps and Gadgets*, Open Learning, Dec 02, 2014.

Umair Haque, who is perhaps the only economist I can read without suffering indigestion, quite rightly condemns today's penchant for addressing social problems with yet another app. "If you believe that Ubers, tacocopters, and dating-slash-butler apps...*change the world*...especially *this* world," he writes, "you're not just clueless. You're *hopeless*." ³⁶⁴

So what *does* matter? "Make a vaccine for Ebola. Give the half the world missing it clean water, education, sanitation. Fix global youth unemployment. Give women and minorities a way to use the web without being harassed." Stuff like that. Concrete, tangible good produced that measurably and meaningfully improves the lives of people and propels us toward higher aspirations.

This is a bit of a challenge for a web-monger like me. For the last twenty years or so I've been scripting my own versions of things I think would help – a learning management system here, an open website on the logical fallacies there, learning networks, open online courses, and most recently, personal learning environments. It's hard not to wonder whether I'm not just serving up more of the same slop that has led us to where we are today.

Haque is pretty clear about what is not useful. "Apps, gadgets, hearts, likes," he writes. "Taps, clicks, swipes, screens. These numb us with comfortable titillation." They prevent us from aspiring to something more. "Things that make people...butlers, chauffeurs, maids, courtesans...debtors, sharecroppers, zombies...don't *change* anything."

He's right, of course. The best inventions are liberating. They give us life, they nourish us, they advance us, they engage us, they empower us. They are not things that help us to become better workers, better servants, better employees.

That, if I may share a secret, is what has always bothered me about my work in education. In so many ways, we are either working to keep in power those who are already in power, providing them elite educations at exclusive universities, or we are perpetuating the servitude of the working people, teaching employment skills and vocational trades to the children of factory workers and farmers. And educators themselves, especially in today's outcomes-based environment, are so often cast in the role of the butler or the maid, pandering to, rather than enlightening, the children of our employers.

³⁶⁴ Umair Haque. What it Means to Change the World. Medium. <https://medium.com/bad-words/what-it-means-to-change-the-world-d2b2bf50d9d4>

I've always aspired to something more. I've always believed that at the end of my career, when I looked back, I would look on a body of work that led to something more significant than an app or a servlet.

That is why I am engaged not merely in the development of learning technology, but also engaged in the development of means, methods and mechanisms to deliver open learning – with 'open' being thought of in the widest and most liberating sense. And when I design educational systems – even when I am working with partners in government and industry – I am first and foremost thinking of my client as the students and learners themselves. And that is why I think in terms not of pedagogy and learning design, but in terms of self-management and personal development.

Educational technology is meaningless if it is not also liberating technology. The purpose of education is not to serve certain social objectives or as a means to employment, but rather to place in the hands of the learner the best and most useful set of tools possible to enable him or her to choose and forge the best quality life for themselves, or as John Stuart Mill would say, to pursue their own good in their own way. Because I believe the best society and the best employment are not those defined by one person over another, but those chosen and built by the people themselves.

We need to remember this when we are building our trinkets and baubles. We can build a better world out of the simplest elements, but only if we image what a better world is like, and refuse to be swayed on our pursuit of it.

*Moncton, Canada
November 17, 2014*

Knowledge as Recognition

This is an [assignment](#)³⁶⁵ for a [grade 12 philosophy course](#)³⁶⁶.

Proposition

Most theories of knowledge depict knowledge as a type of belief. The idea, for example, of knowledge as 'justified true belief' dates back to Plato, who in *Theaetetus* argued that having a 'true opinion' about something is insufficient to say that we *know* about something.

In my view, knowledge isn't a type of belief or opinion at all, and knowledge isn't the sort of thing that needs to be justified at all. Instead, knowledge is a type of *perception*, which we call 'recognition', and knowledge serves as the justification for *other* things, including opinions and beliefs.

Philosophical Enquiry

One of the long-standing problems of philosophy concerns the justification of knowledge. Noam Chomsky called this problem Plato's Problem. It results from what he calls the "poverty of the stimulus." The evidence and information we receive from the senses, he argues, is insufficient to justify the knowledge we have.

A child, for example, can learn a language even though not explicitly instructed. The knowledge of a language is a way of knowing about *universals*, because we can generate an infinite number of different sentences in a language. But our experiences are always finite and limited. No matter how much we experience, we can always imagine, and express in language, something that goes beyond our experiences.

In the field of 'epistemology' - that is, the philosophy of knowledge - this is known as the problem of the justification of induction. How can we know about general properties, such as colours or shapes, when we only have limited experiences of them? How can we know universal truths, such as " $2+2=4$ ", when we have only finite experiences? We can't! This was the conclusion Descartes reached in *Meditations*, and he argued that experience is insufficient and unreliable. We must rely on our rationality, our innate knowledge pre-written in our mind like a "mark of God" to make sense of the world.

³⁶⁵ <http://philosophy.talons43.ca/2014/11/26/midterm-assignment-personal-theory-of-knowledge/>

³⁶⁶ <http://philosophy.talons43.ca/2014/11/26/midterm-assignment-personal-theory-of-knowledge/>

Logic

Cartesian scepticism, as it came to be called, marked the beginning of a tradition in philosophy called *rationalism*. The rationalists believed that knowledge comes first from the mind, and that through the application of the principles of rationality we can come to know about the world. That is not to discount the role of experience and perception. But these, argue the rationalists, are unreliable.

Perhaps the most important of the rationalists was Immanuel Kant. In the *Critique of Pure Reason* he described the "transcendental deduction" in which he established the "necessary conditions of the possibility of experience". Though direct experience of the external world is impossible, he argues, we can understand its fundamental structure because our experiences of it would be impossible without it. These fundamental structures are the principles of space and time, and these are governed by the principles of pure logic.

In the 20th century, the *logical positivists* attempted to realize Kant's vision by constructing a universal theory of knowledge based on fundamental data from experience - *sense data* - and logical inferences from that data. As described by A.J. Ayer in *Language, Truth and Logic*, knowledge begins with the inference of general principles from observation language, and then proceeds by means of *verification* of these principles through the process of making and testing predictions. The *meaning* of a sentence was equivalent to the conditions of its verification; a sentence that could not be verified by experience was, literally, meaningless.

Logic is, in essence, pure abstraction, produced by thought alone. Without the material of observation statements, it has no meaning on its own. Logic can be used to *derive* knowledge from experience, but not to produce knowledge by itself. Logical and mathematical truths are true only within the language of logic itself; they are then *applied* to statements about experience and used to infer new statements about experience. So the theory goes, at least.

Scientific Philosophy

In the 20th century the sciences flourished, greatly bolstered by the application of logic and mathematics to physical phenomena. Our understanding of language and meaning led to the development of computer science, which in turn led to the information revolution.

The scientific model described by Ayer was described in much more detail by philosophers such as Carl Hempel, who formalized the method of hypothesis formation and prediction into what he called the Deductive-Nomological Model. Another model was created by Karl Popper, who emphasized *falsification* rather than verification. Instead of proving that a scientific theory is true, argued Popper, we need to try to prove that theories are *false*.

Even our study of the mind was impacted; based on logical positivist principles philosophers like B.F. Skinner and Gilbert Ryle developed and popularized the science of *behaviourism*, which

reduced all statements about mental phenomena (such as beliefs, desires and hopes) to statements about physical behaviours.

However, the science of logical positivism was based on a critical flaw, which was first described by W.V.O. Quine in his important paper 'Two Dogmas of Empiricism'. Logical positivism depends, he writes, on two principles that turn out to be false:

- the analytic-synthetic distinction, which distinguishes between observation statements and pure logic
- the principle of reduction, which argues that all knowledge can be reduced to observation and perception

Our observation of the world, our perceptions, our experiences - these are all *theory laden*. Scientists work in what Thomas Kuhn called *paradigms* and these define not only the problems that need to be solved and the principles we use to solve them, but also the meanings of the words we use and what counts (and doesn't count) as observation and data.

Metaphysics

Today, we don't know what exists, and what is just an artifact of our mind or of our scientific theories. We are immersed in our world. The meanings of our words is not fixed and determined by observations and reality, but vary and change, as Ludwig Wittgenstein argues, by the way we use them. Our languages are not constructions we create from experience and reason, but games we play with each other in the day-to-day fact of existence.

The theoretical stance we adopt determines what we know (or at least, what we think we know) about the world. One major stance is called 'realism' - this is the idea that we can know that there is a real world, and that science is the process of studying that world. The best evidence of the reality of the world, according to this approach, is that it exists. "Here is a hand," says G.E. Moore, holding out a hand. What more proof could you have? What more proof could you need?

But realism has its sceptics. Not everything that we perceive is 'real'. Take, for example, the colour red. Is the colour red real? Plato thought it was, and that it existed on a plane of ideal forms (along with goodness and virtue, justice and beauty). But even as early as 800 years ago, philosophers like William of Ockham were questioning this doctrine. "Do not multiply entities beyond necessity," argued Ockham in the first formulation of what we now call Ockham's Razor.

Contrasting realism is the philosophy called *phenomenology*. Most completely described by Edmund Husserl, it is the study of the structure of human experience. This experience typically involves what Husserl calls *intentionality*, or the property of being directed outward toward the world. The idea is that experience represents or 'intends' external objects or properties. Experience, therefore, is something that is *interpreted* through a process of reason and reflection.

This approach to phenomena can be illuminating; Jacques Derrida, for example, finds through the interpretation of language the essence of hidden meanings and what he calls the *difference* in the meaning of a word according to the alternatives to that word imagined by the speaker.

In contemporary this has evolved into the idea that knowledge and reality are contained in *representations*, which are essentially mental models constructed as the result of experience. Thus, for example, when we say that a proposition P is 'true', what we mean is that 'P is true in M', where M is a model or representation of the world. Most science today is conducted through the creation and testing of models or representations *as a whole*. One example of this approach is described in Bas C. van Fraassen's *The Scientific Image*, which describes what he calls 'constructive empiricism'.

Representationalism has also been advanced as a theory of mind. In his book *Representations* Jerry Fodor outlines the thesis that our mental states are composed of mental representations, which in turn are created out of what he calls the *language of thought*. Like Chomsky, Fodor believes that the capacity to build these representations is *innate*, and that we are born with the potential to realize a fully formed language of thought already realized. Knowledge, therefore, is a true and justified statement in this language, and a collection of such statements combine to form a representational state.

Toward a Theory of Knowledge as Recognition

The history of philosophy is the history of the attempt to justify knowledge through some mechanism of justifying statements describing states of affairs in the world. But this attempt has been thwarted by the fact that we do not have direct experience of the world, and hence are forced in one way or another to study ourselves in an attempt to study the world.

Ultimately, this is unsatisfying. Logic and language require that statements be true or false, or that we have what are called 'attitudes' toward propositions. If knowledge is formed of propositions, therefore, there will always be the question of what comes before knowledge, that will justify or otherwise lead us to forming these attitudes - that a proposition is believed, that it is probable, that it is true, that it is necessary, that it is intentional, and the like. But knowledge should be the *foundation* of these attitudes, and not the result of them. The idea, therefore, that knowledge is composed of statements in a language, or propositions in a representation, is inherently self-contradictory.

What if knowledge were something else? What if it were something that is *sybsymbolic*? What if language was useful as a way to *express* knowledge, but not what knowledge actually *is*?

In the 1700s the English philosopher David Hume conducted a sceptical enquiry of human reason and reached much the same conclusion. Among other aspects of knowledge, he examined the principle of causation. Without causation, we do not have any coherent concept of science, or

of explanation, or of human action and morality, at all. So if anything is an element of knowledge, cause and effect is.

But cause and effect cannot be derived from experience, and it cannot be derived from pure reason. The idea that, because one event happens, another necessarily follows, cannot be derived from any form of inference at all. But, he observes, it is *universally* believed, and not only by lecturers and scientists, but by the common man, small children, and even *animals*! So *we have* knowledge, even if we don't have the language to express it.

In his *Treatise of Human Nature*, Hume argued that we arrive at principles like causation through the process of *custom and habit*. "Men will scarce ever be persuaded, that effects of such consequence can flow from principles, which are seemingly so inconsiderable, and that the far greatest part of our reasonings with all our actions and passions, can be derived from nothing but custom and habit." And "Thus it appears, that the belief or assent, which always attends the memory and senses, is nothing but the vivacity of those perceptions they present."

Today we call this form of learning 'associationism' and it forms the basis for theories of neural connectivity. Hume's basic principle of *contiguity*, where one idea or impression is commonly followed by another, is an instance of the principle of association described by Donald O. Hebb in what we today call Hebbian Associationism, the basic learning theory for neural networks.

When we associate experiences in our mind, we aren't performing any sort of inference on them, and we don't even typically represent them in a language. We see our child's face every day, and we don't *describe* it to ourselves, we simply come to *recognize* this particular collection of features as it is presented to us every day. To 'know' that one sort of thing causes another is simply to recognize this circumstance each time we see it. To be able to read, to infer, and even to reason, is to recognize common word forms, syllogisms, or commonalities. The recognition, and the fact of recognition, is the knowledge and the justification for knowledge all rolled into one - a direct, non-inferential form of knowledge.

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*Moncton, Canada
November 29, 2014*

E-Portfolios and Badges Workshop

E-Portfolio Workshop, Online Educa Berlin: These are content summaries; if written in the first person it is the speaker speaking, not me. Some comments in parentheses are my own.



Launch of the Europortfolio German Chapter during the Workshop

Igor Balaban - Europortfolio Community and Portal

<http://www.europortfolio.org>³⁶⁷

We've completed one year of the two year project. 351 members from 52 countries are members - 3rd version of the portal was launched yesterday. The portal is the main driver, a gateway that allows people to work together. What you will see today are four key products we have been working on this year.

The portal allows you to collaborate, to create and announce events, offline or online. You are also free to publish your recent work, to use the online collaboration, and to invite people to join you and produce a deliverable. Today we will look at some deliverables that may inspire you to get started.

This started as a project; we hope it becomes a self-sustaining network. For now we have core partners, which should be mentioned.

³⁶⁷ <http://www.europortfolio.org>

Serge Ravet - Maturity Matrix

Now involved in another project called BadgeEurope.

A few words about the matrix. How did we produce them? The idea was to provide a framework to describe the maturity of eportfolio initiatives, trying to describe the complex nature of learning, to go beyond the basic 'how to implement an eportfolio system', to the point where an eportfolio will have a transformative effect.

What we didn't want to do is take a framework and 'add ICT to it' or 'add portfolio to it'. An eportfolio is about learning, so the matrix should be about learning. If it didn't mention eportfolio, that would be great. But in fact what we looked at was the learning itself, and what can be added with the eportfolio.

Example of matrix (very detailed slide with tiny impossible-to-read text). Learning: aware, exploring, developing, integrated, transformative. We wanted to find specific examples of activities outside eportfolios themselves, and then look at them in eportfolios. We have a paper version of the matrix which will be distributed this afternoon.

Janet Strivens - Competency Framework

(No slides - ack!) CRA has taken the lead in the competency framework (CF). Not as mature as the maturity matrix; still open to revision.

The CF recognizes that one of the major purpose of a portfolio is to gather and display evidence of competences. We are trying to do two things:

- arrive at a consensual understanding of the nature of competence. One of our concerns is that the view of competence presented as a project view is too UK-centric. So we want to share the understanding of competence with you and ask you whether this aligns with your understanding. We have already shared with Australia and New Zealand, but they are already closely aligned to the UK. We will share this with you this afternoon.

- to do with the technology which can support the recognition and accreditation of competence. The document takes the view that a range of functionalities is associated with eportfolio technologies. It looks at these in terms of how they support competency recognition and accreditation. We will share this with you this afternoon.

In the final version of the document, 3 or 4 months time, we intend to link the competency framework document to an ongoing and developing spreadsheet of organizations and frameworks related to the recognition and accreditation of competencies.

Marcelo Fabian Maina (in place of Lourdes Gardia)

UOC - creation of an online course that serves as an entry point for early adopters or non-expert users of eportfolios.

Three specific aims:

- create an EP environment for the organizers
- create an EP environment for the students
- help people create their own EP

The design principles for the course modules:

- non-stop, always open, self-study, self-paced
- customizable, task-oriented
- use and reuse OER (content)
- creation of the 'learning scenario'
- orient them toward tangible results
- create sharing options through the social web

The course is made up of 7 modules (which I won't list here). The first five are oriented to individuals, the last two are oriented to organizations, focusing on systemic change and moving from an individual to an organizational initiative. Each module has six sections: objectives, questions, investigate, activities, etc.

We have a 'pyramid of objective' to find what the common objectives are of individuals so we can find what questions they all have. We will share this with you this afternoon.

The course isn't available yet - we have the structure and write-throughs as the modules, but what we hope to get from you is input from you.

Anastasia Economou, EUfolio, by video

<http://www.eufolio.eu>³⁶⁸

The project is 'EU Classroom ePortfolios'. Started in May 2013, ends April 2015. It includes 14 partners from 7 European countries.

The need was based on 21st century skills. There were broken into 'develop' these skills, and to 'assess' these skills. Assessment was both 'for learning' and 'of learning'.

³⁶⁸ <http://www.eufolio.eu>

Goals: to design innovative ePortfolio models, to pilot these modules through case studies in 40 schools, to select evidence for the efficiency of teaching and learning approaches, and promote strategies of effective practice.

The challenges: we needed to share a common understanding of what an eportfolio is. Most of the cases referred to higher education. We also had to prepare the teachers to use the EPs in their teaching practice; they needed to go through a transformation, and not just add this as an extra thing to their teaching. We needed to examine the affordances of the technology and adapt online learning strategies for the implementation. Finally, it's a challenge to communicate these results - we're still trying to find a way to communicate these to policy-makers.

The main tasks: design, develop, implement, suggest.

The content areas included assessment and eAssessment, 21st century skills, and the learning design process. This was to help them align not only the content knowledge but also the learning outcomes. Three steps: 21st century technologies, activities, then assessment.

The 21st century skills include:

- ways of thinking
- ways of working
- tools for working
- the 21st century world

How do we assess these skills? This is where the eportfolio come in. There were three stages or levels to the process:

- storage
- workspace
- showcase

Storage: students can search and gather material, video, audio, etc. We develop skills like uploading, downloading, search and so on.

In the third level the students will present their products: skills like presenting, sharing, assessing.

The workspace level we wanted to emphasize. We wanted students to provide evidence of the process they used to achieve their learnings: journals, poems, etc.

In the assessment, students go through: reflection, talking, creating, interacting, using forums and pages.

The process to implement the model: train the trainers, train the teachers, then train the students. We used Mahara and Office 365, and are still working on the customization of it.

We held a trainers forum, covering a common understanding of what a portfolio means, and also sessions on 21st century skills, assessment, and the portfolio design process. We also had workshops on Mahara as a tool for the portfolio project. We are now running pilots, but we don't have any data as of yet.

We decided to use an approach having to do with embedded multiple case studies. That is, for each teacher, with each class, we refer to it as a case. Since some classes have more than one teacher, this is again another case. So each student might have an eportfolio with 2 or 3 or 4 teachers.

We developed some tools to do the research. These included questionnaires. and also ways to gather notes and observations, as well as ways of looking at the artifacts.

I will show (with scepticism) some of the results from the first phase, from Cyprus. One of our questions was about the impact of the ePortfolio. There was an impact in the teachers design process. The teachers had a transformation in terms of how to use the technology, not just as a tool, but as a part of the whole learning. They used Mahara not just in class but also in other spaces. From a teachers discussion group in Cyprus, it was very obvious how the students were re-engaged in learning. The teachers had evidence of the students' learning.

It was important to see how the portfolio facilitated learning. We got three comments from teachers, about the use for summative assessment, about the communication and interaction during the implementation, and about the accessibility of the system.

Barriers included: infrastructure, administration, barriers at home, also, how to use ICT in the learning process.

We will finish the pilot at the end of 2014 and will work on the analysis January-February and share our analysis thereafter. We will be having a conference.

Ilona Buchem, CreditPoints with OpenBadges

@mediendidaktikCentre for Recording Achievement (CRA)

Open Badges for Job Application (slides by-NC-SA :)

This is a qualification project for students who come from abroad, migrants who have difficulty finding a job, who have education, even a PhD, by assigning 'credit points', as part of the Federal Network Integration through Qualification (IQ) project in Germany.

Each participant co-constructs an individual qualification schema. We use the badges to recognize the skills and combine them with an ePortfolio to help them find employment, by making them more visible and potentially more attractive.

The approach is not based on the 'mastery' approach - we simply observed how people were progressing while they were learning and then 'discovering' the skills, identifying them as competencies, and awarding badges for those.

One of the most important processes was competency recognition - we used ProfilPASS, a German Tool, for this. For example, for language-based badge, we linked this to the European Qualification Framework to describe different competency levels; each badge connects to a PDF that described what the badge means - the the person can read, write and speak the language, for example.

We designed badges that have a lot of space to include as much information as possible - we created a cube, with information in three areas (and colour indicates module).

The showcase type of ePortfolio (or 'digital job application videos' as we call it in German). You have you're c.v. shown on the site, the badges are integrated, to show in one place the skills of the person. Participants used the backpack to organize and display their badges on different sites; we also included the badges in the certificates. Credit points count as ECTS points (whatever those are).

A publication (in German) is coming soon.

Eric Rousselle, CEO, Discendum, Inc

(an ePortfolio service)

We are a Finnish service provider, we have an open LMS platform, badge factory, ePortfolio system built on Mahara. There has been for several years a strong interest in PLEs and personal learning; that's why we went with Mahara. Not perfect, but it has a big potential.

<http://kyvyt.fi> is a national e-portfolio service designed and hosted by Discendum, launched in August, 2010, used by 38,500 learners and 200 organizations. The users are mainly schools, vocational and higher education institution. Kyvit.fi is used mostly for reflective learning, student counseling, and assessment.

It's free for end users; organizations pay for the use, and users own their own contents.

There has been a very good response to date, with positive attitudes from students and authorities. The community is still growing after 4 years.

Some of the positive outcomes are: students are moving from the 'aware' stage (in the maturity matrix) to 'exploring' and 'developing'. Some schools are integrating ePortfolio practices in their curriculum. Some student shave used their ePortfolios after graduation.

Challenges: there is strong LMS culture which emphasizes the teacher's role and the importance of controlling and monitoring the student's progress. As a PLE and social media application, Kyvyt is challenging for teachers and also for students who are used to being monitored. There is an issue (for example) around students forming groups by themselves. We still need good pedagogical models, user cases and templates (we have a conference every year to attract these). The big problem for many teachers is learning how to use yet another system.

We are often missing an organization-level strategy - teachers are using it, but not organizations as a whole. Also, because the institution is not hosting it, teachers and schools are reluctant to use it - IT departments are not interested in supporting a system they don't host. As a business, hosting and developing a national eportfolio system is most challenging.

For learners, many ePortfolio systems are too complex and too academic. Learners should have the feeling "it's nice" to use the portfolio, and not "I have to do it". The 'academic' eportfolio systems are probably not what citizens need in a life-long learning environment. In many countries we are creating a portfolio that is useful in an academic context, but not a real-life context.

So: badges. There is the potential to grow the value of a portfolio by adding badges. So we have developed a plug-in so we can issue badges in Mahara. We're looking at a 'badges first' approach to ePortfolio - we want to build a "better backpack" because Backpack is not a very good tool. We are looking at an open badge passport as a micro-portfolio. The idea is to gather badges, organize them in pages, and reflect and build the big picture.

But we need to bring portfolios to life. A mechanic working on engines all day doesn't see why they should go to Mahara and write a page. So we want to integrate them, they take a picture on their mobile and get a badge. The key words here are simplicity and usability. Using badges gets us away from text-heavy portfolios, and introduces the possibility of search, which for employers is very nice. They can search employees for badges and set badges as goals for skills training.

*Berlin, Germany
December 03, 2014*

Rheingold, Lewin, Stevenson

These are summary notes of the presentations at Online Educa Berlin, 2014. If the text uses the first person, it is the presenter speaking, not me.

Howard Rheingold

For me it has always been about the kind of learning and teaching that technology enables. Social learning is what makes us human. Without the connection to the students and the pedagogy, I don't think the technology would have been so useful.

I'm talking about a new culture of learning - also the title of a book by JS Brown and Doug Thomas. One aspect: learner centred. Before, you used to have to go to a school. Learners have many other options now. It's also more social - learning has been more and more peer-to-peer and not just listening to the teacher. It's also more inquiry-based. It's also more collaborative - this used to be called cheating. It's also cooperative - I talk about co-learning, being responsible for each other's learning. Networked: this is new - children in schools are able to connect with each other in ways that weren't possible before.

In 1996 I wrote this article, virtual communities. I created a 'university of the future' that cost several million dollars - I didn't imagine that 10 years later people would be able to have all this virtually for free.

In 2008 I was able via a MacArthur grant to create a social media classroom. The idea was to enable students to use different media in the same browser-based environment.

The forum, for example, enables the sort of online conversations that are really not feasible using email lists. The forum explicitly enables the group to have a voice. In school these conversations are truncated; the bell rings and students move on. Online these continue. It's about the group being more than the sum of its parts.

On another tab you find the blogs. It is the individual blogger that chooses the subject. This is more and more important at younger ages. Think of the difference between writing a paper only the teacher sees, and writing a paper the world sees.

There's also the wiki, to create pages that anyone authorized to edit. We use it to collaboratively author documents. We also use social bookmarks.

A lot of what I am talking about isn't something I knew. It is something I learned along with my students. It was about empowering the students, to take control of their own learning. Here's a picture of how the classroom has changed. Working with students we developed the concept of co-teaching. As well, we reorganized the room into a circle - there's no back row in a circle.

One of the things we did was to develop a lexicon of the words and phrases we encountered; it was up to all of us Wikipedia-style to add to the definitions. If each one of us does some little thing we are able to create something larger.

We also used mind-maps to allow people to break out of the linear, to think visually about the subjects. One of the co-teaching duties was to make a mind-map of the materials assigned.

A few years ago I decided to experiment outside the university and go into purely online teaching. I started Rheingold U for students all over the world. Interesting - I changed my greeting from 'esteemed students' to 'esteemed co-learners'. It reflected a different attitude to students, to give them power over learning.

We use a wiki, we meet online once a week - we can use Collaborate, Adobe Connect, Big Blue Button - it's an exercise in multi-tasking in many ways. I put up a page and asked participants to take new roles = search, mindmap, create lexicon, etc. This creates interactivity - you could go to YouTube and just listen. BB Collaborate has a very nice whiteboard that lets people put up stuff anonymously. We use it to brainstorm; then some students would create more formal mindmaps.

It's really not a matter of memorizing facts; it's a matter of finding connections and finding meaning.

Since then many services have started up to allow people to learn outside school - Khan Academy, Coursera, etc. If you have internet access you can learn. That started me thinking, what's the next step? What do self-learners need to know in order to effectively teach and learn from each other. More and more people are finding out they can learn what they want to learn online.

What if we eliminated the teacher altogether? How would they organize themselves? What would they do? So, I got together with a group at Berkeley and talked about it. Over time the group in the room dropped out, but an international group online worked together to create what we called 'Peeragogy'. It was an exercise in peeragogy. We studied and worked online - we used Google Hangouts and Wordpress - we created a Handbook. You can join our meetings and help us edit and revise it.

I tend to work ahead of the rest of the world and I think peeragogy will be more common over the next 2, 3, 5 years. Yes there is a place for expertise. But we can't scale up traditional brick and mortar schools. Also, there is an economic question: do people want to pay more taxes to pay for teachers and schools.

A recent McArthur grant got me involved in open and connected learning. A good example is ds106.us - instead of using the digital classroom, this is teaching and learning on the open web. I ask my students to claim a domain name and get a WordPress server on the web - costs

\$25 - and take control of what they do on the web. The web is not just Facebook; it is not just social classrooms. I created a course hub that aggregates their blogs.

They are learning how to create a public voice. I tell them, whether or not they like it, they have a public face. People talk about them. This is about them being able to take control of their own selves. We use MediaWiki, we use Discourse (discourse.com) - working with the organizers of these open learning courses (eg. Jim Groom) led us to create an open course on creating open courses. There are core groups, and thousands worldwide, and you can use the Wordpress filters to control what you see.

Right now online you can find our work at connectedcourses.net - it's not about driving this top-down, but to enable people to co-evolve the pedagogy, not to replace traditional learning, but to enhance it. Every year in the syllabus I introduce students to new ways of participating in ways they are not accustomed to. They can read books and listen to lectures, but they're not used to co-teaching and working together. They don't just take a package of learning from the course.

This not the only way of learning. There are many things you need to learn how to do - how to change a lights switch. More and more this procedural knowledge is something that more and more we need to do together.

Lisa Lewin - Pearson

@lisalewinlive The Ed Tech Revolution

The big news story of higher education in the 20th century was one of access. There was a big explosion of access to tertiary education, something that used to be reserved to the elite. It became accessible to the disadvantaged, ethnic minorities, to women.

The OECD's list of nations that have 40% who have reached higher education attainment. (North America, Europe, Japan, Korea, Australasia). I did. I'm from the midwest US. My grandfather was born 1925 in southern Illinois. He was in WWII in Japan, used the GI Bill to pay for his education. My mother was born 25 years later; she attended a land-grant university (the US granted land to states that could be used to start universities - Many of these grew to become the mega-universities). That's where she met my dad, a bright international student from Jamaica. I was born in 1975, so when I went to Harvard I was able to take advantage of a loan program (unsubsidized loan at low interest backed by the government). It shows that policy interventions can have both a micro-impact (my case) and a macro-impact (all of yours).

Now, we're making a bet that technology can continue to improve access. It gives flexibility, more diverse options. We also hope that technology can increased access in the developing world. We're placing a bet that tech can expand access on that axis.

We also hope that etch will not only expand the quality of education, but also improve the quality. That's where facts and figures are a bit murky. When we look at the data, on balance,

we're not getting the big learning gains that we would expect. Access has expanded, but we still have issues of completion, employability, training in 21st century skills. It's tougher having e-learning produce gains in quality.

Maybe this is a problem in innovation. Here is a (Foster's) technology S-curve (a theory that suggests technology follows a common curve, from trial and error to rapid adoption, to mainstreaming at a performance limit, to eventual replacement). I argue that we are at the end of the first curve in educational technology. We've seen some mainstreaming and rapid adoption - it's no accident that the sponsors are Pearson, Blackboard and D2L - we have LMSs and 'online homework systems'. So we might be at that phase near the top of the curve, facing diminishing returns. On the measure of learning gains - we're not seeing 'double the learning gains'. So the question becomes, how do we get to that next technology?

Some candidates. For example - brain scans - we didn't know before that during a lecture the brain slows down to an activity below that of sleeping. We didn't know about the impact of nutrients. Etc. If we could create brain-informed teaching and learning strategies, that might bet us to the next level.

Or another theory: it's not brain science that will get us to the next level, it's data science. The theory here is that we were not able to understand what was happening at the point of instruction. We only test what students every few weeks or every few months. Imagine what can happen if we observe every course resource, to actually dissect the effectiveness of all the micropoints. Now we have a critical mass of student s- we have a zettabyte of data. That's lot of data; we could mine that.

But wait. Maybe, the limit to progress in ed tech is a human limit. Eventually machines will be able to do everything better. If we want truly personalized learning, an algorithm will be able to produce this better than a human ever could. Engineers in augmented reality and virtual worlds suggest that machines can help us overcome physical limits - to demonstrate nuclear fission, for example, or to think about how we better scale and give training teachers better practice without subjecting students to their experimentation.

Or there's one more possibility. What's preventing us fro getting these outsized learning gains is that we have not had a metascience that pulls all those threads together, helping us tie all of these things in a manner that's somewhat wholistic. That's what learning science - a new discipline - will do.

My personal view is that any of these, any one of them, if we could figure out how to apply it correctly, could just explode our ability to apply ed tech. But what that will rely on is for all of use to do out part to develop a better and bolder innovation ecosystem. Here's what I mean by that.

At a certain point, there's basic research. Following that, there's a technology development space - an incubation space. Early-stage startups, taking new discoveries and trying to apply the. Then you have a product development phase, and a scalability phase, where you have people whose job it is to productize those innovations, so they can be used by the masses.

We need to do two things. First we need to go deeper in all of these things - being bolder and more creative in research and innovation, etc. And the other thing is what I'll call horizontal coordination, all of these working together, so that we're actually translating the great work that's happening on the frontiers into actual products everyone can enjoy.

Mark Stevenson

@optimistontour

Hello! Hello! Hello! I will go very fast.

So I grew up in a depressive household, that led me to create a consultancy.

Douglas Adams - three types of tech

- tech that existed when you were born - doesn't feel like tech
- tech created before middle age, that's exciting and useful
- tech created after middle age, which is pointless and makes you angry

So in learning, we have technologies that look interesting but we don't know what to do with it. Eg. genetic testing. For example, I was screened, I have the same risk as a black man for a certain disease. I said I wanted a test, my doctor said, I can only recommend that test if you are a black man. My doctor is not a racist, but our system is, relying on superficial cues rather than actual data.

Looking at the exponential growth of tech. Your mobile phone has more computing power than the entire Apollo program. You might think a car driving itself is amazing. But you can see somebody in such a car being amazed. Now they will be allowed on the roads. What does this do to insurance companies? If there's no driver, who do they blame? But humans are bad at driving cars; it will reduce accidents.

In a few years, there will be a 1 cent human genome. What does that do to medicine. Fuel created from carbon, which they feed to algae. Taking carbon from the atmosphere. Many companies bid on this project. Kleinworks won the bid, and is making diesel from the air right now. This will hit a niche market in 2023. The cost of solar power is dropping, and capacity is doubling every couple of years. Companies are switching from oil and gas to renewables.

The world will change dramatically, because all of our politics and economics are the politics and economics of energy.

Another amazing thing. 3D printing. 3D printed technology - a 3D printed heart. A German technology, Nanoscribe, 3D printing components for microchips on a nano scale. Eventually 3D printers will be able to print all the components required to make a 3D printer.

Solar powered mobile phones. Blood tests you can run on your mobile phone. Designs for printers that produce pharmaceuticals. But these together. bioCurious.

Digital was the cocktail sausage before dinner.

You're creating an industry that is supposed to usher us into that world. JS Brown - nearly every social technology and business structure can't survive, and yet we're trying to educate people into those structures. Learning quicker than your competitors may be the only way to survive. The future needs a different model of education. Automation applied to an inefficient operation will just magnify that inefficiency - Gates.

We all want to innovate. We love innovation. It's amazing. All my clients want to do that. But what they want is innovation-wash - to appear to do it, without actually doing it.

We need radical change, but most of us can't do it, because of the way we were educated. Sinclair - "it is difficult to get a man to understand something when his salary depends on not understanding it." Remember Wang? Remember Blockbuster. Big companies die because of their culture. Culture eats strategy for breakfast. None of the new technologies were developed by incumbents.

If it doesn't interact with you, it's broken. Publishing, medicine, manufacturing, energy - not just consumers, but producers. In education, it's about co-learning. learning is not a place - it's something that we are, something that we do. If you try to just recreate the place, you're not innovating.

Mass power is coming to you. And with power comes responsibility. With mass power, mass responsibility. That's why your work is so important. You have to become citizen and state. You can't predict the future, you can only prepare for it. The future is just a mirror, and asks us what kind of world we want. If we don't look in that mirror and see a world of justice, and humanity, and compassion, we'd better be prepared for the consequences.

*Berlin, Germany
December 04, 2014*

Open Education, MOOCs, and Opportunities

Reusable Learning Resources

The initial development of online learning technology began at scale with the development of the learning management system (LMS) in the mid-1990s. These systems were modeled on distance education resources such as programmed texts and course workbooks. These were designed originally by organizations such as the Open University, in Britain, and Canada's Athabasca University. Online courses were developed according to a protocol that developed over 20 years of experience. These combined learning materials, activities and interaction, and assessments.

Technological systems based on these designs were first developed by the aviation industry, in the form of the AICC specification (Aviation Industry Computer Based Training (CBT) Committee). These standards were adapted by the Instructional Management Systems (IMS) consortium, a collection of academic and corporate training providers. These defined metadata standards describing small and reusable resources first called 'learning objects' by AutoDesk's Wayne Hodgins. These standards, called Learning Object Metadata (LOM), enabled the development of resources that were reusable, discoverable, and sharable.

Major LMS companies such as WebCT, Blackboard, Angel, Saba and Desire2Learn all adopted standards originally developed by IMS. In addition to LOM, the consortium designed Content Packaging, to bundle sets of learning objects for storage and delivery, and sequencing and design specifications, to organize them into courses. In addition, an organization called Advanced Distributed Learning (ADL), working for the U.S. military, developed the Sharable Courseware Object Reference Model (SCORM) to both describe learning resources and enable them to communicate simple messages with LMSs. SCORM 2004 remains the dominant learning resources specification in both the corporate and academic learning technology marketplace to this day.

Additional technologies to support resource discovery and reuse have been developed since then. Among them were IMS Common Cartridge (CC) to support the ability to 'plug in' applications into LMSs, the Learning Technology Interoperability (LTI) to enable LMSs to launch typical applications such as chat or discussion engines. These were supported in term with application-specific application programming interfaces (APIs) and specialized software, such as Blackboard's 'Collaborate' synchronous conferencing system.

Open Education Resources

Alongside the development of educational technologies is an equally important movement to support open educational resources. This movement predates the development of the world wide

web in 1994, as seen for example in the Gutenberg Project, an open access archive of public domain works of classic literature. In addition, there were during this time nascent free software licenses were also developed, first to support 'freeware' software applications distributed across pre-internet electronic bulletin boards, then to enable the distribution of online gaming libraries, such as the LP-MUD.

Free software was formalized with the development by Richard Stallman of the GNU Public License (GPL) in 1998 (ref). This license not only promoted the free use of software, it also guaranteed access to the original source code of the application, and was 'viral', which meant that any new work produced using the source was required to carry the same license. The license did not prohibit commercial use of the software, however, the viral clause made it unattractive to companies that wanted to develop proprietary applications, so licenses without the viral clause, such as the Lesser GPL and the Berkeley Systems Distribution (BSD) were later developed.

Content was treated differently by Stallman. To support the free distribution of software documents and support materials, the free software documentation license (FSDL) was developed. It was similar to the GPL, but in order to ensure the integrity of documentation, did not allow derivatives. Learning content required a more flexible model, which was provided first by David Wiley, with the Open Content License, and then by Lawrence Lessig, with Creative Commons. Both of these licenses allowed for the free reuse and redistribution of the resource, but with conditions.

The Creative Commons license (CC) has become widely used and today thousands of libraries and millions of resources use the license. It became successful because it offered flexibility to content authors and publishers. By allowing a set of sublicenses, it allowed authors to specify several things:

- By using the Non-Commercial (NC) clause, could restrict copying and reuse of the resource to non-commercial purposes only
- By using the Attribution (By) clause, could require that any reuse identify by name (and typically URL) the original author of the resource, and
- By using the Share-Alike (SA) clause, required that the subsequent copying and reuse of the content use the same license as the original, as in the 'viral' GPL
- By using the No-Derivatives (ND) clause, authors could require that only exact copies of the original be made and redistributed

In 2002, UNESCO, in an examination of the needs of developing nations, and the potential offered by the free distribution of digital learning resources, developed the concept of the 'Open Educational Resource', as follows: (ref)

In a related but separate initiative, the Massachusetts Institute of Technology (MIT) launched what it called OpenCourseWare (OCW). This project, funded by Foundations such as Hewlett,

involved the conversion and distribution of all MIT course materials on the internet. Though not the equivalent of a full MIT education, these resources were visited by millions of people around the world over the last 12 years. OpenCourseware spawned a number of additional projects, including the OpenCourseware Consortium, and the Open University's OpenLearn initiative.

Content Syndication Networks

The concept of content syndication originates with the newspaper industry. The idea is that a news story published in one newspaper might be of interest to readers of other newspapers, and so the same story, after its original publication, is distributed to these other newspapers as well. In time, press agencies such as Associated Press and Reuters, formalized the syndication of news content and provided some original news coverage as well.

In 1998 Netscape, the creators of the first commercial web browser, developed a web site called NetCenter and encouraged contributors to 'syndicate' their content in it. This was supported using a technology called Rich Site Summary (RSS), co-developed by Netscape and Dave Winer. RSS went through several early versions: RSS 0.91, which was the first production version, RSS 1.0, which used a web technology called Resource Description Framework (RDF), and RSS 2.0, known as 'Really Simple Syndication', which was adopted by blog engines such as LiveJournal and Blogger. A parallel standard, called Atom, was also used to support blog post syndication, and additionally defines a standard for uploading contents, including comments and new blog posts. These specifications brought content syndication to the online publishing community.

In education and academia, meanwhile, a parallel initiative called 'Open Archives Initiative' (OAI) was created. This followed the calls of academics (in documents such as the Berlin Declaration and Budapest Open Archives Initiative) for the free distribution of academic content. Technology supporting open archives, called OAI, to create lists of academic journal articles in repositories for retrieval and distribution. This technical development now numbers in the thousands of repositories, and millions of articles, as listed in the Repository of Open Archives Repositories (ROAR) and has been paralleled with the 'Open Access' movement led by Stevan Harnad and Peter Suber, who promote the creation of institutional services rather than reliance on commercial publishers.

Content syndication has been behind some of the most innovative developments on the world wide web. Microcontent services such as Twitter and Facebook originally supported RSS. Millions of people have uploaded photos to Flickr and videos to YouTube, many licenses with Creative Commons and shared with RSS. What we now know as the social web, and the social network, evolved from these origins.

Learning Technologies at the National Research Council

In 2001 members of the National Research Council's e-Learning Research Group joined a pan-Canadian network of learning resource providers called eduSource. This initiative, a three-year

\$10 million project, brought together institutions like Athabasca University and TéléEducation Quebec (TelUQ) together with colleges, corporations and other government partners. This initiative designed and built software to support a pan-Canadian network of learning object repositories and to develop a Canadian version of LOM called CanCore.

In addition to participation on the Steering Committee, NRC staff (including Stephen Downes and Rod Savoie) drafted the organization's core philosophical principles. Together with several partners in Atlantic Canada, the NRC developed the core framework for licensing and authentication, known as Distributed Digital Rights Management (DDRM). In addition, an alternative content syndication framework, called Distributed Learning Object Repository Network (DLORN) was developed.

The National Research Council also engaged in a pioneering content recommendation project with a New Brunswick company, Mosaic Technologies. Working with the Semantic Web group located in Fredericton, the eLearning group developed a product called Sifter/Filter. This product enabled the company to describe resources with metadata in such a way that properties of the learning resource could be matched with the needs of the course developer. Mosaic was eventually acquired by a British technology company while the core technology was rebranded as a music recommendation service, RACOFI, and commercialized.

In 2003 NRC research Stephen Downes developed the concept of e-Learning 2.0 by employing content syndication technology and social media to support learning. Learning, he argued, would be best supported through social networks with the development and free exchange of learning resources, thus enabling students to add to the instruction provides by schools, employers and universities with their own contributions and interactions. Working with George Siemens in 2004 and 2005, the learning theory known as Connectivism was developed, with the idea that learning takes place not just in an individual person but across a network of connections. This would be supported by open educational resources, and to this end NRC defined a set of sustainability models for the OECD in 2006.

The National Research Council's e-Learning group continued development work in collaboration with the major LMS company, Desire2Learn, and the Université de Moncton. The SynergiC3 project helped D2L implement a collaborative learning content development system in its core project. NRC contributions to the technology included content harvesting and syndication technology, a semantically supported workflow engine, a data representation format called 'resource profiles', and an upgraded version of distributed digital rights management. NRC patent applications resulting from this work have been incorporated into Desire2Learn core technology.

Massive Open Online Courses

In 2008 Stephen Downes and George Siemens developed the first Massive Open Online Course. This course, called Connectivism and Connective Knowledge (CCK08), was designed to explain

and expand the learning theory they had been developing since 2004. At a Desire2Learn conference in Memphis, Tennessee, Downes and Siemens determined that the online course they were developing should emulate the structure of the theory they were describing in connectivism - that is, it should be an open course, designed as a network of connected parts, designed to facilitate communication using social networks and the sharing of learning resources.

The course was launched in September, 2008, using Moodle, MediaWiki, WordPress, and an application designed by Downes called gRSShopper. This application, the same employed in the construction of DLORN, is used to author and syndicate Downes's e-learning newsletter, OLDaily. The course was sponsored by the University of Manitoba as part of its Certificate in Adult Education (CAE) and had 24 paying students enrolled. It was also opened to the general public and attracted 2,200 registrations. Dave Cormier and Bryan Alexander coined the term 'MOOC' - Massive Open Online Course - to describe this new form of online learning.

Between the years 2008 and 2014 the NRCDC led or was a part of the following MOOCs:

- CCK08 - the first course, conducted over 10 weeks in the fall of 2008. Weekly synchronous sessions were conducted using a conferencing system called Elliminate. This course proved the concept of the networked course and led the use of distributed content networks to incorporate student contributions to the core course content. By the end of the course 170 students were contributing RSS feeds, while 1800 participants were subscribed to the course content newsletter.
- CCK09 - the second version of the same course saw many of the original participants of the first course return to help teach the second, thus proving that the same model can be duplicated with more robust student interaction in the second iteration.
- Critical Literacies - along with researchers Helene Fournier and Rita Kop, this course attempted to engage learners with the core skills they need in order to become proficient participating in MOOCs. It was designed in response to criticisms that participants must already be literate and educated in order to benefit from the instruction.
- Personal Learning Environments, Networks and Knowledge (PLENK 2010) - this course examines the idea of the personal learning environment (see below) and the creation of self-organizing learning communities.
- Change 2011 - this was the longest course, at 30 weeks, running through the fall of 2011 and the spring of 2012. It proved that a MOOC can be run for a long period of time with the same core group of participants, and that new participants can enter the course at any time.
- CCK11. The third version of the first course included a test of the Big Blue Button (BBB) open source conferencing system. Because Elluminate was sold to Blackboard, becoming

Blackboard Collaborate, an API connecting gRSShopper and Big Blue Button was authored. However the number of users proved to be too much for BBB.

- Course on the Future of Higher Education (CFHE) - organized in cooperation with Athabasca University, EDUCAUSE, the Chronicle of Higher Education, the Gates Foundation, and Desire2Learn. This course demonstrated that a traditional LMS could be used to support a connectivist-style MOOC, albeit with an integration with gRSShopper. To support this course an API between gRSShopper and D2L was developed.
- MOOC-REL - this course was offered in French and covered the topic of Ressources Educatif Libre (REL). It was offered in cooperation with the Organisation internationale de la francophonie and the Université de Moncton. MOOC-REL also involved the production of a series of videos and the development of content for the OIF.

Through six years of MOOC development the National Research Council has gained considerable expertise and research through numerous iterations. NRC staff have published numerous articles documenting the forms of participation and interaction that take place in MOOCs.

Following the NRC's work, the MOOC became much more widespread. Most notably, Solvig and Thrun launched the Stanford Artificial Intelligence MOOC, which attracted 170,000 enrollments. Although the Stanford MOOC is described as a distinct form of MOOC, it is noteworthy that it has the same origins as the Connectivist MOOCs. The Stanford authors reported that they were inspired by Salman Khan, who launched the Khan academy a series of freely accessible video lessons offered on YouTube. Both the connectivist MOOCs, and the Stanford MOOCs, depended crucially on free and open resources.

The Structure of a MOOC

Both forms of MOOCs, the connectivist MOOC (cMOOC) and the Stanford MOOC (xMOOC) are based around a common core of content. This content serves different roles in the two types of MOOCs, which will be discussed.

In both types of MOOCs, weekly synchronous events are held. Both xMOOCs and cMOOCs record these as videos. In addition, both offer supplementary materials, such as additional videos, articles, and learning activities. In some forms of cMOOC, such as the ds106 MOOC conducted by Jim Groom of Mary Washington University, collaborative and creative activities are the core of the course. In xMOOCs, adaptive learning technology supports instruction. Probably the most advanced of this can be found in CodeAcademy, a system that allows students to teach themselves programming.

The difference between the cMOOC and the xMOOC is in the distributed nature of the course. While both types of MOOC involve the creation and distribution of open educational resources,

the cMOOC in addition draws on student participants to develop and distribute their own resources, and to find related resources from around the internet and incorporate them into the course. For this reason a cMOOC requires a much less intensive body of resource production, and can be developed for a much lower budget. Even so, both forms of MOOC require the creation of some core content, to serve as the focus around which subsequent interactions and activities take place.

Additionally, the cMOOC draws on self-organizing social networks in a way the xMOOC does not. While it is true that informal learning groups, such as in-person meetings, online conversations, Facebook and Twitter groups, and other social networks form around the xMOOC, they are not integrated into the structure of the course itself (this lack of integration is so profound it has led some to propose the MOOC 2.0, which is essentially the cMOOC design). The cMOOC employs content syndication technologies to collect resources and conversations conducted by course participants around the world, and to build their contributions into the structure of the course itself.

This results in a course that is not only more relevant to participants, it also results in a course that is a dynamic entity, growing and changing over the years as new resources are created and added. Unlike traditional courses, including xMOOCs, which require redevelopment after a shelf life of three to five years, a MOOC can be rerun indefinitely, as the four iterations of the CCK course have shown.

The xMOOCs were deployed with limited testing and commercial software developed and funded without reference to earlier technology, including content syndication and social media. As a result, products such as Udacity, Coursera and edX - all of which have commercial intent and all of which were derived from the same Stanford AI model - involve only the presentation of video material, adaptive learning exercises, and testing. It is this lack of integration with a student community, and the resulting inflexibility of the xMOOC, that have caused large numbers of students to drop out and for Sebastian Thrun to criticize his own technology.

Next Generation: Personal Learning Environments

In two conferences in Manchester, UK, in 2005 (Alt-C) and 2006 (PLE), the concept of the personal learning environment was first defined. The core idea of the PLE was to take a student-centred point of view for the provision of learning resources and services.

As described above, the first generation of learning technologies centred around the development of learning objects. These early learning materials, which could be complex and engaging, were packaged and distributed through learning management systems. In order to access a learning object, a student would register as a student in a course on an LMS. Even Moodle, which is an open source learning management system, requires that a student register on the service and sign

up for a course in order to access a learning resource (or even to participate in a course discussion).

This form of content management does not mesh well with open educational resources, which are intended to be freely accessed and shared. This is why MIT, when developing Open Courseware, also developed technology called DSpace, which is an adaptation of Open Archives Initiative. It needed a way to distribute academic resources without requiring that readers register and enroll.

In addition, the use of the LMS disabled portability of content. Artifacts created by students and stored in LMS ePortfolios, and comments and interactions among students, could not typically be shared beyond the LMS. Moreover, a student who was enrolled in one LMS could not take advantage of content or assets stored in another LMS. Learning records were also locked inside institutional LMSs, making transfer or recognition of prior learning difficult or impossible. Finally, many services in common use outside an LMS - including blogging tools, personal calendars and email, task managers, microcontent and social media, could not be used inside the LMS. The student's social world and academic world remained apart.

The PLE was developed in response to the need to facilitate interoperability between the different systems. As originally developed, it was more of a concept than a digital application - the addition of an open LMS would enable the deployment of the rest of the internet technologies in support of learning. This was the basis for the original design of Instructure's Canvas, which creates greater interaction in and out of the learning management system. Blackboard and D2L have both developed open versions of their software for free courses as well. Data portability, however, remains a challenge.

In 2010 the National Research Council embarked on an internal PLE project called Plearn. This was a proof-of concept prototype that demonstrated that an environment could be built that connected traditional learning services, open archives and open repositories, and social networking software and services. It also demonstrated that the personal learning environment was pedagogically feasible, that is, that the instructional and social supports, known as 'scaffolds', necessary to enable learning, could also operate in a personal learning environment.

The Plearn project also demonstrated some of the newer technologies for interoperability. It was designed around a Javascript Object Notation (JSON) framework. This is a data representation system that replaces RSS, and can be used for both content syndication and application programming interfaces (APIs). This allows different software applications to work much more closely together and ultimately enables the replacement of SCORM with more robust messaging between components. The same sort of system, called OAuth, which allows a person using one online social networking tool, such as Facebook, to share content with another such tool, such as WordPress, can enable an individual learner to combine the functions of a learning management system with those of a social network.

Learning and Performance Support Systems

When the National Research Council reorganized in 2012-2013 it dissolved individual project-based groups and instead focused on a smaller set of research programs. One of these, structured around the idea of the personal learning environment, is the learning and performance support system (LPSS). This is a five-year \$20 million initiative to advance and deploy core PLE technologies while at the same time supporting commercial development of related technologies and meeting key policy objectives, such as increasing employability in disadvantaged populations.

The LPSS does not replace the LMS or the MOOC. Rather, these continue to be provided by employers, academic institutions, foundations and governments in order to serve important learning, training and development environments. These agencies have the option of creating and making available open educational resources, drawing on the relevant community to locate and create open educational resources, or to supplement these materials with commercial content and custom software applications. The personal learning environment is designed as a means to enable an individual learner, student or staff member to access these resources from multiple providers.

Hence, just as a connectivist MOOC is based on the concept of content syndication to bring together resources from multiple providers around a single topic, LPSS employs the same technology, called the resource repository network (RRN), to allow an individual to obtain several parts of his or her education from multiple providers. At its simplest, an LPSS can be thought of as a viewing environment for multiple MOOCs. In this way, an LPSS is much more like a personal web browser than it is a resource or a service.

Like a browser, each person has his or her own instance of LPSS. Though resources can be shared, each LPSS user has his or her own list of bookmarks and resources. Because each LPSS is individually owned, it can also act as a personal agent for the student. For example, by providing credentials to remote systems (using technology such as OAuth), it can eliminate the need to register at multiple services. An LPSS can therefore serve as an important place for a student to store his or per personal learning records. A JSON formatted data exchange called xAPI (the eXperience API) created by ADL makes it possible for an LPSS to communicate with learning resources directly, and with an LMS or a MOOC. This creates, finally, a personal and portable learning record.

Like the original concept of the PLE, the LPSS envisions a user employing a number of online services to create and share content. Hence, for example, a user (who may be a student, an employee or even an expert or a professor) may wish to store videos on YouTube, photographs on Flickr, and documents and spreadsheets on Google Docs. It should provide access to, and synchronize content among, a variety of online storage media, such as Dropbox or Cubby. A

person can even sort custom applications on Windows Live or Amazon Web Services. Data exchange services, in addition to authentication, are required for this service.

Advanced Services

It is commonplace today to depict online learning as something that takes place at a computer screen. However with an increasing number of people using smartphones in their everyday lives, mobile deployment is also important. An LPSS, however, envisions a world where learning resources are available outside the domain of traditional computing environments.

One application developed by LPSS, for example, is the Multiple Interactive Trainer (MINT). This is a firearms training system used by military and police. The objective of LPSS is to enable the exchange of information between the MINT trainer and the LPSS application, enabling the results of sessions to be available one day to the next, or for a person to report training results to an associated LMS.

A similar application is being developed by the NRC's medical devices portfolio. Medical simulation systems that emulate the look and feel of actual humans are already deployed in hospitals around the world (including Riyadh). The medical devices team is working with LPSS to exchange xAPI data and to support training scenarios with external applications.

*Moncton, Canada
December 12, 2014*

The OOC

I posted [this](#)³⁶⁹:

The conundrum of creating an open course in a closed site – Storyboard OOC update

Gabi Witthaus, *Art of e-learning*, Dec 22, 2014



So this, I think, is the opposite of a MOOC: "We chose to use a platform that requires people to have accounts and sign in, in order to be able to set up and manage the groups effectively." Ironically the letter they choose to drop MOOC is not 'O' for 'Open' but 'M' for 'Massive'. It's true that if the course is not open, it won't be massive, but the really important bit is whether or not it's open. Additionally, setting up a course in such a way as to require management of groups is also contrary to the intent of MOOCs. So why not just call it an 'OC' (Online Course)? Well, it wouldn't be very interesting if it were just one of those, would it? And that's why we're getting so much false-MOOC pollution.

And Gabi Witthaus responded:

Stephen Downes has thrown me a curved ball - <http://www.downes.ca/> (sixth one down from the top at the moment). It stings a bit because Brenda and I are doing this as individuals with no institutional backing and zero funding, and we are sincerely trying to make a contribution to open education. We are certainly not trying to limit openness - and I don't believe that the idea of groups in open courses runs counter to the spirit of openness. I really don't want to go into battle with Stephen, but I can't let him give people the impression that the OOC is not open! (Apparently he has come to that conclusion because I said it will be run on CourseSites where participants will need to sign in. Well, by that logic, the MOOCs on all the major MOOC platforms are not MOOCs.) I'll base my reply to him on the assumption that I did not make it clear enough in my last post that the OOC is actually an open course.

Here's my response:

Thanks to Gabi for posting this and please allow me a few words.

> It stings a bit because Brenda and I are doing this as individuals with no institutional backing and zero funding, and we are sincerely trying to make a contribution to open education.

³⁶⁹ <http://www.downes.ca/post/63171>

I appreciate that, and I'm sympathetic, because I've spent many years in a similar situation. By the same token, as I'm sure you would agree, this doesn't render you immune from criticism. Much of the work I've done over the years has been criticized (and in turn, I've criticized my share of people along the way). It's all dialogue and discussion, and intended to result in a better outcome.

> *We are certainly not trying to limit openness*

I hear this a lot – usually right after someone has taken some of another measure that limits openness. And that, I'm afraid, is how I would interpret the present circumstance.

In my view (and not everyone agrees with me) if you are requiring a login in order to access course materials, you are limiting openness:

- you are requiring that people *give* something (specifically, contact information) in order to access the material (there's a *reason* Blackboard would want to force this)
- you are making it impossible for other sites to simply link to or embed the content you are sharing
- it is not accessible to search engines and aggregators

You might say that these aren't very significant limitations. True enough. But my point is that they *are* limitations. You've created costs and barriers to the material. It is *not* open, at least, not open in what I would consider a meaningful sense of the word. Stuff behind userids and passwords has a very different status – a *closed and presumptively private* status.

> *I don't believe that the idea of groups in open courses runs counter to the spirit of openness.*

There are groups and then there are groups.

If people gather around open content and organize themselves into groups then that is very much in the spirit of openness. But that's not what's happening in this case. You required logins “to be able to set up and manage the groups effectively.” This makes the groups something you create and control, and not something people create and control for themselves.

I'm not sure exactly of the range and scale you had in mind of ‘managing’ the groups – it reminded me of some ill-fated attempts to automatically generate small groups in some previous MOOCs – but to the extent the groups are managed the course becomes less open. For example, are you telling people what groups they can join and what groups they can't? Are discussions being limited to specific topics? Must groups be located on the course website?

Finally, what if a person doesn't *want* to be in a group? This is true for many many people. All they want to do is read the course content and now you're putting them into a group and giving them (presumably) unwanted messages and email.

You don't have to agree with me about this. But it's the sort of criticism of groups I have made many times in the past and would not be at all surprising for someone to see coming from me in this case, especially when it's used as a justification for closing the course behind a login.

> I really don't want to go into battle with Stephen, but I can't let him give people the impression that the OOC is not open!

Then remove the login.

> by that logic, the MOOCs on all the major MOOC platforms are not MOOCs.

I've made *that* argument many times as well. :)

In fact, many of the MOOC engines are closing their content behind subscription walls. Many also have licenses prohibiting sharing and reuse of the content. Some of them (and most of the 'major' MOOC engines) are now even charging for content. They keep chipping away at the definition of MOOC until it comes to resemble exactly the same sort of course that institutions were offering before MOOCs came along, except maybe at discounted prices.

The *whole point* of MOOCs is that you make them massive by *eliminating* the bottlenecks in traditional courses that made massive enrollments impossible. These limitations include:

- tuition or other fees
- logins and registration to view content
- centralized discussion forums

They also include things like heavy content (such as video), processor-intensive functions, personal interaction with the professor, etc.

Now I know, the Storyboarding course is not massive. My take is that this is because it *couldn't* be massive. And it couldn't be massive because it is closed or limited in certain ways that make massiveness impossible.

This is your choice. I understand the reasons behind the design decisions that you've made. But my observation stands: this makes it *just like every other traditional online course* – it's being designed as a hands-on artisan course with specific interactive intent designed into the structure. That's fine if that's your choice. But you shouldn't brand it as the other thing. Because it isn't one.

Anyhow, I'm sorry the criticism made you feel bad. That wasn't my intent.

*Moncton, Canada
December 22, 2014*

Becoming MOOC

There are two types of MOOCs. On the one hand, there is the xMOOC - this is a formal course created in a site like Coursera or EdX. An xMOOC will have regular lessons, videos and assignments, be led by an elite university professor, and attract a large online audience. These are the MOOCs that have received most of the attention in recent years and have generally shaped people's impressions. But there's another type of MOOC, called the cMOOC, which is based on connection rather than content, which looks more like an online community than a course, and doesn't have a defined curriculum or formal assignments. These were the original MOOCs, and they posed a much greater challenge to both the educational institutions that offered them and the participants who studied in them.

One major criticism of the cMOOC is based on the free-form nature of the course. Students have to manage their own time, find their own resources, and structure their own learning. For this reason, it is argued, students must already have a high degree of skill and internet savvy in order to be successful. A student who cannot navigate complex websites, search for and assess resources, or make new friends through a social network may have difficulty navigating through a cMOOC. As Keith Brennan writes, "Not everyone knows how to be a node. Not everyone is comfortable with the type of chaos Connectivism asserts. Not everyone is a part of the network. Not everyone is a self-directed learner with advanced metacognition. Not everyone is already sufficiently an expert to thrive in a free-form environment. Not everyone thinks well enough of their ability to thrive in an environment where you need to think well of your ability to thrive." (Brennan, 2013)

But what makes a person able to function from the first day in such an environment? What constitutes the literacy that is missing in such a case? There's no clear answer, but proposals abound.

Brennan himself suggests that proficiency is based in learner efficacy. "Self-efficacy is our belief that a task is achievable by us, and that the environment in which we are working will allow us to achieve that task. It's that ticking heart that measures out the motivation in us," he writes. And in order to preserve and promote self-efficacy, design is important. Tasks must be challenging, in order to be satisfying, but not so frustrating as to create confusion. Whether a particular task satisfies these criteria, he writes, depends on cognitive load and prior knowledge. That's why "why we tend to teach absolute novices using techniques and contexts that are different to the ones we deploy for absolute experts, and why we avoid exposing novices to too much chaos." Other writers refer to these criteria under the heading of flow, and trace its origin to game design. (Baron, 2012)

But cognitive load theory assumes that there is some specific outcome to learning such that supporting experiences can be divided into those supporting the learning outcome (aka 'signal')

and those that constitute part of the background (aka 'noise'). This is especially the case if the purpose of the learning experience is to remember some specific body of content, or to accomplish some particular task. However, in a cMOOC, neither is the case. Indeed, navigating the chaos and making learning decisions is the lesson in a cMOOC. The cMOOC is in this way similar to constructivism. As George Siemens writes, "Learners often select and pursue their own learning. Constructivist principles acknowledge that real-life learning is messy and complex. Classrooms which emulate the 'fuzziness' of this learning will be more effective in preparing learners for life-long learning." (Siemens, 2004)

What, then, would promote learner efficacy even in chaotic or noisy environments? A second, more robust, proposal takes the idea of literacy literally. A language might appear chaotic at first. Even if someone has learned how to spell the words, and even if they know what they mean, the nuances of using them in a sentence are many, and a language supports an infinite number of new sentence combinations. Each new experience with a language will be different, there are tens of thousands of words to choose from when forming a sentence, and only the barest of grammatical rules to aid construction. Imagine the language learner given a new text to read and criticize, picture them in front of a blank page they have to fill with words, and you have created an experience very similar to participating in a cMOOC.

What sort of literacy would be appropriate in a cMOOC? Two major types of literacies suggest themselves: 21st century literacies, and digital literacies.

21st century literacies are those literacies appropriate for living and working in the 21st century. This is an environment which changes at a much greater pace than in previous years, where there is a constant flow of information, where connectivity with people worldwide is part of our everyday reality, and where jobs that existed ten years ago have disappeared, and new ones have taken their place. A good example of this is the Framework for 21st Century Learning, which addresses several dimensions of this new type of learning, including core skills of collaboration, creativity, communication and critical thinking, and supporting skills such as workplace skills, information media skills, and the traditional core types of literacy and numeracy. (The Partnership for 21st Century Skills , 2011)

Alternatively, we can focus on literacies specific to the digital medium itself. For example, the Mozilla Foundation has developed and promoted a Web Literacy Map which describes in greater detail how to engage with digital media (as opposed to merely consuming it). (Belshaw, 2015) Three major types of skills are identified: exploring, building and connecting. The first describes how to find your way about the chaotic environment and even to make sense of it for yourself. The second examines traditional and new forms of content creation, including authoring and art, in a digital media environment. And the third addresses the previously under-represented function of sociality and connection. Taken together, these three literacies can be seen as a way for individuals to manage cognitive load for themselves, to adapt the task of making sense of the

web to their own skill level, and therefore to manage even in an environment that is not well designed.

Belshaw writes, "In its current form, the Web Literacy Map comprises a collection of competencies and skills that Mozilla and our community of stakeholders believe are important to pay attention to when getting better at reading, writing and participating on the web. Web literacy is about more than just coding. The web literacy standard covers every part of web literacy-from learning basic coding skills to taking action around privacy and security." In this sense, the modern understanding is about more than communication and meaning in a language or symbol system. It is about operating and interacting in a complex and multi-dimensional environment. This makes it particularly relevant to an understanding of the difference between literacies required in traditional courses and the contemporary literacies required in a much less structure learning environment such as a MOOC.

These types of literacies can be combined into an overarching set of literacies that may be described under the heading of 'critical literacies'. These literacies encompass not only the skills related to comprehension and sense-making, but also the creative abilities that support criticism, construction and communication. And they go beyond this in addressing the dynamics of today's world. They include, at a minimum, the following: the ability to detect and define syntax, structure, patterns and similarities; the ability to identify and generate meaning, purpose and goal; the ability to sense and create context or environment; the ability to apply or use language, literacy and communication to accomplish tasks; the ability to support a conclusion, criticize an argument, offer an explanation or define a term; and an understanding of how to recognize, manage and create change. Or, in brief: syntax, semantics, context, use, cognition and change. (Downes, 2009)

These literacies may be necessary for success in a MOOC, but they are more widely applicable as well. The theory of knowledge underlying the creation of the cMOOC suggests that learning is not based on the idea of remembering content, nor even the acquisition of specific skills or dispositions, but rather, in engaging in experiences that support and aid in recognition of phenomena and possibilities in the world. When we reason using our brains, we are reasoning using complex neural nets that shape and reshape themselves the more we are exposed to different phenomena. Choice, chance, diversity and interactivity are what support learning in neural nets, not simple and static content. Cognitive dissonance is what creates learning experiences. To learn is to be able to learn for oneself, not to learn what one is told; it is to be able to work despite cognitive overload, not to remain vulnerable to it. So the cMOOC is harder, requiring a greater degree of literacy, but in developing these literacies, promotes a deeper learning experience.

Finally, an understanding of the literacies required also helps us understand the difference between traditional courses, including the xMOOC, and the less structured cMOOC. It also offers ground for criticism of the former. Traditional literacies are rooted in our comprehension

of, and ability to work within, abstract symbol systems (and in particular, language and mathematics). It is no coincidence that PISA, for example, measures student performance in language, science and mathematics. These are the languages of learning, as well as the content of learning. But from the perspective of the cMOOC, these traditional literacies are inadequate. They form only a part of the learning environment, and not even the most interesting part, as we engage in environments that cannot be described through timeless abstractions or static facts and figures. But this is exactly what we face when we attempt to extend our learning from the eternal present and into the vanishing past or future. We need to learn to engage with, interact with, and recognize form and change in the environment for ourselves, rather than attempt a static and distanced description.

Learning in a MOOC and literacy in a MOOC become synonymous. We are not acquiring content or using language and literacy, we are becoming literate, becoming MOOC. Each bit of experience, each frustrated facing of a new chaos, changes you, shapes you. Participating in a MOOC is like walking through a forest, trying to see where animals have walked in the past, trying to determine whether that flash of orange is a tiger. There are no easy successes, and often no sense of flow. But you feel the flush of success every time you recognize a form you defined, achieve a skill you needed, and gradually gradually you become a skilled inhabitant of the forest, or of 21st century human society.

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Note: this article originated as a submission requested by a magazine, but when I learned that they wanted an article that was 2,000 characters long, not 2,000 words, this article became available as a blog post.

*Moncton, Canada
February 11, 2015*

Ten Key Takeaways from Tony Bates

Like pretty much everyone else in the field I've been immensely enjoying Tony Bates's work-in-progress, an online open textbook called [Teaching in a Digital Age](http://opentextbc.ca/teachinginadigitalage/).³⁷⁰

Having said that, I think my perspective is very different from his, and this summary post offers me an opportunity to highlight some of those differences. So in what follows, the key points (in italics) are his, while the text that follows is my discussion.

Note that this discussion is focused specifically on the "differences between classroom, blended, online and open learning." We have points of disagreement in other areas too :) but this post offers a way to focus on some aspects of that. Note as well that I'm not offering 'gotchas' here; Bates has discussed many of these points elsewhere and my objective is not to refute him based on this quick summary, only to identify the differences in perspective.

1. There is a continuum of technology-based learning, from 'pure' face-to-face teaching to fully online programs. Every teacher or instructor needs to decide where on the continuum a particular course or program should be.

The continuum here is presented in one dimension, the most obvious dimension, with teachers and instructors making the decision as to where some particular course or program ought to lie. I think all elements of this statement are problematic.

First, because online learning provides affordances not available in the classroom, there are multiple dimensions of comparison. For example, we could draw a line from one-to-one teacher on student instruction, to small classrooms, to larger lecture or presentation format courses, to delivery to thousands or even millions of people.

Second, one of those dimensions concerns whether the online offering should be a course at all. Online learning allows for informal conversation, videos, simulations, interactive learning, games, and a host of other models that can be attempted imperfectly at best in a traditional classroom. Understanding, for example, the role informal learning can play is key to understanding the distinction between in-class and online learning.

Third, in online learning the locus of decision-making need no longer rest with the instructor. Unlike a traditional environment, where a student's choices are to "stay" and "leave", an online student can select from many different options - including ion-class, if they're lucky enough to be able to find one that is local and offered at a time they can attend, at a rate they can afford.

³⁷⁰ <http://opentextbc.ca/teachinginadigitalage/>

2. *We do not have good research evidence or theories to make this decision, although we do have growing experience of the strengths and limitations of online learning. What is particularly missing is an evidence-based analysis of the strengths and limitations of face-to-face teaching when online learning is also available.*

Here I am first inclined to point to differing beliefs regarding the nature and role of research and theories. I consider what I do to be research, for example, and I do *not* consider surveys of a dozen graduate students to be research. And I am sceptical of the value of theories based on models employing (what have been termed) folk-psychological concepts and naive understandings of human cognition. Any theory of the form "x causes y" in this field should be considered suspect.

So it follows that to me "an evidence-based analysis of the strengths and limitations of face-to-face teaching when online learning is also available" is an oxymoron. Far too much in such an account is left unstated and merely assumed, with variables to be filled in by the reader's own prejudices. What constitutes a 'strength'? From my perspective, each person learning seeks different outcomes, so a 'strength' for one is a problem for another.

But most of all here is the presumption that we can determine *a priori* the desirable properties of online or traditional learning. In this regard, I side with [John Stuart Mill](#)³⁷¹, and aver that "the sole evidence it is possible to produce that anything is desirable, is that people do actually desire it." Without an *a priori* definition of 'effective' most so-called evidence-based decision-making falls flat, and of course, what we do know though observation is that people desire many different things.

3. *In the absence of good theory, I have suggested four factors to consider when deciding on mode of delivery, and in particular the different uses of face-to-face and online learning in blended courses:*

- *your preferred teaching strategy, in terms of methods and learning outcomes*
- *student characteristics and needs*
- *the pedagogical and presentational requirements of the subject matter, in terms of (a) content and (b) skills*
- *the resources available to an instructor (including the instructor's time).*

I find it fascinating that three of the four factors are based on the instructor, with only the very generic "student characteristics and needs" constituting the fourth.

I can understand that, from the perspective of the instructor, the instructor's "preferred teaching strategy" matters a great deal. But from the perspective of the student, the response is, "who

³⁷¹ <https://www.marxists.org/reference/archive/mill-john-stuart/1863/utility/ch04.htm>

cares?" Elsewhere, the many weaknesses³⁷² of the lecture format, for example, have been documented, as also most instructors' preference for the lecture. This has produced yet another generation of students asleep in their classroom (especially those where electronic devices are 'not allowed').

The characterization even of "student characteristics and needs" is suspect. The phrasing suggests two aspects of concern: first, that we are considering these in the aggregate, as a generalization across an entire class (or generation?) of students, and not individuals; and second, these are factors out of the students' control entirely, as we consider (predefined? instructor-defined?) "needs" instead of wants, and "characteristics" instead of preferences.

Part of this is the unrelenting instructional stance Bates takes throughout his work. It results in an assessment of factors impacting instructional decisions, even in areas where it's not clear the decisions are open for instructors to make. The key difference between in-class and online learning is the shift in the locus of control.

I would also add (cynically) that today the resources available to the instructor are increasingly based on the students' willingness and ability to pay, as our governments gradually remove³⁷³ all levels of support for public higher education.

4. The move to blended or hybrid learning in particular means rethinking the use of the campus and the facilities needed fully to support learning in a hybrid mode.

No disputing this one.

As the trend toward online learning continues, the traditional school or university increasingly will become a place where local residents access lab and conferencing facilities, no matter where they are enrolled. Meanwhile, classes offered *in situ* at these campuses will increasingly need recording and conferencing facilities to support their worldwide audience.

5. Open educational resources offer many benefits but they need to be well designed and embedded within a rich learning environment to be effective.

I mentioned above the need for an *a priori* presumptions regarding the desirable properties of online or traditional learning. It comes into play here.

For one would ask, what is the basis for the belief that OERs need to be well designed and embedded within a rich learning environment to be effective? The evidence seems to suggest otherwise. The Khan Academy, for example, made a virtue out of offering very low quality

³⁷² <http://www.timeshighereducation.co.uk/news/lectures-dont-work-but-we-keep-using-them/2009141.article>

³⁷³ <http://www.newswire.ca/en/story/1489083/university-funding-in-ontario-hits-worrisome-milestone>

videos helping viewers understand math and physics concepts. People exchange and learn from ideas presented in discussion boards across the internet despite these boards having no pedagogical design at all.

I think that only within a very narrow definition of "effective" can we demonstrate a "need to be well designed and embedded within a rich learning environment."

Again, it comes back to what people want to do. Generally, the learning I need to do from the internet is immediate and simple. A (badly designed) Wikipedia page often does the job for me. Indeed, typically, something designed in a rich learning environment just takes too much time and effort to be useful. I don't need a battleship if I'm just trying to cross the river.

6. The increasing availability of OER, open textbooks, open research and open data means that in future, almost all academic content will be open and freely accessible over the Internet.

Agreed.

7. As a result, students will increasingly look to institutions for learning support and help with the development of skills needed in a digital age rather than with the delivery of content. This will have major consequences for the role of teachers/instructors and the design of courses.

I also agree with this. I've actually discussed it at length in [The Role of the Educator](#)³⁷⁴. And my reflections here suggest a very different future than the one considered in this article.

First of all, increasingly, educational institutions will not offer courses at all. Why would they? If you're looking for "learning support and help with the development of skills needed in a digital age" you are very rarely looking for a course. Typically, you're looking for help with a project, or maybe an offer of a project, in which you can apply and augment the skills you're attempting to develop.

And different aspects of your support are offered by different people, at different institutions. Why would we suppose that the same agency offering learning is also the one assessing that learning? Insofar as 'design' (properly so-called) comes into play, it will be based as much on principles established outside education.

Sure, there will be structured learning experiences (and we might even still call them 'courses'). But the idea of an instructor offering a course through a given institution will be the exception, a tiny minority of the cases, compared to the much larger learning and development environment generally.

³⁷⁴ http://www.huffingtonpost.com/stephen-downes/the-role-of-the-educator_b_790937.html

But of course Tony Bates knows this...

8. OER and other forms of open education will lead to increased modularization and disaggregation of learning services, which are needed to respond to the increasing diversity of learner needs in a digital age.

Of this there can be no doubt.

But let me add that the phrase "increased modularization and disaggregation of learning services" suggests the repackaging of products and services that already exist. But the defining characteristic of online learning is the wide range of *new* things you can do to support learning. This leans that there will be a proliferation of *new* learning services. And additionally, many old learning services will be discontinued.

For example, when I was growing up, there was a thriving industry producing binders and lined paper. Moreover, the concept of blogging did not exist. Today we take electronic notes, blog them directly, and hire blog moderators to ensure children don't get themselves into trouble publishing online.

Learning online isn't simply a shift in modality. It's *different*. The methods are different, the objectives are different, and the services are different.

9. MOOCs are essentially a dead end with regard to providing learners who do not have adequate access to education with high quality qualifications. The main value of MOOCs is in providing opportunities for non-formal education and supporting communities of practice.

It is again interesting to see this one thing highlighted. It is interesting to me because this was never the *intent* of the MOOCs I produced, and with some few [exceptions](#)³⁷⁵, is not the intent of MOOC producers today.

But more interesting is the question of *why* MOOCs are a "dead end" in this regard.

The suggestion here (and it's only implicit) is that MOOCs are *incapable* of providing the learning required to warrant the awarding of a credential. That's why Bates includes the phrase about students "who do not have adequate access to education." This suggests that access to *traditional* education is a necessary condition, that MOOCs could not provide an education by themselves.

But why not? The role of answering this question is played by the phrase "high quality qualifications." Even if MOOCs could provide qualifications, they would not be "high quality".

³⁷⁵ <http://www.acenet.edu/the-presidency/columns-and-features/Pages/Giving-MOOCs-Some-Credit.aspx>

These, it appears to be suggested, may be offered only by (putatively) high quality formal education.

But I submit that these are not empirical arguments. Indeed, I would go further and suggest that the only reason students cannot earn high quality credentials in MOOCs is that the institutions that offer such credentials *won't* grant them for MOOCs. And why would they? Their business model depends on requiring students undertake extensive and often extensive coursework before the credential can be issued.

What makes the MOOC a "dead end", in other words, has nothing to do with the MOOC itself, but rather, has everything to do with the credentials.

The more interesting question here is whether a person working from childhood *could* achieve the same degree of knowledge and (qualification for) credentials taking MOOCs exclusively. Can a non-literate and non-educated person become literate and educated through open online learning? Is there a fundamental property of closed formal learning that suggests that it is the only route to a credential?

There are arguments to be made on both sides here. But I submit that the case is far from closed, and that this is not a takeaway.

10. OER, MOOCs, open textbooks and other digital forms of open-ness are important in helping to widen access to learning opportunities, but ultimately these are enhancements rather than a replacement for a well-funded public education system, which remains the core foundation for enabling equal access to educational opportunities.

I think that Tony Bates and I both agree on the importance of an open and accessible public education system.

Where we disagree is in the form that system should take.

The *existing* public education system does a poor job of ensuring equal access to educational opportunities. Major barriers exist across the board, in factors as varied as child poverty and nutrition, access to school materials, fees and access to extracurricular activities, expectations and class backgrounds, travel and work opportunities, opportunity cost and risk, and much much more.

Viewing online learning as nothing more than an enhancement of the traditional system is, to my mind, to preserve the inequalities inherent in the traditional system. It is to misunderstand the role played by the traditional system not only in the provision of an education but also in social networking and the formation of social classes.

The primary purpose, for example, of a school like Harvard or Yale is not to provide a superior education (their protestations to the contrary notwithstanding). It is to provide exclusive access to

a network of potentially rich and powerful individuals who will shape and promote your career through future life. Simply building an enhancement on *that* system will not change the inequality it represents.

For online learning to truly reach its potential it needs not only to break the educational monopoly of the rich and powerful, it needs to break the *social* monopoly of the rich and powerful, rending open their cliques, and laying bare the foundations of their influence. *We too* can form global networks of mutual self-support, but *only if* we break the existing structures designed to preserve status and privilege.

And in the end, I think that this points to the deep difference between Tony Bates and myself. I think that we disagree ultimately about *what constitutes an education*.

I think that he views it in terms of classes and content, of subjects and competencies and credentials, in terms of instruction and demonstration, pedagogy, skills and knowledge. This is a common and very traditional view of education, but one which I have increasingly come to question.

In my view, education is more akin to shaping and growing oneself, of acclimatization to a community and to an environment. The learning of any subject is analogous to the formation of a literacy in that subject, based not only in speaking the right words, but also in seeing the world in a certain way, recognizing some things as important (and other things as not). *Expectations* are as important as knowledge in this view, the *way we say something* as important as what we say.

This is what distinguishes between the education an elite receives, and an education that is reserved for the rest of us. While the mass of people get facts and skills and credentials, the elite are *transformed* into a natural ruling class. It's like the difference between someone who is taught the rules of the game, and someone who trains as an athlete. No amount of skills and drills can produce in a non-elite person the social and literary bearing of an elite person.

My objective is to transform learning as a whole into something that produces at least this possibility for everyone. We should embrace this as a *public policy objective*. Because, with all the capacity, technology and wealth available to us in society as a whole, it's the least we can do.

*Moncton, Canada
February 22, 2015*

From MOOC to Personal Learning

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The cMOOC, is based on connection rather than content, looks more like an online community than a course, and doesn't have a defined curriculum or formal assignments. What makes a person able to function in such an environment? What constitutes the literacy that is missing in such a case? What type of learning design or learning technology is best suited to support learning in a free-form community-based environment? These are the questions intended to be addressed in this paper. It describes the basis for a personal learning architecture and outlines the elements of the 'learning and Performance Support System' project being developed to implement this architecture.

The first Massive Open Online Course (MOOCs) was created in 2008 by George Siemens and myself. The course, titled Connectivism and Connective Knowledge, was implemented as part of the University of Manitoba's Certificate in Adult Education and simultaneously offered at no charge to approximately 2200 people worldwide. In the years that followed CCK would be offered three more times. Additionally, the same platform was used to deliver a course called Personal Learning Environments, Networks and Knowledge (PLENK) in 2010, as well as the 30-week course on Change.

In 2011 Stanford University offered its first MOOC, the Artificial Intelligence MOOC authored by Norvig and Thrun. It differs from the network-based connectivist MOOC (cMOOC), though, by being centred on a single platform and focusing on content like a traditional course. The xMOOC, as this model came to be known, is characterized by limiting autonomy and diversity - all students followed the same lessons at the same pace. Although it was open, interaction flowed one-way, from professor to student.

Since that time the field has seen experiments, articles and publications in the field with varying attention paid to each of the four terms in the original definition. Research and reports have questioned the sustainability of the MOOC model, questioned variables like learning outcomes and completion rates, and questioned whether the needs of non-traditional and less independent students are being met. Some have questioned whether MOOCs should be massive at all. Others have questioned whether it should be free.

These questions need to be asked differently of the two types of MOOCs. The xMOOC has received most of the attention in recent years and have generally shaped people's impressions. But the other type of MOOC, called the cMOOC, based on connection rather than content, looks more like an online community than a course and doesn't have a defined curriculum or formal assignments. These were the original MOOCs, and since they posed a much greater

challenge to both the educational institutions that offered them and the participants who studied in them, they must be assessed differently.

One major criticism of the cMOOC is based on the free-form nature of the course. Students have to manage their own time, find their own resources, and structure their own learning. For this reason, it is argued, students must already have a high degree of skill and internet savvy in order to be successful. A student who cannot navigate complex websites, search for and assess resources, or make new friends through a social network may have difficulty navigating through a cMOOC. As Keith Brennan writes, "Not everyone knows how to be a node. Not everyone is comfortable with the type of chaos Connectivism asserts. Not everyone is a part of the network. Not everyone is a self-directed learner with advanced metacognition. Not everyone is already sufficiently an expert to thrive in a free-form environment. Not everyone thinks well enough of their ability to thrive in an environment where you need to think well of your ability to thrive." (Brennan, 2013)

But what makes a person able to function in such an environment? What constitutes the literacy that is missing in such a case? What type of learning design or learning technology is best suited to support learning in a free-form community-based environment? These are the questions intended to be addressed in this paper.

Brennan himself suggests that proficiency is based in learner efficacy. "Self-efficacy is our belief that a task is achievable by us, and that the environment in which we are working will allow us to achieve that task. It's that ticking heart that measures out the motivation in us," he writes. And in order to preserve and promote self-efficacy, design is important. Tasks must be challenging, in order to be satisfying, but not so frustrating as to create confusion. Whether a particular task satisfies these criteria, he writes, depends on cognitive load and prior knowledge. That's why "why we tend to teach absolute novices using techniques and contexts that are different to the ones we deploy for absolute experts, and why we avoid exposing novices to too much chaos." Other writers refer to these criteria under the heading of flow, and trace its origin to game design. (Baron, 2012)

But cognitive load theory assumes that there is some specific outcome to learning such that supporting experiences can be divided into those supporting the learning outcome (aka 'signal') and those that constitute part of the background (aka 'noise'). This is especially the case if the purpose of the learning experience is to remember some specific body of content, or to accomplish some particular task. However, in a cMOOC, neither is the case. Indeed, navigating the chaos and making learning decisions is the lesson in a cMOOC. The cMOOC is in this way similar to constructivism. As George Siemens writes, "Learners often select and pursue their own learning. Constructivist principles acknowledge that real-life learning is messy and complex. Classrooms which emulate the 'fuzziness' of this learning will be more effective in preparing learners for life-long learning." (Siemens, 2004)

What, then, would promote learner efficacy even in chaotic or noisy environments? A second, more robust, proposal takes the idea of literacy literally. A language might appear chaotic at first. Even if someone has learned how to spell the words, and even if they know what they mean, the nuances of using them in a sentence are many, and a language supports an infinite number of new sentence combinations. Each new experience with a language will be different, there are tens of thousands of words to choose from when forming a sentence, and only the barest of grammatical rules to aid construction. Imagine the language learner given a new text to read and criticize, picture them in front of a blank page they have to fill with words, and you have created an experience very similar to participating in a cMOOC.

What sort of literacy would be appropriate in a cMOOC? Two major types of literacies suggest themselves: 21st century literacies, and digital literacies.

21st century literacies are those literacies appropriate for living and working in the 21st century. This is an environment which changes at a much greater pace than in previous years, where there is a constant flow of information, where connectivity with people worldwide is part of our everyday reality, and where jobs that existed ten years ago have disappeared, and new ones have taken their place. A good example of this is the Framework for 21st Century Learning, which addresses several dimensions of this new type of learning, including core skills of collaboration, creativity, communication and critical thinking, and supporting skills such as workplace skills, information media skills, and the traditional core types of literacy and numeracy. (The Partnership for 21st Century Skills , 2011)

Alternatively, we can focus on literacies specific to the digital medium itself. For example, the Mozilla Foundation has developed and promoted a Web Literacy Map which describes in greater detail how to engage with digital media (as opposed to merely consuming it). (Belshaw, 2015) Three major types of skills are identified: exploring, building and connecting. The first describes how to find your way about the chaotic environment and even to make sense of it for yourself. The second examines traditional and new forms of content creation, including authoring and art, in a digital media environment. And the third addresses the previously under-represented function of sociality and connection. Taken together, these three literacies can be seen as a way for individuals to manage cognitive load for themselves, to adapt the task of making sense of the web to their own skill level, and therefore to manage even in an environment that is not well designed.

Belshaw writes, "In its current form, the Web Literacy Map comprises a collection of competencies and skills that Mozilla and our community of stakeholders believe are important to pay attention to when getting better at reading, writing and participating on the web. Web literacy is about more than just coding. The web literacy standard covers every part of web literacy-from learning basic coding skills to taking action around privacy and security." In this sense, the modern understanding is about more than communication and meaning in a language or symbol system. It is about operating and interacting in a complex and multi-dimensional

environment. This makes it particularly relevant to an understanding of the difference between literacies required in traditional courses and the contemporary literacies required in a much less structure learning environment such as a MOOC.

These types of literacies can be combined into an overarching set of literacies that may be described under the heading of 'critical literacies'. These literacies encompass not only the skills related to comprehension and sense-making, but also the creative abilities that support criticism, construction and communication. And they go beyond this in addressing the dynamics of today's world. They include, at a minimum, the following: the ability to detect and define syntax, structure, patterns and similarities; the ability to identify and generate meaning, purpose and goal; the ability to sense and create context or environment; the ability to apply or use language, literacy and communication to accomplish tasks; the ability to support a conclusion, criticize an argument, offer an explanation or define a term; and an understanding of how to recognize, manage and create change. Or, in brief: syntax, semantics, context, use, cognition and change. (Downes, 2009)

These literacies may be necessary for success in a MOOC, but they are more widely applicable as well. The theory of knowledge underlying the creation of the cMOOC suggests that learning is not based on the idea of remembering content, nor even the acquisition of specific skills or dispositions, but rather, in engaging in experiences that support and aid in recognition of phenomena and possibilities in the world. When we reason using our brains, we are reasoning using complex neural nets that shape and reshape themselves the more we are exposed to different phenomena. Choice, chance, diversity and interactivity are what support learning in neural nets, not simple and static content. Cognitive dissonance is what creates learning experiences. To learn is to be able to learn for oneself, not to learn what one is told; it is to be able to work despite cognitive overload, not to remain vulnerable to it. So the cMOOC is harder, requiring a greater degree of literacy, but in developing these literacies, promotes a deeper learning experience.

Finally, an understanding of the literacies required also helps us understand the difference between traditional courses, including the xMOOC, and the less structured cMOOC. It also offers ground for criticism of the former. Traditional literacies are rooted in our comprehension of, and ability to work within, abstract symbol systems (and in particular, language and mathematics). It is no coincidence that PISA, for example, measures student performance in language, science and mathematics. These are be languages of learning, as well as the content of learning. But from the perspective of the cMOOC, these traditional literacies are inadequate. They form only a part of the learning environment, and not even the most interesting part, as we engage in environments that cannot be described through timeless abstractions or static facts and figures. But this is exactly what we face when we attempt to extend our learning from the eternal present and into the vanishing past or future. We need to learn to engage with, interact with, and recognize form and change in the environment for ourselves, rather than attempt a static and distanced description.

Learning in a MOOC and literacy in a MOOC become synonymous. We are not acquiring content or using language and literacy, we are becoming literate, becoming MOOC. Each bit of experience, each frustrated facing of a new chaos, changes you, shapes you. Participating in a MOOC is like walking through a forest, trying to see where animals have walked in the past, trying to determine whether that flash of orange is a tiger. There are no easy successes, and often no sense of flow. But you feel the flush of success every time you recognize a form you defined, achieve a skill you needed, and gradually you become a skilled inhabitant of the forest, or of 21st century human society.

These literacies form the design architecture for a learning technology that supports personal agency in a learning community. They form the basis of the a personal learning architecture being developed in the National Research Council's Learning and Performance Support Systems program. This program was developed and approved to address the issue of skills shortages in technical and professional industries in Canada. It is an issue that costs Canadian industry billions of dollars a year while thousands of Canadians remain unemployed. Our solution is to provide each person with a single point of access to all their skills development and training needs, individualizing their learning path, providing learning support, and supporting learning tailored to industry needs and individual performance support.

This program builds on the National Research Council's deep connection to the e-learning industry, including collaboration and commercialization across the sector. The program draws on NRC's research in other fields, such as machine learning and analytics. And NRC is free to take risks on technology that might daunt commercial providers. NRC's track record in this sector includes the leadership role it played in the eduSource network of learning object repositories, the Sifter/Filter content recommender later commercialized as Racofi, sentiment analysis in learning, the Synergic3 collaborative workflow system, and more.

NRC's Learning and Performance Support Systems program touches on all parts of Canada's learning technology, but has the most direct impact on the learning management system (LMS) sector. This is an area that includes content management systems, talent management systems, and the LMS. It also impacts content developers and e-learning distributors, including MOOC distributors and educational institutions. It also impacts end users themselves: not only students and individual learners, but also their employers.

In recent years NRC has become widely known for developing and refining the Massive Open Online Course (MOOC), including the creation of the technology behind the original Connectivism and Connected Knowledge (CCK08) MOOC offered in 2008, creating a dynamic connected application to support learning. The MOOC combined several themes which were in themselves becoming increasingly important: the idea of massively multi-user environments, the idea of using open and distributed content, the idea of fully online delivery, and the packaging of these as an online course.

The NRC-designed MOOC differs significantly from traditional courses. The most obvious difference is that the course is not located on a single platform, but is instead a web created by linking multiple sites together. The architecture of this web is intended to optimize four design principles: each member of the web operates autonomously, the web links diverse services and resources together, the web is open and supports open engagement, and the web encourages cooperative learning. Engagement is at the core of cMOOC learning. Participants aggregate resources from multiple sources, remix these in various ways, adapt and repurpose them to their own needs, and then share them. If we look at the structure of the course from this perspective, we see a network of individual learners interacting with each other and exchanging, and working with, diverse resources obtained from a variety of internet sources.

Looked at more deeply we can describe specific support requirements for each student. A student creates a resource, and makes this available to the course where it is accessed by a second student, who via this resource finds a third student's resources. From the course provider perspective, students contribute content metadata and the learning provider may create additional content, all of which is accessed and shared by course participants, who may also attend live online events or access event recordings. From the student's perspective, by contrast, the view is to a set of other students or course instructors, and via interactions with these course participants, to a wide range of resources and services across the wider internet, everything from blog posts to YouTube videos.

To support a student's involvement, therefore, technology design is based on the idea of putting at the centre of a learning network, connecting via a single environment to other participants, course resources, and myriad online services. This in turn suggests a simplified design that supports this student-centered approach with connections to learning support applications, and in particular, to resource repositories, to external cloud media storage, to learning applications and APIs, and to external graph-based analytics. These components form the core of the Learning and Performance Support Systems (LPSS) technology development proposal, which incorporates these connective elements with a personal learning record to support lifetime management of credentials, training records, and learning activities, and a personal learning assistant to manage the system.

The NRC LPSS program is a 5-year \$20 million effort designed to develop these core technologies and bind them with a common platform. The program applies this technology through a series of implementation projects with commercial and technical partners, including other NRC and Government of Canada (GoC) branches. These projects are managed through a program organization that maps the technology effort to client demands and the employment outcomes described at the beginning of this paper. Program deliverables include not only the technology development, which will be implemented in corporate, institutional and government environments, but also a series of publications and white papers describing the LPSS learning network, how and why it works, and how to connect to it.

Also LPSS can be viewed as a stand-alone system, it is designed in a distributed and modular fashion in order to enable it to be inserted, for example, directly into work environments and corporate contexts, directly addressing human resources and training requirements. This interoperability is achieved through the personal learning assistant (PLA). Like an LMS, the PLA displays learning resources and plays interoperable learning technology (using standards such as ADL's SCORM or IMS's LTI). But it also the leading edge to much more. As mentioned above, the LPSS program is developing five core technologies, linked by the Common Framework (CF). These are the aforementioned PLA, the Resource Repository Network (RRN), Personal Cloud (PC), Competency Development and Recognition Algorithms (ACDR), and the Personal Learning Record (PLR).

Let us examine these in more detail. The first of these is the Resource Repository Network (RRN), needed to provide connectivity with external resources. This package of applications enables a user to manage and discover lists of sources and resources. In a sense, it functions like the syndicated content (RSS) readers of old, but is designed to access and manage many different forms of content, including calendar information and modern Javascript-based (JSON) descriptions of courses and programs.

A second aspect of LPSS is the Personal Cloud (PC) set of applications. These applications manage personal cloud storage services. Some of these are familiar, such as Dropbox and Google Drive, and some of these are innovative, such as personal home-hosted cloud storage using OwnCloud. But more is involved than merely storing data; resources must be secured, backed up, authenticated and synchronized. This enables LPSS to support genuine data portability, and eliminate reliance on a single provider.

As mentioned above, interoperability is achieved through the Personal Learning Assistant (PLA). In addition to displaying learning resources and running e-learning applications, the PLA is designed to 'project' LPSS capacities into multiple platforms. These include not only desktop and mobile devices, but productivity applications such as Word and PowerPoint, interactive environments such as conferencing systems and synchronous communications platforms, simulations and games, as well as tools and devices. The PLA exchanges information with these environment, enabling them to interact intelligently with the user. One example of this kind of integration is LPSS's integration with another NRC product called 2Sim, which provides virtual haptic training simulations in medical environments. By exchanging activity data (using the Experience API, or xAPI data exchange format) LPSS supports a continuous learning path using these systems.

This points to an additional set of services that can be integrated into a distributed learning application, Automated Competency Development and Recognition (ACDR). This is a set of intelligent algorithms designed to import or create competency definitions matching employment positions, to support the development of learning plans based on these competencies, to provide resource and service recommendations, and to tackle the seriously challenging task of assessing

performance based on system and network interactions. It is worth noting that while LMSs and xMOOCs tout learning analytics, only a distributed personal learning network application can apply analytics using a person's complete learning and development profile, and not only the specific LMS or cMOOC.

This functionality is enabled by the Personal Learning Record (PLR), which collects learning records and credentials obtained through a lifetime and stores them in a secure locker owned by the individual and shared only with explicit permission. The PLR collects three major forms of records: learning activity and interactivity records, such as xAPI records; a person's personal portfolio of learning artifacts and evidence; and the person's full set of credentials and certifications, these verified by the issuer.

It should be noted that LPSS recognizes, and is designed to cooperate with, existing personal learning environment and personal learning records, including Europe's Responsive Open Learning Environments (ROLE) project and start-ups such as Known, Learning Locker and Mahara. Additionally, LPSS is designed to work with MOOC providers - not only NRC's gRSShopper but also Coursera and EdX. We've integrated badges in a Moodle and Mahara environment for the Privy Council Office, we're doing xAPI application profile development, and are engaged in collaborative workplace training and development. These implementation projects (as we call them) reinforce LPSS's mandate to be more than just a theoretical exercise, but to apply the technology in authentic environments, supporting individuals in a learning network and feeding this experience back into product improvement.

It may be suggested that there are any number of companies engaged in aspects of learning analytics, personal learning records, learning technologies integration, and the like. But the LPSS approach is different - by creating many small things linked together instead of one large centralized application, many tasks that were formally simple - like data storage, content distribution, authentication and analytics - become that much more difficult. Take analytics, for example - how do you do big data analysis across thousands of separate systems each with its own unique data structure? These are the hard problems NRC is trying to solve.

LPSS launched in an initial pre-alpha version October 1, 2014. Invitations may be obtained by going to <http://lpss.me> and filling in the short form. Users will also be asked whether they would like to participate in LPSS development research (this is not required and all personal research is subject to strict Government of Canada research ethics protocols). Functionality in this early system is limited; the first release focused on content aggregation, competency import and definition, and simple recommendation.

The next release will feature the 'connectivist' social interaction architecture being designed through an implementation project with the Industrial Research Assistanceship program (IRAP) supporting small and medium sized enterprise. The roadmap projects two other major releases, at

6-month intervals, coupled with ongoing client-specific and industry-specific learning solutions. Technology will be transferred to partner companies beginning in 2017.

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*Portions of this paper appeared as a blog post, [Becoming MOOC](http://halfanhour.blogspot.com), February 11, 2015 (<http://halfanhour.blogspot.com>) and portions were presented as a keynote address, *Design Elements in a Personal Learning Environment*, March 04, 2015, delivered to 4th International Conference e-Learning and Distance Education, Riyadh, Saudi Arabia. (<http://www.downes.ca/presentation/356>)*

A Lexicon of Sustainability

This is a summary of a talk at the Hewlett Grantees' Meeting, San Francisco, March 25, 2015. Errors (and typos, etc) are my own.

Douglas Gayeton

Lexicon of Sustainability³⁷⁶

<http://lexiconofsustainability.com>

Our food system is opaque. We asked people to develop a lexicon around food sources.

We started with the word 'sustainability'. That is one of the most opaque words. I asked a native hunter - he said he watches what the animals eat; they always leave something behind. I asked a farmer; she said it was about survival. I asked Miguel, who started growing organic food because it was too expensive.

How to tell these stories? Photography is great, but it only captures one image at a time, one moment in time. I looked at a place where he grows fish in boxes, the waste is used to grow tomatoes, and he also grows worms. How do you tell that story in one photo? You can't - I made a composite after taking thousands of photos.

What if I had him tell me what the word 'vermiculture' means? You can combine the words with the picture and tell a good story.

So we went around the United States and created a lexicon of sustainability. We created a book - the focus groups came back: "Nobody knows what 'lexicon' means."

The power of graphical ideas: thought bombs. Photo composites with words all over them. By making things graphical and textual at the same time you engage people's left brain and right brain at the same time. You create a deconstructive narrative. Thing Sherlock Holmes: "all the answers were in this room. We just had to piece them together in the proper order." From a passive learning experience to an active learning experience.

Knowing words - learning what they mean - can change the way entire industries work. A loaf of bread - a list of ingredients - most of them did not exist 20 years ago. The Bible used to be written in Latin only - that is what an opaque religion looks like. But what if we published the book in the language that we speak?

Eg. rBST is the name of a growth hormone fed to cows. A farmer sold milk without rBST - he was sued by Monsanto (they eventually lost). Or consider - what is the "cage free egg"? What

³⁷⁶ <http://lexiconofsustainability.com/>

does it mean? I asked the producer what it means. Pasture raised. But nobody knows what that means.

What is the real cost of cheap food? People growing food according to values are competing against an industrial system that has externalized all its costs. The concept of 'true cost accounting' looks at how much something really costs. Consider a river - it provides free energy, and can be used to dispose of waste. We always pay when we get things cheap.

The best example when we look at food is the 'cow to pickup truck index' - the value of a grass-fed cow compared to a truck. How can these compete against an industrial system? Convincing people of the value of voting with their dollars. There's this idea of organics and eating locally.

There's a movement to have producers say whether food contains GMO organisms. It would force food producers to be transparent. It is opposed by Monsanto and others who benefit from an opaque system. GMOs aren't always bad - eg., a variant of papaya that was resistant to a disease, which was in danger of being wiped out in Hawaii. People talk about GMOs as privatizing seeds, etc - but that didn't happen here; he open-sourced the seeds.

Or another term - 'antibiotic free' - 80% of the antibiotics are fed to livestock, and they're not even sick, because they gain weight quickly. So there's going to be a movement to label antibiotics in meat.

In fisheries, the term 'red snapper' doesn't mean you're getting red snapper. There's always the pressure to give you fish close enough to what you always get (so fish are predictable like tomatoes). There's an initiative to tag a fish so you know where and how it was sourced.

The concept of 'identity preserved' gives us a sense of where the food that is grown goes - for example, wheat grown in California that is shipped to Italy to become pasta.

Before the second world war we spent 30% of our money on food. But after the war we applied economies of scale to everything. Everything was centralized. Everything was based simply on price. How do you reverse that? It's a big challenge.

There's a town called Greensboro that died. They went and asked an old man what happened, he didn't know, but he said they used to be able to get a pie of pie in a pie shop. They re-opened the pie shop, and the town began to grow again. You can't have commerce without food. People are beginning to apply the principle of 'terroir' - the idea that everything has a place - to the food industry (in the shellfish industry it's 'aguair').

'Community Supported Agriculture' (CSA) - is where they get a box of food every week that is locally sourced. They are being more connected to their food, who grows it, where it's grown. Or a pie shop in San Francisco set up a CSAA for fish. This used to be commonplace. In Italy they knew to never buy fish on a Monday - wait until Tuesday when it's fresh. This is an example of people being connected to their food.

A regional food hub - people are rebuilding what was dismantled when the industrial food system came in. People in the community selling for many producers. Producers pooling transportation costs cooperatively.

There is the concept of a 'food desert' where there was no food in a 6-square mile range. I went to a local supermarket - no food - just candy, chips, alcohol, etc. Consumers don't know they have other choices. There's a new 'corner store' movement - inserting places to buy local food in these corner stores.

It's a system that is made by people. The average age of a farmer is 57. People are scrambling to educate young farmers. The concept is 'green collar' - they give people land and training, for a period of time (then you have to find your own land). It's a 'farm incubator'.

And there's a 'kitchen incubator'. Setting up people with kitchens, business training, etc. - that's how you reinvent local food systems. Systems that are based on value.

So - what's the verdict? I'm not pessimistic when I see seed swaps. Upswapping, to convert land to farmland. We took this to Mexico - in Mexico 'organic' didn't mean anything. Every Mexican, though, knows the meaning of GMOs - because corn in their national food. We learned, we need to speak to people in their own language.

We do projects based on portability - PDFs you can distribute. We do puppet shows. We do food conferences. We help with street events. You can go to our website, you can download our resources. We have a website, launching next month, the 'lexicon of food'. All resources open sourced and free. Showing what people farms. Doing projects teaching people about aquaponics. We do 'market makeovers'. We have kids in Mexico making images to explain their food system.

It's very powerful because it's made by people. It's people-sourced.

What will be your 'Road to Damascus' moment?

Q: what about school lunches?

A. People are confronting that problem. Politicians won't spend more money on school lunches until they see the value in it. Right now that's opaque.

Q. I don't know a lot about food, but what I do know about is beer. What I've seen taking over Virginia is craft breweries, where people grow their own hops, etc. People are willing to pay \$9-\$9 per glass.

A. They say people always centralize industries but that's not true. Another example is the music industry.

Q. Often discussion of open education is overly cerebral. But food today is your #1 cool thing. You can convince people with photos with food, but in education it's harder.

A. Our project is not about food, it's about climate change. People don't identify with climate change. But you take all the ideas that contribute to climate change as clear as possible, so you can't mistake the message overall. The idea of the taxonomy is to pinpoint all the individual ideas of a thing and make them clear.

Q. We are using terms in education that people believe they already know and we are using them in different ways. How did you grab people and help explain the complexities.

A. First we make everything as conversational and without jargon as possible. And second, we say we are not out to make the definitive lexicon of things. Words are shifting and changing. It's our biggest problem with Wikipedia - it doesn't have enough context to show all the contexts a term can be used in.

Q. Terms - like taxonomy - can acquire baggage over the years. Eg. GMOs - we read all our foods are genetically modified over time. You see that in education all the time - all the different terms for 21st century skills.

A. We did a show; they kept asking for a list of all the images and we set them. It was only at the last minute we set up the GMO image of papayas. They said "what are you thinking?" There was a lot of opposition. All of these terms should elicit the fact that it's not a fixed idea, it's a dynamic idea.

*Sausalito, United States
March 25, 2015*

OER Business Models: A Debate

This is a summary of a debate including four participants, listed below, at OER2014. Errors and omissions are still my own.

Your Mission

What is your mission in OER and what is your business model?

David Harris – OpenStax

It's really about access, providing access to the highest quality OERs possible. A whole suite of products beyond the textbook. We've created an ecosystem around learning materials. This ecosystem is the core of our business. Eg. we might partner with John Wiley & Sons. We work with multiple partners to provide more options and choice for our partners.

Lisa Petrides – IKSME

Our mission is about maximizing all of these open access tools that enable breakthroughs in teaching and learning. We build tools, develop capacity, support the OER Commons library, etc. There are two main components to the business model: first, the R&D side, and second, the service department, that offers services around the capacity-building piece, showing people how to organize and use their content. The core is, how does it impact the learner?

David Wiley – Lumen

Two-fold mission: save students money and improve student success. We have a particular focus on at-risk students, so especially the community college. The business model is based on helping faculty make the transition from commercial to open textbooks. Any course that we provide support for we charge a per-enrollment fee. All the content is CC-licensed content, and the platform is open source as well.

Gary Lopez - MITE / Ed-Ready

Our mission is to improve access to everyone. The goal of the introv project is to make sure online K-12 content is available to every person at no cost. The business model supports business and mission goals. In addition to the content, there is a membership component, which supports both goals.

Reactions: To Gary: if you're not a member of the community, what are your rights of access?

Gary: if you're an individual you have full rights to use and re-use. We focus on institutions - if you're an institution, we ask that you join our membership.

What does it mean to be sustainable?

Lisa - ISKME is a non-profit. It's very much of a Linux model - the content itself should forever be free and open. Access is always available. It's different from what Gary talked about - it means that any wrap-around services are going to be another type of service, eg., we might to an LTI or API integration, or a workflow process - some such thing. The key to being sustainable is to always ask, how do we keep that part (the core part) free?

Gary - there a fundamental difference between for-profits and non-profits in their goals. In for-profits the business goals are financials, and officers have a responsibility to achieving financial goals. Unless there's a special arrangements to make supporting OERs the goal, the financial responsibility always rises to the top. When a non-profit is set up, the mission is the goal.

David - sustainability is critical to us, especially if you are on the producing side of OER, and especially if you think it has to be a market-based solution, which means it has to be of high quality. I think it is irresponsible of a non-profit to assume you will be given philanthropy. As you move toward sustainability you get greater independence and greater opportunity to pursue strategies that support the mission. As a non-profit we don't have the overhead that for-profits need to generate, so we can produce at a lower cost.

David Wiley - what's my ongoing ability to continue to meet my goals? For Lumen it means being able to continue to partner with institutions and continue to drop the price to zero, and be able to look beyond the grant.

Reactions: Lisa - the two people beside me came from the publishing side. What was that like?

Gary: I didn't come from publishing; I was faculty. My company got purchased by Harcourt. You don't have a cost of money. You can go into markets more aggressively. Davis Harris: we started out pro-market, but then it became just about the shareholders, which I didn't like. To provide the greatest access, we have to think about marketplace solutions.

Lisa: let's look at this. What's been working in open food has been from the bottom-up. But we are still working from a top-down perspective (eg., responding to concerns raised by publishers).

David Wiley: we became for-profit to maximize our ability to succeed, eg., we can partner with institutions, and we can get more traditional investment as well, so we don't have to rely on grants. The quality issue Dave prings up is interesting; historically nobody talked about quality - it was always some proxy for quality. What's the only actual condition? Whether kids learn from it. So we don't get distracted by how glossy it is.

David Harris: you are misinterpreting what really counts as quality. Eg. there are review boards, etc.

Gary: we're gathering data, that data has to do with efficacy, whether people succeed. It was before that the issue of whether people were actually learning never came into the equation (with commercial publishers).

Lisa: so 'sustainability' in OERs is about learning.

Defining OER

How do you define OER, and why do you think your business is OER?

Gary: we don't think about the definition of OER. We're focused on our mission to provide access to quality education for everyone. Whether or not something falls within the definition is secondary.

David Harris: I don't think it matters what I think it is, that's defined by the license we use. We use the CC-by license, which is critically important, because it provides freedom to the end user. We use this to sell the concept to academics. They realize they can publish derivative versions, for example.

David Wiley: I'm on the other end of the scale; I obsess about it. There's a two-part - there has to be free and unfettered access to the resource; and I have to have free and perpetual ability to engage in the 5R activities. As a matter of contract, any school we work with, the license says the work we produce has to be OER.

Lisa: how we define OER is that it isn't a thing, it is a practice; it includes content and curation and quality and rigor and standards and change in teaching practice. When we say we are in the business of OERs it is about free and open access to the world's knowledge. It's in the last few years we've really understood our role as a public library; we're not serving an institution. The other thing about OER Commons is we aggregate all of the licenses into four buckets.

David Harris: we have to be careful as a community because over the next 12-18 months we will see more and more 'openwashing' by major publishers, because OER is establishing a brand identity. And questions about who should be producing it?

Gary: anyone who want to. Who shouldn't?

David Wiley: to Lisa, if the category becomes so broad, it's difficult to know what we're talking about. Eg. open pedagogy is different from OER.

Lisa: our open speaker used the work 'ecosystem'. You can't just have the seed: you need the market, and the water. It has to be inclusive of the whole piece. Otherwise you have something disjointed and not sustainable. Eg. if you have content and nobody uses it, how is it that we have OER? It can't just be about this thing.

David Wiley: but each of the parts of the ecosystem has a name, the ecosystem is 'open education'.

Gary: but it does show that just creating them and putting them out there has no value. You have to maintain them, have version control, etc. That's hard.

Q3. What does it mean to say we're giving the seeds away for free, but not the water, etc?

Lisa: well that's why we say it's a whole ecosystem. As opposed to the strategy of building this part, then that part, etc. If you build the whole thing at once, that's sustainable.

David Harris: yes, but we think we don't have to build the whole ecosystem ourselves. If you are going to build the whole system, you can't have everything free, all the time. You are going to need revenue.

Gary: lets get back to access and equity. Free access doesn't mean anything if you don't get back to the mission, which is to help people succeed. So there need to be measures you can measure to show that you can attain that. We should all be thinking about the mission. We don't have to build it all ourselves. We're all working in different ways, but united in purpose.

David Wiley: it's like the whole approach to OERs in the early days was like we set up a table with seeds, and said, here are free seeds, we've solved world hunger. Then we argued a lot about what the boxes look like, And we're learning we have to add more support.

David Harris: but we're also learned that equity doesn't mean it always has to be free.

Gary: books are expensive because they're expensive to create. That's not free, and we have to find ways to pay for it, to bring the price down but not scrimp on the value we create.

David Wiley: it would be interesting to see what are all the steps involved in producing high quality materials. It would be interesting what happens when we pull out some of the steps and see whether there is a difference in equity.

David Harris: faculty would demand full evidence. That gets into scale. How many of those conversations could we have?

Gary: I think we can always come back to an economic argument to support it.

Lisa: I think we should have an equivalent of true cost accounting for this.

David Harris: I don't think it will be looking at the efficacy of learning systems. But learning systems are not inexpensive to develop.

What is the impact of an open license on a sustainable business model?

David Wiley: two different ways: open licenses completely enable everything we do, because the licenses create the infrastructure that supports everything we do. On the other hand, because we have this licensing requirement, then putting that license in a contract (and being willing to walk away when it's not there) helps us snowball the value we can provide every time we work with somebody.

Gary: David is spot on. But the impact is, any license will limit the range of business models that are possible. So a business model limited by an open license means not restricting usage of the system to people with buying power. And if usage is not so limited, then it opens up other models - by selling services, by selling secondary materials such as advertising, etc. You need to build the business model first, then craft the license.

Lisa: our business model depends on having teachers and institutions, etc., to actually work with on these projects. The license acts as a conduit to make this happen. Because without the license we wouldn't have the users. As nice as it is to have big government initiatives, the majority of people have actually created their own kind of license that meets their needs. That's why we've created this mapping into four buckets. One is a free-for-all, another is a remix-and-share, another is share, and another is read-the-fine-print.

David Harris: I agree, you need a common set of licenses so you have a common language. Gary's system would create a proliferation of licenses, you meet business needs, but not learning needs. People were concerned about CC-by licenses, because you lose control. But these concerns were misplaced. I have seen very little profiteering from it. And on the positive side we have 30 ecosystem partners. It may be called an open license, I call it an innovation license.

Gary: yes, there would be a lot of versions. But the question is, how it impacts sustainability. If there are limited numbers of license, there are limited ways to create sustainability. That's what we're doing. A lot of what we have is CC-by, but other stuff has a different license. This was never going to be a debate. Business models speak for themselves, they either work or they don't.

David Wiley: on license proliferation, even within Creative Commons, we have some Legos, we have some Duplos, we have some knockoffs that don't fit either. At the end of the day we have some questions about whether the different licenses actually fit. There's a finite amount of time and effort we can undertake to make them fit together.

David Harris: David is correct. If there were more standardization around a common license, there would be more activity, more remixing.

Gary: Let's get back to mission. If our mission is to help people learn, we can get stuck in a rut on this. There are many ways to help people.

How do you foresee your business models disrupting existing business models?

David Harris: we've disrupted the higher ed publishing industry in the following ways: from day one, all students have access to the learning materials; second, we have lowered costs even when open licenses are not used, because there is a ripple effect of lower costs; and third we are leveling the playing field of non-standard producers. We are breaking barriers down. Forth, OER can be blended now, because of OpenStax materials - people take small pieces and embed

them in online learning environments. We are supporters of open data; publishers were previously very closed with their data.

Lisa: aside from the cost, etc., the role of what you teach and how you teach is often determined in a top-down way, especially in K-12, but we are actually empowering teachers to take back control of the professionalism of their own practice; they leave and take the practices back to their classrooms and we get calls from boards saying "what's going on?" Also, in some ways as a field, we went to far too quickly to try to define what sustainability was.

David Wiley: i don't like to use the 'd' word. I don't think we're there yet. I think in some ways we're starting to be annoying to publishers. But I don't think we've broken open the market yet. Once we take a billion dollars out of the market then we'll be there. Where there has been some stuff going on is this intuition that 'you get what you pay for' - this is opening up some efficacy research conversations. I would cite John Hilton's work is more exhaustive on OERs than all the peer-reviewed work on the efficacy of person's work.

Gary: we actually may have crossed over this year, and disruption many have happened. Eg. math product - the system has been adopted by states like Montana, Utah, Hawaii, and more. And we've been adopted by hundreds of schools. So what does Ed-Ready disrupt? It eliminates texts, tuitions and time involved in math remediation. And the efficacy is bringing people from secondary to post-secondary at an unprecedented rate. And those who are using Ed-Ready are remixing it. In Montana there are some 400 versions of it. And we are really upsetting Pearson.

David Harris: it doesn't take 30-40% market share to impact publishers. 10% works.

Gary: that depends on the market. It is true in the book market, but not the assessment market.

David Wiley: one strategy we've had is not to go after individual courses, but to go after entire degree programs. When you can flip the entire degree program, now as a student I can actually budget for it. We've now pulled a third of the cost out of a degree program.

Gary: what we're seeing is not only are we displaying high-stakes texts, we're creating pathways. We find ourselves being adopted by a college, and then being adapted by their feeder systems. The uptake by feeders systems has been breathtaking.

Lisa: I love and applaud these efforts, eg., the high stakes test alternatives. But what does it mean to have the market. We're still doing education pretty much the way we were. It still costs money. I'm still looking to see what's possible in this market. What does it look like to have the corner store? What does it look like to have the seed exchange? We need a way to see what it could look like the other way.

Gary: we're beginning to see this. We're beginning to see what it looks like when people build things that meet their own needs. We're not just seeing people build more stuff. We're seeing

people build stuff that works better. Eg. to support personal learning. We're coming up against some of the real tenets of public education which is not working.

Closing Statements

Gary: I'm delighted we're analyzing and re-examining our mission. Also, though, we should be looking at how to rebuild the connectedness in the community. Perhaps that's because it seems like we're competing with each other. But we don't see that this is so; we're competing with Pearson and the commercial publishers. So I hope this will be the start of a clear commitment to OER and to one another.

Lisa: On one hand we're not competing in a traditional way, but at the same time I think some of our ideas and how we're going about them might be in conflict with others, but that's still OK, but we suffer from the milquetoast that we're all one big happy family - let's have more disagreement. Some people say "don't put a crack in what we're doing" but I think we should be innovative, have arguments - competition does push us forward.

David Harris. First, please recommend OpenStax to others. Now, there was a Gates report - there is great opportunity for OERs. But our market size is 3-4%. So we are an irritant. There is a debate of whether we focus on supply or demand. But of course we need to do both. Yes we need supply. But just building it is not enough. We need to build the tools. The goal is to get to 10% of the market - if we do, we can win the market. If we work together we can do it.

David Wiley. So, amen and hallelujah to everything else that has been said. Don't make seeds and put them on the table. Pick a problem and go try to solve that problem. Pick developmental math and go try to solve that problem. Pick something concrete and go fix it. If it's concrete enough you'll know that you've fixed it. Everyone on this panel - we've picked a problem. Who is feeling pain, how can we fix this pain, then we went and solved it.

Closing points:

- over the next year or so, there will be ways to continue this conversation - eg. Creative Commons business model project (Lumen learning - <http://bit.ly/lumencanvas>³⁷⁷)
- we don't all have to agree on things, it's good to have polite disagreements (Oscar Wilde - "friends stab you in the front")
- applause please

Sausalito, United States

³⁷⁷ <http://bit.ly/lumencanvas>

The Power of Reuse: Wikipedia in Action

Summary of a panel at the Hewlett Grantees' Conference. Errors are again my own.

Pete Forsyth, Wiki Strategies

(See also his blog post with resources for this panel at <http://wikistrategies.net/oer-wikipedia-getting-started/>³⁷⁸)

In the past we've been saying that it's important to the field of OER to improve content. But really, it's about teaching and learning. So what is it about Wikipedia that is an opportunity for learning?

Jeanette Lee, the Cambridge School of Weston

We are integrating technology in the classroom, and students are always asking whether they can use Wikipedia. We have a handout we created on how to use Wikipedia. One of the students wanted to use the message box from an article, and we had a conversation about how to use it. So, students are using Wikipedia and the question is how to integrate it.

Amin Azzam, UCSF

The peer review process has sort of a stranglehold on academic advancement, but they were interested in partnering with Wikipedia such that if an author updated an article it might be counted as a publication. The meeting on this was just yesterday.

The medical students all go to Wikipedia first when they go o look something up, because it's written in a way they can understand, and then they go to a more reliable source. So then someone suggested that students could contribute to Wikipedia.

Dan Cook, Wiki Strategies

I'm a voracious consumer of Wikipedia. My work is both as a journalist and as a consultant. This week for example there was the experience of going from an article being marked for deletion to the potential removal of the banner altogether. I have these experiences pretty much on a daily basis.

I was part of the 'new journalism' when it was coined in the 80s. Secret sources and fights with the editors and all that. But now Wikipedia is the new journalism of today; leave your ego at the

³⁷⁸ <http://wikistrategies.net/oer-wikipedia-getting-started/>

door, don't use any modifiers, we don't want any spin. But it's a hard place for traditional journalists to work; we have to unlearn everything we learned about journalism.

Jeanette

I compare Wikipedia articles to an expository essay, which students have to learn. So getting them to understand that Wikipedia articles have structure, they have references, etc. So the idea is making the use of Wikipedia in academia transparent. People are using it, they're just using it quietly. It was about how to get a language to move between Wikipedia articles and the more traditional essay.

A funny statistic from Pew, from February: 90 percent of AP and National Writing teachers find information online for their classes; 90 percent use Google, 87% use Wikipedia, but they discourage their students from using it. So there is this contradiction. So we need to get out in front and deal with this contradiction. We need a PR campaign or something, so people know it is legitimate to use in their classrooms.

Amin: Yes, 87-93% of medical students admits to using it.

Dan: If you could just get them to take the next step and look at their sources!

Jeanette: yes, that's what we want them to do, it's a great skill to develop.

Amin: there's roughly 26K articles in the medical field, but a lot of them have room for improvement. One thing with my students is they're in the final year of med school, so they can contribute, but they haven't lost the ability to speak English yet.

Pete: the articles I contributed to most were on topics I was learning about. Also, Amin mentioned 'English Wikipedia'. This points to a way where Wikipedia and OER have a lot of aspirations in common. (Reads from letter mourning the death of Babu Gi, from Kerala, and commemorating his contributions).

Amin: discusses the translation of medical articles into other languages. Wikipedia has an initiative called 'Data Zero' to give access to Wikipedia content for free. To me this is a no-brainer. (See http://en.wikipedia.org/wiki/Wikipedia_Zero³⁷⁹)

Jeanette: opportunities for OER to learn from Wikipedia - I don't have students contribute to Wikipedia, but I do have students use materials from Wikipedia and OER Commons - I do hand over a lot of content to students, and then they create the content that everyone uses. I give them the option: either I lecture, or you do this project. Usually they choose the project. And they know that everybody will be using the material for understanding the text. I view Wikipedia as

³⁷⁹ https://en.wikipedia.org/wiki/Wikipedia_Zero

part of the OER community, and it's a way for them to use Wikipedia even if they can't contribute (they're just high school students, I would have too many permissions I have to fill out).

Amin: there's a source of med information by students for students called 'Up To Date', it's called 'crack for medical students', but it's subscription, and they don't realize how much the school has to pay.

Pete: where do students become ready to contribute to Wikipedia?

Jeanette: I think definitely there are high school students ready for that.

Amin: it's a question of what fraction of school work is contributing. For example in my class they have peer review. They need this support.

Jeanette: some projects are individual and some are group. Anything that's a presentation for the class, they grade it, I don't grade it.

Pete: I see this as a new journalism and I would like to see training begin in the classroom, so they don't get the bad habits I got. When will students work on Wikipedia?

Jeanette: there are concerns about privacy, that's the barrier. I do think it would be a hard sell for some districts. Showing districts how they can use Wikipedia would be much easier.

Amin: my students had to create user names, so we could track their contribution. They began with non-descriptive user names, but eventually made it clear they were future doctors.

Pete: there is this culture of anonymity in Wikipedia. It's a major part of the ethos. But then there's the potential for conflict of interest; we don't want the chief of Enron writing the article.

Dan: why did reporters have bylines? So they could be held accountable. Journalists especially need to have user names that are transparent and they should describe themselves in a transparent way. There needs to be a high level there. When I search to see if an article is credible, I don't like seeing that the author is anonymous. Wikipedians will have to grapple with this.

Amin: the concept of anonymity almost doesn't exist any more. They have their Facebook pages, they scrub them clean before going into med school.

Dan: I think it's people in my generation, they don't want to give up their social security numbers, etc.

Jeanette: developing people who are comfortable as Wikipedia users, as they go into college, they're used to working in that kind of environment.

Amin: my future students will be already equipped knowing how to be contributors.

Q: there are now things where you can remix in the OER space; but in schools there is this top-down ethic about who is eligible to do that (it has to be curriculum specialists, etc).

Amin: I consider the medical librarian an equal partner in the course, and the Wikipedia contributors to be equal partners. There's no way for any of us to be experts in everything. It takes a village.

Pete: Wikipedia and OER are characterized by people coming together in ways that were never anticipated, and saying to previous generations, we're not waiting around for you any more. We want to address content gaps. Etc. The sort of thing that doesn't work well in that crowd-sourced way. Eg. the small number of contributions by women.

Q. Pete said to me, the first thing they do after you tell them about OER, they go to Google and search for it, and find the article on Wikipedia. Do you care about what they're reading? Do you feel this is your responsibility? What ought we be doing in this community?

Pete: it's not an easy process, it doesn't have easy boundaries, you have to decide what's important for yourself, and you have to think about how much you can get in, how to work with other people.

Amin: Wikipedia is not a democracy, it's a do-ocracy.

Q: it seems to be impermanent, in the beginning, anything we thought was of value was not surviving. But the value is where you should be participating. It does compel participation. We made a lot of mistakes, but most of our articles are surviving now; it's about participating in the community. Our students talk about 'surviving the Wikipedia process'. But that's the strength of Wikipedia.

Pete: we see this dynamic a lot. People contribute an article and it's highly imperfect, just what was in the newspaper. And then a few years later an expert comes along, and says there's all these errors. And I say to them, "when were you going to do this?" When would you write the article, without having seen all the errors.

Dan: I tell people, "go to the talk pages". That's where you can see the process at work.

Q: does it make sense to have a Wikimedian-in-residence in OER?

Amin: Brilliant idea.

Jeanette: I totally agree with that. And Wikipedia has done a good job partnering with universities. Such a person could encourage partnering with districts.

Q: question was more whether it would conflict with the Wiki education foundation?

Pete: no it would not at all. I know most of those people, I think there would be delight.

Sausalito, United States
March 26, 2015

My Viva

Patrick Dunleavy offers [this list](#)³⁸⁰ of ten typical questions that might be asked on your PhD oral exam. I always felt I would have aced my oral exam, but I never got to take it because my examiners [did not want](#)³⁸¹ me to work on network theory.

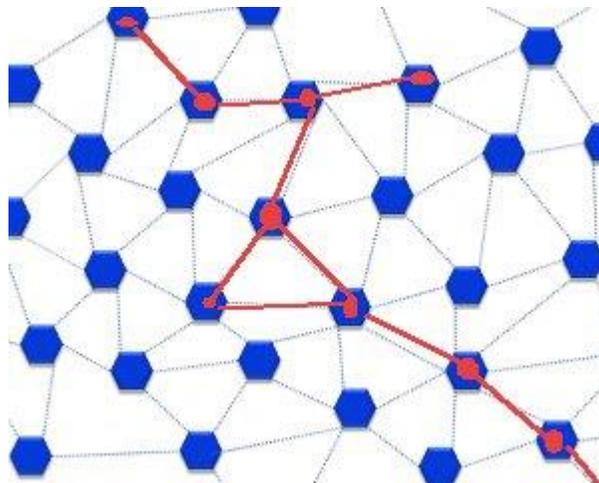
So how *would* I have answered these questions? Dunleavy's post begs a response...

1. What are the most original (or value-added) parts of your thesis?

The semantics of distributed cognition.

In distributed cognition, there is no single location in memory where we might find an idea or concept. Rather, it is *distributed* across a set of connections between entities (a graph theorist might say it is constituted of a set of edges between nodes).

Like this:



We can say a few things about these distributed representations that are significant:

- They are not *representations* at all - that is, they do not 'stand for' things or 'signify' things. This set of connections, for example, does not stand for the concept 'couch' nor the word 'couch'.

³⁸⁰ <https://medium.com/advice-and-help-in-authoring-a-phd-or-non-fiction/top-ten-questions-for-the-phd-oral-exam-c3687cc75962>

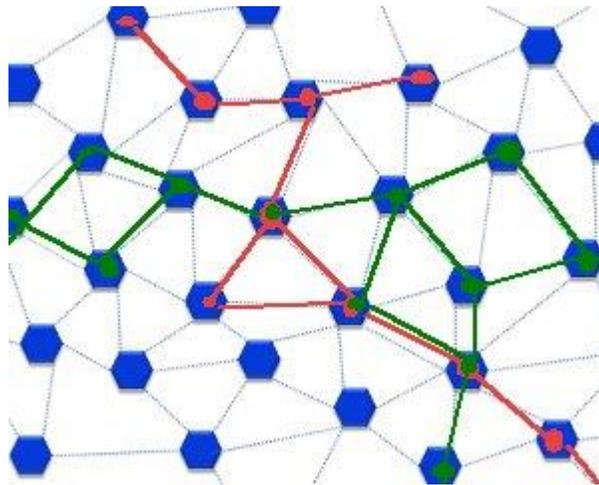
³⁸¹ <http://halfanhour.blogspot.ca/2009/03/tnp-20-years-on.html>

- They are not *propositional* - that is, they are not encoded in the form of a sentence, and we do not 'think' in words and sentences (there is therefore no 'encoding' that takes place when we communicate or perceive the world around us).
- They are *different* for each person. No two activation networks are alike. Indeed, they are even different in the same person over time. There is no static constant that instantiates the concept 'couch' at all.

The best way to think of the web of connections is to think of it as being like the ripples that spread out when you throw a stone into a pond. The initial stimulus causes a cascade of interactions and water molecules bump against each other, a spreading wave of activation that follows the path of least resistance. The waves do not 'represent' anything, they are not 'about' the stone, and indeed, you cannot infer to the existence of the stone merely from the presence of the waves (although Kantian metaphysics is based on exactly that sort of inference).

To make life more complex, we only have one set of interconnected entities and connections between them, and exactly the same set of connections contains multiple concepts or ideas. So in addition to our thought of a couch (symbolized in red) we might have a thought of a dog (symbolized in green).

Like this:



Again, these activations do not stand for anything; they are simply characteristic patterns of spreading activation that occur in the presence of a stimulus. It is typical for the green activations to overlap the red activations. This means that, in certain circumstances, the activation of 'dog' might, by association, cause the activation of 'couch', depending on the overlap of these and other associated concepts.

This is the basis for inferences. As Hume would say, "the far greatest part of our reasonings with all our actions and passions, can be derived from nothing but custom and habit." Our inferences from one thing to another, from cause to effect, from premise to conclusion, are based in

repeated iterations of an *associative* logic, which is based on the mechanics of spreading activation.

There are different ways to talk about this. One way is to describe it *mathematically*, through the principles of network interactions and learning theories. Each individual entity has its own activation function, which determines how likely it is to be activated by incoming stimuli; each connection has its own weight, which determines how much signal it carries forward, and the creation and destruction of connections in a network, its *plasticity*, is determined by the learning theory, which derives these new connections from weights and activation functions.

Another way to talk about it (and the way I talk about it in my dissertation proposal) is to talk about it *conceptually*, by describing the *relevant similarity* between one concept and another. We might think of this as the degree of overlap between one concept and the next - a very loose statement of the idea would say that 'dog' and 'couch' have a similarity ranking of '3', based on the overlap depicted in the diagram.

It is this network semantics based on similarity that is probably my most significant contribution to the field. It follows the work of people like Amos Tversky in presenting a *feature-based* account of similarity, but analyzes this in terms of spreading activation in neural networks.

2. Which propositions or findings would you say are distinctively your own?

None.

If you take the theory I've just outlined above seriously, you see that it would be inconsistent for me to say that everything is connected, and then for me to say that some proposition or finding is distinctively my own.

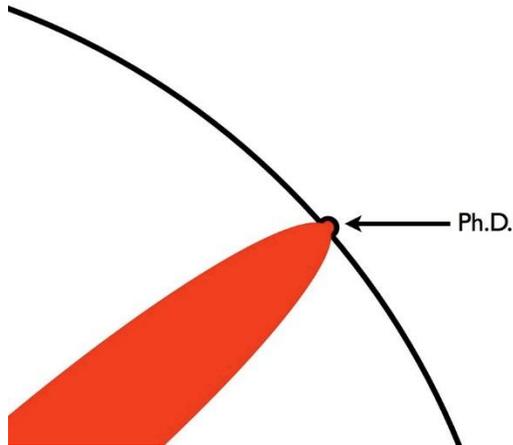
Indeed, I struggle with the idea that my thesis is based in *propositions* at all. This supposes an idea of a theory or model that is composed of a set of related propositions which are either all consistently and coherently maintained by some logical framework or all derived from a set of observations or measurements on the bases of some sort of inference calculus. And I doubt that either is the case.

At *best* what I offer is a perspective, a point of view, a set of outcomes as presented from the perspective of *this* entity given the experiences and observations obtained over a lifetime. But these are all influenced to a significant degree by interactions and communications with others.

My understanding of the word 'Paris', for example, carries with it the influence of every other occurrence of the word 'Paris' I have experienced in my lifetime. It can 'mean' nothing else. Indeed, if I were to say that the meaning of the word 'Paris' were uniquely my own, there would be significant cause for concern, for either I would be asserting some sort of supernatural

connection to Truth and Objects, or I would be asserting some sort of egotitocal priority of my own perspective above that of all others,

There is this totally false [depiction of the PhD thesis](#)³⁸², which is this:



which supposes that the individual researcher forges beyond the rest of knowledge on his or her own. But that's not how it works. We do all of our work *entirely within* the range of what might be called 'existing knowledge'. And when existing knowledge grows or changes, it does so *on its own* and not by virtue of one unique entity.

3. How do you think your work takes forward or develops the literature in this field?

Honestly, this question is just the same as the previous question, except that it refers to the localization of those propositions or findings.

The presumption in the question is that my new research *builds on* or *extends* previous research. It is a perspective or point of view that depicts knowledge as a mountain of propositions or facts, and it suggests that our PhD work is intended to extent that mountain (in an appropriately inferential of evidence-based way).

In my own case, if I had to characterize my contribution, it would be like this: same mountain, different view.

As I said in my answer to the previous question, there is nothing uniquely my own that has been added to human knowledge; I am working withing the same world, the same linguistic framework, the same logic and mathematics, the same sets of properties and qualities, as everyone else.

³⁸² <http://matt.might.net/articles/phd-school-in-pictures/>

My contribution, if we must identify one, is that I *see it differently* from everyone else (of course, *everyone* sees it differently from everyone else).

One thing that I think is important is that I think that social knowledge and human knowledge are relevantly similar. Specifically, they share the same structure and the same logic. In both humans and societies, the structure of a concept or idea is the same: it is the set of connections between entities.

This general structure - what I called 'Learning Networks' and George Siemens called (more successfully) connectivism - calls into question even the *concept* of 'literature in the field', because knowledge is not divided between some privileged set of writings, 'literature', and everything else.

At best, the 'literature' might be thought of as some stigmergic activity enabling each of us to contribute our own perspectives to a common object - a human intellectual anthill, of you will. But this thing that we build is distinct from the knowledge we have as a society, and does not hold any epistemic priority over other such network-based objects of knowledge, such as the 747 aircraft or World War II. It's a *thing* upon which each of us can reflect and obtain our own unique perspective take on collective knowledge.

So I am frankly not interested in developing 'the literature', except to offer the occasional contribution as a social gift, much the way I might contribute to Wikipedia or add to a cowpath in the grass by walking upon it. I don't think the objective of research or scientific enquiry is to develop the literature, or at least, not *only* to develop the literature. It is to *engage*, to contribute a *life* to society.

If I were forced to discuss there I think this is the greatest advance, I would probably say that it is the application of this thinking to education and pedagogy (keeping in mind that if it weren't me, it would surely have been *someone*).

Educational theory before connectivism is based almost completely on the idea that learning involves the recall of a set of propositions or facts, and is cumulative (much like knowledge in the literature) and stigmergic (analogous to a *co-creation* of knowledge). Dissuading ourselves of these propositions, and understanding that learning is network based, founded in the development of custom and habit, is the core of my work over the last ten years.

4. What are the 'bottom line' conclusions of your research? How innovative or valuable are they? What does your work tell us that we did not know before?

This is the same question again, but with a slightly different presupposition about the nature of enquiry. The presupposition actually takes two forms: first, as the 'bottom line' as a chain of inference or the conclusion of a logical argument; and second, as the 'bottom line' or net value (to society? to Bill Gates?) of the research.

Both presuppose a *directionality* to research. Both suppose that research works toward an *outcome*. And both, in their own way, focus on the utility or *value* of the research.

As we can no doubt infer what I have discussed above, directionality is very much a matter of perspective. Sure, it is always possible to depict a progression or flow from one entity to the next to the next in a network. It is always possible to describe a series of activations, one after another, over a slice of time. But the idea that these *lead* anywhere is surely a matter of opinion.

So at best what this question is asking me to do is to imagine the perspective of some putative observer and to ask what my work looks like from their perspective (this is in fact the actual process I undertake when describing our research program in my current office).

For example, we could ask, "what is the value of knowing that learning is associative rather than propositional?" We can take the perspective of four distinct entities to draw out the implications:

- from the perspective of the individual student, it results in understanding that learning *anything* is based in a certain set of skills (which I call the 'critical literacies') formed around the idea that knowledge is not cumulative and constructed, but rather based in practice and reflection resulting in habitual *recognition* of relevant phenomena. In other words, it makes them better learners.
- from the perspective of the teacher, it results in the understanding that teaching does not consist in explaining or describing, because these depend on an already strongly developed association between the words and the concepts, but rather, that we can at best *show* (ie., model and demonstrate) actual practice, and have them obtain direct experience and practice.
- from the perspective of the education technology provider, it results in the understanding that networking and interaction are essential components of learning, that new experiences must be based on past experience, which entails the development of *personal* and *experiential* learning environments.
- from the perspective of the employer seeking to address skills shortages it results in the shift from a formal class-based outcomes-based learning paradigm to an ongoing informal learning network, hands on support systems, and personal learning program.

These four might seem as large leaps from the answers given to the first and second questions, but they are not in fact so large - of course, depending on your starting point you might have to shift your thinking 180 degrees to get to this perspective, or it might click into place as immediately intuitive or rational.

5. Can you explain how you came to choose this topic for your doctorate What was it that first interested you about it? How did the research focus change over time?

Mostly by accident, by opting for what I thought was obvious, and by seeing opportunity.

The accidents are the vagaries of experience. Early exposure to science fiction in the local library stirred my imagination and led me to want to be a scientist; poverty led me (on the advice of my father) to investigate computers and technology; being overlooked for promotion led me to enrol in university to become a scientist; a full English section in my physics program led me to enrol in philosophy; my first course in philosophy exposed me to David Hume.

Why is this important? Because of my background in computers, I knew that logic is arbitrary, so I was sympathetic with Hume's scepticism. This led me over time to a district of cognitivist methods over time, and hence a Bachelor's thesis defending Hume's associationism and a Master's thesis questioning model-based semantics as arbitrary and unsound.

In my PhD years I worked on the idea of knowledge as based on relevant similarity, developing a logic of association, while at the same time creating huge conceptual maps of ideas, disciplines and a wall-sized history of philosophy. So I was ready with [Francisco Varela](#)³⁸³ discussed the essentials of network theory in a lecture at the University of Alberta, and between reading [Rumelhart and McClelland](#)³⁸⁴ and attending the [Connectivism conference](#)³⁸⁵ in Vancouver, had come to see that connectionism and associationism amount to essentially the same theory.

I came into the field of learning technology via distance education at Athabasca University. Given my background, it should be no surprise that I tried several things, including the creation of a Bulletin Board Service (BBS) and co-authoring of an academic MUD. At Assiniboine I created a website and online courses and eventually a learning management system. As I gained experience I found that network principles could be applied to learning technology. I explored the use of content syndication, developed the idea of learning networks, and with George Siemens created the first MOOC. These were all instances of connectionism applied to pedagogy.

My core academic interest lies in understanding knowledge and cognition -- the processes of learning, inference and discovery. Time and experience have refined my early thoughts on the matter, but I have always approached the subject from an empirical and scientific perspective. There are no magic symbol systems, there is no privileged access to nature. There's only experience and a very human - indeed, a very *animal* - way to comprehend it.

³⁸³ http://en.wikipedia.org/wiki/Francisco_Varela

³⁸⁴ <http://mitpress.mit.edu/books/parallel-distributed-processing>

³⁸⁵ <http://books.google.ca/books/about/Connectionism.html?id=I8yvQgAACAAJ>

6. Why have you defined the final topic in the way you did? What were some of the difficulties you encountered and how did they influence how the topic was framed? What main problems or issues did you have in deciding what was in-scope and out-of-scope?

If I had to state in a sentence how I define my topic, it is in the previous paragraph: understanding knowledge and cognition through understanding the processes of learning, inference and discovery.

In other words, I am focused first on *how* we learn rather than *what* we learn. This is an epistemic choice; a cognitivist or rationalist approach will first describe what we know - "we know language, we know mathematics, we know who we are," etc. My view is that many of these knowledge claims are incorrect. We do not know universal truths, we do not have knowledge of ideal abstracts. We don't, I argue, because we *can't*.

As a consequence, through most of my career I have found myself in conflict with those who have very specific theories about what we know, and (therefore) how we know it. They depict these knowledge claims as *givens* and construct and derive theories of learning and pedagogy based on this.

For example, a common line of argument runs as follows: we understand scientific principles, therefore we have knowledge of abstract universals, therefore these must be codified in a physical symbol system, so learning is a process of acquiring and codifying these statements. This creates a view of knowledge and learning that is *content-based* and focused on the assimilation of a set of these statements by the most efficient means possible.

This is the dominant view, and the position I advocate meets opposition at each stage of the inference.

It results in the need to reframe knowledge and learning from the ground up. It becomes very difficult to decide that something is "out of scope" because each statement of an educational theory varies in importance and meaning depending on which of these perspectives you take. Even the idea of what constitutes a *theory* - and whether connectivism is one - depends on your perspective.

Throughout the last fifteen years or so I have assembled thousands of small items, hundreds of blog posts, and various talks and longer works. These do not lead from a basis of evidence to a single conclusion. Rather they are point by point observations on a welter of interconnected points, none of which is pure data, none of which is pure theory, all of which constitute an interconnected perspective on knowledge and learning that undermines, and advances an alternative to, the cognitivist view.

7. What are the core methods used in this thesis? Why did you choose this approach? In an ideal world, are there different techniques or other forms of data and evidence that you'd have liked to use?

As someone who wrote a presentation entitled [Against Digital Research Methodologies](#)³⁸⁶ I have to say I didn't use any core methods *per se*. It's not that I think that science is random. It's rather that, in the words of Paul Feyerabend, scientific method is *whatever works*.

I've given the talk several times and have tried to express this in different ways. I've talked about my work as being a process of discovery, in which I try things, explore things, and look for patterns that stand out, unexpected significance or meaning, patterns of change, and even observations and inferences.

In other cases I've talked about conduct by research and design (not, by this I do *not* mean "design-based research", properly so called).

Maybe the best way to approach this question is to take on the question of data and evidence head on. Because the presupposition in a question like this is that the research methodology will either be *inductive* - that is, inference to a general principle or method based on evidence - or *abductive* - that is, inference to the best explanation of a body of data or evidence.

In my talks I argue that this depicts research as following a classical theory of science, one in which we express data as a set of "observation sentences" and derive from that a set of theoretical statements, which collectively form a model or representation of reality. Most people understand that in the end we cannot distinguish between observation statements and theoretical statements - this is why 'truth' is often defined as 'truth within a theory T'.

But they are less likely to agree with (or even understand) [Quine's](#) second proposition³⁸⁷, that reductionism is a dogma. We don't in *any* way infer from evidence and data to generalization or method. Rather, the data show us only one of two things, either:

1. that something exists, or
2. that something is possible

Indeed, the bulk of my work takes the form: *it can be done, because I've done it*. My work, in other words, takes the form of modelling and demonstrating, of giving an example (nothing more) that others can use in their own thinking and their own reasoning.

³⁸⁶ <http://www.downes.ca/presentation/315>

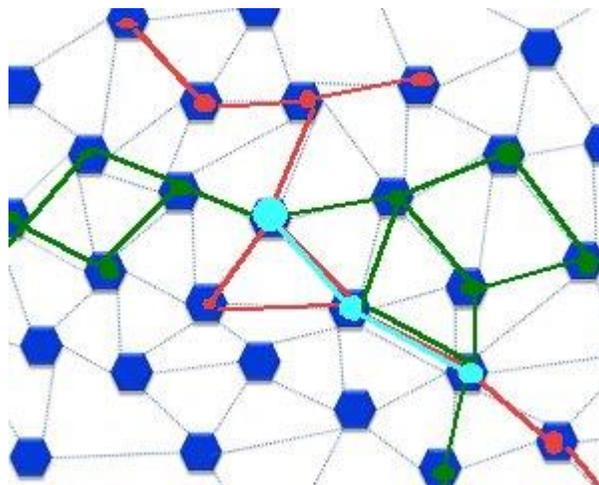
³⁸⁷ <http://www2.drury.edu/cpanza/quinereview.html>

It is often asked of me: if there are no universal principles or generalizations, then what *are* those statements that look like universal principles or generalizations? In response, I say that they are abstractions.

But then, continue my questioners, aren't abstractions themselves idealizations based on evidence? And my response is, no, abstractions (and therefore universals and generalizations) are not created by *inference* from a set of empirical data. They are created from *subtractions* from empirical data (sometimes even one piece of data).

There are many ways to create abstractions, but I'll illustrate just one: the elimination of extraneous data from two overlapping concepts. Consider the concepts of 'dog' and 'couch', which I described above. If we *keep* the connections between those entities where the concepts overlap, and discard the rest, we have a new abstraction, which is whatever it is that dogs and couches have in common.

Like this:



How should we characterize this abstraction? This is where the characterization gets difficult. It might be the idea that dogs like to sleep on couches. It might be that both dogs and couches are things. What it means depends on everything else around it. The more we subtract, the less the overlap, the greater the range of possible things it could be.

8. What are the main sources or kinds of evidence? Are they strong enough in terms of their quantity and quality to sustain the conclusions that you draw? Do the data or information you consider appropriately measure or relate to the theoretical concepts, or underlying social or physical phenomena, that you are interested in?

This question doubles down on the idea that a thesis is created by assembling a body of data or evidence that supports a conclusion. Hence the thesis is evaluated by two criteria:

1. the quality of the evidence (which speaks to the *soundness* of the thesis)
2. the inference from evidence to conclusion (which speaks to the *validity* of the thesis)

I've dealt with inference above. But what are the criteria for good evidence?

Virtually all research that still uses this model will be based on some sort of statistical generalization; the days when we could reason inductively from evidence to conclusion are long since past, a relic of the world when Newton's theories held sway. Perhaps it is true, as Einstein said, that God does not play dice with the universe - but if so, then he is a mean poker player.

Evidence is based on two criteria: *quantity and type*. By quantity we are asking whether we have *enough* evidence to draw a statistical inference. There are some fairly well-established principles of probability that are at least as reliable as any other form of inference that will tell us that, for example, we cannot infer from 20 specific instances to a population of 7 billion instances.

But more significant is the question regarding the type of evidence, which is specifically focused around the question of whether the evidence is *representative* of the population as a whole. That's why you don't just ask your friends how they'll vote when you're predicting an election; chances are, your friends will vote like you do. It should also be why a class of 50 midwestern undergraduate psychology students should not be used as the basis for drawing conclusions about *anything*, but journals keep publishing the studies.

In my case, none of these matter, because I'm not generalizing (or, at least, I'm trying very very hard not to generalize).

In my case, the question is always: is this example an *instance* of the thing I'm talking about? If it is, we can say that it exists, and move on, trying to find associated phenomena. If it is not, then what was it that misled me about it? Either way, I learn.

In a world without universal (or even predefined, or even commonly understood) categories, answering questions like this is not a trivial matter. In some cases, it is sufficient to obtain *agreement* among a group of people that "this x is a y". In other cases, we have to take our time, be pedantic, and show that "this x is precisely a y". Most of the work involved *unravelling* confused, imprecise or inconsistent categorization. People assume that because we use the same words we mean the same things, while experience suggests that this is often not the case.

In my case, we consider the set of posts, papers and talks, etc., to be both the evidence and the conclusion (this is an instance of what I mean when I talk of 'direct perception'). There is no sense to dividing one set of my posts as the evidence and another as the conclusion. The same happens in the mind: the set of neural activations is at once the evidence and the conclusion. There is no *thing* over and above the set of neural activations that constitutes the 'thesis' being

discovered or proven (or, to be more accurate, if there is, it exists only as an *emergent* phenomenon, and can only be *recognized* externally by a third party or observer).

So when we ask what the sources of the evidence are, and whether they sustain the conclusion, we are asking what is, in my mind, an incomprehensible question, or more accurately, one that embodies incorrect presuppositions about the nature of knowledge. Similarly, if one asks about the *correctness* of the evidence and the conclusion, we reach the same conclusion, that the question presupposes an incorrect epistemology.

I have developed and often talked about my response to this, which is what I call 'the semantic principle', and what is at best a set of methodological presuppositions based on some opinions about the most effective function of a network. So I ask whether in the entities and connections in my thesis are diverse, autonomous, open and interactive. There's a longer discussion to be had here (what does it mean to say a concept is autonomous, for example? what does it mean to say that the parts of a thesis are diverse?) But it gets, I think, to a deeper understanding of epistemic adequacy that a query about the soundness and validity of an argument.

9. How do your findings fit with or contradict the rest of the literature in this field? How do you explain the differences of findings, or estimation, or interpretation between your work and that of other authors?

I've discussed a lot of this in my discussion above. But I have as yet remained silent on the difference between my own approach and the major approach in learning theory, or perhaps I should say 'set' of approaches, under the heading of 'constructivism'.

If I had to put the matter in a phrase, I'd say that constructivism is cognitivist and connectivism is non-cognitivist. Of course some people will immediately respond that there are some varieties of constructivism that are non-cognitivist. I typically respond, only half in jest, that for any criticism of constructivism C, there is a version of constructivism not-C, for an indefinitely large set of criticisms {C1...Cn}.

In fact, though, theory-building, model-building and representation all had their foundation in philosophy and the sciences well before their appearance in education, and the emergence of constructivism in education is a not-surprising response to (for example) behaviourism and instructivism, just as they were responses to logical positivism in the sciences. Bas van Fraassen, for example, offers a prototypical account of '[constructive empiricism](http://sites.harvard.edu/fs/docs/icb.topic1470783.files/van%20Fraassen_Scientific%20Image.pdf)'³⁸⁸ in the sciences. Other

³⁸⁸ http://sites.harvard.edu/fs/docs/icb.topic1470783.files/van%20Fraassen_Scientific%20Image.pdf

flavours of constructivism are found in things like Larry Laudan's '[Progress and its Problems](#)'³⁸⁹. Or Daniel Dennett's '[The Intentional Stance](#)'³⁹⁰.

They are at once responses to scientific realism, grounding science in logical and social structures (there's a strong strain of this as well in Kuhn), and at the same time are responses to the discredited idea of 'the observation statement', which was science's only response to the idealist and the rationalist. Scientific constructivism was a way to preserve rationality in science, without surrendering its basis in empirical grounds. Only these grounds would be served by proxy, through an active engagement with experience, a process of *construction*, the formulation of what Quine called 'analytic hypotheses', the presentation of tentative conclusions, models and representations which would be evaluated *as a whole* against experience, against reality.

It's a brilliant response, and I have no real quarrel with the overall approach. My major criticism is that while they jettisoned the 'positivism' of logical positivism, they kept the 'logical' part, and it was in the *logical* part that logical positivism actually foundered. Indeed, Quine should have called his paper Two Dogmas of Logicism, for that's what they were. Specifically:

1. The analytic-synthetic distinction fails not because there are no observations, but because there are no observation *statements*
2. The principle of reduction fails not because there's no empirical basis in fact, but because there are *no logical principles* of reduction

And this is where I find my difference with the constructivists. In (almost) all cases, they depict the creation of knowledge as one of *construction*, where we (intentionally) *create* models or representations, grounding them in a model or environment (literally: "making meaning"). Often this is depicted as a [social activity](#)³⁹¹ (sometimes, it is depicted as *only* a social activity). As a stigmergic activity, as I discussed above, I can comprehend it. But not as a theory of learning.

And the reason it is not a theory of learning is simply this: in a person (in a network, etc) *there is no third party to do the constructing*.

The creation of a model or representation (or network or theory or whatever) that will be tested against experience (or reality, or a run computer simulations, or whatever) is a representationalist theory which assumes a distinction between the model and whatever would act as evidence for that model (and, often, a set of methodologies and principles, such as 'logic' and 'language', for constructing that model).

³⁸⁹ <http://www.amazon.com/Progress-Its-Problems-Towards-Scientific/dp/0520037219>

³⁹⁰ <http://www.amazon.com/The-Intentional-Stance-Bradford-Books/dp/0262540533>

³⁹¹ http://epltt.coe.uga.edu/index.php?title=Social_Constructivism

But the network theory I've described, if taken seriously, entails the following:

- the network is self-organizing; we do not 'create' sets of connections, these result naturally from input and from the characteristics of the entities and connections
- the network does not 'represent' some external reality; 'evidence' and 'conclusion' are one and the same; the network itself is both the perceptual device *and* the inferring device
- learning isn't about *creating*, it's about *becoming*

Someone recently said to me, "well that makes you a radical constructivist". Perhaps. But now the meaning of 'constructivist' has ceased to be anything that would be recognized by most constructivists. This is an outcome that could be predicted by my own theory, but not by most others.

10. What are the main implications or lessons of your research for the future development of work in this specific sub-field? Are there any wider implications for other parts of the discipline? Do you have 'next step' or follow-on research projects in mind?

I have several things in mind, though life may be too short for all of them:

- I want to continue to develop in technology an instantiation of the concepts I describe in theory (understanding that there's no theory, etc., etc.). This is the basis for my work in MOOCs and my current work in personal learning environments, as instantiated in the [LPSS Program](#)³⁹². I want to see the various ways in which a learning network can grow and develop and help real people address real needs and make their lives better.
- I want to draw together the various threads I've described in this post and offer a single coherent statement of connectivism as I see it. Related to this, but probably a separate work, I want to draw out and make clear the elements of 'critical literacy', which I believe constitute the foundations (if you will) of a new post-cognitivist theory of knowledge (the program above has funding but I have no funding for this work, so as a message to society at large, if you ever want to see this, consider some means of funding it).
- I would like to see the principles of self-organizing knowledge applied to wider domains and to society at large, as (shall we say) a new understanding of democracy, one based not on power and control and collaboration and conformity, but one based on autonomy and diversity and cooperation and emergence. Society itself will have to do this; I can but point the way.

That's pretty much it, from an academic and professional perspective. But I also understand that the work is not possible in the confines of my own office working with texts and software. None of what I do today, nor indeed, have ever done, has been separate from the rest of my life and

³⁹² <http://www.nrc-cnrc.gc.ca/eng/solutions/collaborative/lpss.html>

living. Each experience that I have, each society that I see, each new city and each new bike ride adds a nuance and a subtlety to my understanding of the world. It is a beautiful life and my greatest contribution to the future would be, I think, to continue living it.

That's my PhD oral exam. I'd like to say [thank you](#)³⁹³ on behalf of the group and ourselves and I hope we've passed the audition.

*Moncton, Canada
April 4, 2015*

³⁹³ <https://www.youtube.com/watch?v=Xwy-CPaXgOc>

Mark Surman on Open Education and the Open Internet



Article and photo by Stephen Downes

This is a summary of Mozilla CEO Mark Surman's talk at Open Education Global in Banff April 24 (today). It is a paraphrase with lots of direct quotation, but shouldn't be taken as word-for-word literal. All errors are my own.

We need to help 5 billion people over the next 5-10 years become web literate.

Three quotes from great Canadian thinkers: "We are trying to do today's job with yesterday's tools and yesterday's concepts." "We drive into the future looking only into our rearview mirror." - classrooms are organized around how monks talked.

The experience of living in a small town as the only punk rock kid shaped me. And we lived in the media culture hegemony, and also we lived in a time of very conservative politics with a daily fear of nuclear war. What punk rock showed me was that we could play a role in shaping the world we want. And I was a photocopier kid - a big part of punk culture was cutting things up and remixing them. Records, guitars, and a scene: this idea of our media, our ability to produce it, and a community. It's an ethos very different from the television world we grew up in.

The last 40 years has been technology that lets us reshape our world. When I got a tape recorder that I could record on, that was radical. These technologies and freedom inspire me. And I

couldn't but help myself when the modem came along. And when Mosaic came out in 1994, I said that's what I want to work on.

Second Canadian: [Harold Innis](#)³⁹⁴. "The Roman Empire and the city states were essentially products of writing." They could issue edicts and laws. How do we build the world we're trying to build? There's a connection between power and words, power and communication, and what we're trying to do is shift that, and make communication more open.

Mozilla: it says in our incorporation documents: "we exist to guard the open nature of the internet." Best job I ever had. That's what drove me to work on the Cape Town declaration. We said it can't just be OERs, it can't just be open content, it has to be learning, it has to be participation.

So I would argue that we have a common ethos around that idea. And I see Mozilla as being the David that can take on the Goliath with those ideas. And so we have won a number of battles, we have a lot to celebrate. Firefox itself is a big victory - we went from 98% Internet Explorer domination, and Microsoft was determining where the internet was heading. Firefox was a huge victory in shifting that. That was 10 years ago, we haven't won much lately. Reference to Sunday New York Times advertisement for Firefox 1.0 (I contributed to that: SD)

There is a shift, even in mainstream, toward seeing publishers as expensive and in the way. By contrast we have organizations like Lumen, David Wiley's company, getting traction and VC money. Similarly, you've heard lots over the last few days, more and more public money has gone into ensuring that learning resources are open. For example, \$2 billion for OERs in colleges.

Those victories don't just limit themselves to this room. We have those dollars to people who aren't having this conference explicitly. Eg. local tax grant in Missoula. We have people around the world coming to OERs and open learning, and doing real stuff. We see a bias toward action. Lots of victories, lots to be proud of.

We have won many battles... but we are losing the war.

We are losing the battle for openness, the open web, and in transforming education. These - Pearson - are the kind of people are going to win. They may shift from selling textbooks to capturing analytics and selling data, but they're still winning. Mozilla isn't anti-business but we're against oligopolies. I'm more afraid that this is going to be Pearson - 'Classroom'. As much as I use Google every day, it's increasingly a company that controls vast parts of the internet. India - Google is effectively a monopoly with Android in smart phones. But unlike Windows and IE, they control the OS, they control the money, they're taking over the carrier layer - this is a

³⁹⁴ http://en.wikipedia.org/wiki/Harold_Innis

monopolist with an intent to take complete vertical control over our internet lives. That is losing the war.

How many think Uber is the good guy? We don't think of them as relevant, but it is likely the next big monopolists. Their goal and intent is to become the monopolist in the area of physical motion - to know everything about us, everything about the movers. That is then cloaked in a positive aspect of creating a new type of work.

"Millions of Facebook users don't even know they're using the internet." People don't even know what they're using. They don't really know what the affordances are in any of the most basic ways the way we know. There's a massive gap between the general purpose computers we have in our pockets and what people think they have.

We're seeing the growth of the empires that will shape humanity with a new set of values for probably the next few hundred years. The centre of that empire is pretty limited - it comes from Palo Alto, it comes from Silicon Valley. It's not that diverse a place. It's not the kind of empire I want to see. I don't want to see empire.

Fork in the road.

Do we want 'the next Steve Jobs' or do we want Edward Snowden. Do we want creativity and freedom, or control and a lack of agency. Are we going to choose openness, or are we going to choose the Matrix.

William Gibson, third (sort of) Canadian: "The future is here, it's just not evenly distributed." The future I have committed to is a future where everyone has the know-how to be internet citizens in full. That's where we want to go - how do we win the war?

Most of the people in the room used Mosaic, most were online before 2000 - the internet soon will be 5 billion people - that's where the battle for open will play out).

Three things we are doing:

First, web literacy. The challenge we have is to help 5 billion know how to wield that general purpose in computer in their pocket. We try to put it into Firefox, we try to put it into everything we do (cf Doug Belshaw's competency map). Participation, using the open web, is a bit part of this.

Second, we need to commit to learning and not just to open educational resources. That's what I took from my early work in Shuttleworth to what I'm doing now. The language we use to talk about our approach to pedagogy is: learn by making, make stuff that matters (that's a key idea OER brings to the table, we can work on real material that is stuff we need), do it together (social for us has to be a part of a radical open pedagogy).

Third, think of ourselves as bigger than just those of us around a single table, bigger than just this room - think of ourselves as people who want to take this open road (you are invited to Mozfest in November).

A movement, a different approach to learning (web literacy), can help us go down the open road if we do it ambitiously enough.

We've been doing this at Mozilla. Eg., the Maker Parties. We've had teach-ins, to have people teach digital literacy to those around them. And this year we want to rally people to move literacy on a massive scale - we don't know how to do that. Mozilla Academy? We will put whatever resources to bear on this, and help people do this. There are 300 organizations that make the Maker Parties happen - we want to do this together, get on the ball, and move it a lot faster.

This is important. We are at a Gutenberg moment. We are at an early phase in internet technology. What gets written today will determine the future.

Q. I'm struck by the fact that there are many Davids. How do you unite the Davids.

A. You have common cause though you have many approaches. 'Open' has been the rallying cry. But in that rallying we have become inward focused. The concept of 'open' isn't something that will get into the water necessarily. The key is to think practically, do things that will help people, rather than be evangelical. That may be a rallying point, but still around our ideas.

Q. Net neutrality - where the telcos are trying to determine what speed you will have and more. Steve Jobs was a master at creating beautiful golden cages. You cannot have OER and openness within a closed hardware environment.

A. Another hour-long talk. In general, in building this movement for openness, Mozilla very public takes a much more pragmatic approach on whether everything has to be free. Of course we all know all of the pieces we wish were there, they're not even not there is an way even open-advocates can live in an all-open world. Eg. should we be implementing the DRM standard in HTML 5. Of course we're against that. But if we don't implement it and the other three browsers do, then millions of our users won't be able to watch videos.

Which road do we choose, in order to remain relevant, and still keep a principled stance? Hardware and net neutrality are very important in that. Hardware is the biggest vector for network surveillance (I should have added Sczchen to the core of the new empire, on the hardware level). And it's a big question about how companies like Facebook play into net neutrality - Facebook is marketing itself in India as the free internet, don't bother with the rest of it.

Q. I can't help but think about Aaron Schwarz. Will civil disobedience become an appropriate response?

A. It already is. We don't hope what happened to Aaron will happen to others. But people like Anonymous - it's a tricky thing to know what appropriate civil disobedience is. There may be real criminals in there. We don't all have the same agenda. Tricky questions.

Q. Would the internet be different if we had women making it?

A. Yes. And we need more of that. Mitchell Baker is a champion for women in technology and as leaders. But we're still very male-biased. We do need to have gender as an issue as we build, we're not as aggressive as we want to be yet, but it has to be a part of what we think.

Q. The web literacy is the closest thing to what I mentioned yesterday as digital citizenship. Who are the right people to engage on this?

A. We are three stakeholders to first engage. Many great conversations here, eg., talking with Cable (Green) about getting a course on web literacy. And Cathy saying one way to do it is immersion. This is a good group of people to try to get some of those approaches into the mainstream.

There's a lot of other stakeholders we think about. The right part of business, for example, even some of the goliaths - eg., the phone companies, who have a set of interests counter to the core Silicon Valley values. Eg. they want people to make and consume local content.

Q. It's very common for us to conflate the web with the internet. To what degree is Mozilla interested in non-web parts of the internet.

A. As an activist, conflating the web with the internet is now a problem in my view. We think of the web as the human interaction layer, at least for now. The rest of the web isn't really usable by people. But increasingly not. We contrast the web with what's happening on the smart phone right now - the web is open, iOS and Android are much more bundled and controlled. But we have to pick our battles.

Q. Read-write-communicate has me thinking about openness - are you making the same pitch to other segments of the internet? Is it the same pitch?

A. The answer is, I'm about to. I'm trying to figure out a crisper pitch. This is spring training. I'm taking this to Quartz, and giving them the same pitch. The same in OE Africa in May. To see who we can bring along with us.

Q. I don't like your metaphor with the word 'battle' and the word 'war'. Cf. Hal Plotkin. He was entertaining us and also warning us with an example from the U.S. establishing a so-called 'free university' which failed because people became too militant.

A. Many people don't like those metaphors. I think we're too passive. Let's see if we can find a middle.

Q. Facebook is bringing free 'mobile internet' to people which is Facebook(+Google+Wikipedia)-only - internet.org

A. They're kind of BS. But they will be influential BS. Even at the board level, we talk about, do we play with internet.org or not? I've been into these sorts of discussions for years - the old Internet Advisory Council in Canada. It's companies saying "we will solve the problem of access." It's an exceptionally simplistic view. People will get access. The market will take care of access anyway. They want to be seen as on the forefront of solving that problem, and to capture customers while they're at it, with monopolistic strategies. But if we help internet.org where half the peopel only have Facebook, that's a bad outcome.

*Banff, Canada
April 24, 2015*

Research and Evidence

I wrote the other day that the study released by George Siemens and others on [the history and current state of distance, blended, and online learning](#)³⁹⁵ was a bad study. I said, "the absence of a background in the field is glaring and obvious." In this I refer not only to specific arguments advanced in the study, which to me seem empty and obvious, but also the focus and methodology, which seem to me to be hopelessly naive.

Now let me be clear: I like George Siemens, I think he has done excellent work overall and will continue to be a vital and relevant contributor to the field. I think of him as a friend, he's one of the nicest people I know, and this is not intended to be an attack on his person, character or ideas. It is a criticism focused on a specific work, a specific study, which I believe well and truly deserves criticism.

And let me clear that I totally respect [this part of his response](#)³⁹⁶, where he says that "in my part of the world and where I am currently in my career/life, this is the most fruitful and potentially influential approach that I can adopt." His part of the world is the dual environments of Athabasca University and the University of Texas at Arlington, and he is attempting to put together major research efforts around MOOCs and learning analytics. He is a relatively recent PhD and now making a name for himself in the academic community.

Unfortunately, in the realm of education and education theory, that same academic community has some very misguided ideas of what constitutes evidence and research. It has in recent years been engaged in a sustained attack on the very idea of the MOOC and alternative forms of learning not dependent on the traditional model of the professor, the classroom, and the academic degree. It is resisting, for good reason, incursions from the commercial sector into its space, but as a consequence, clinging to antiquated models and approaches to research.

Perhaps as a result, part of what Siemens has had to do in order to adapt to that world has been to recant his previous work. The Chronicle of Higher Education, which for years has advanced the anti-technology and anti-change argument on behalf of the professoriate, published (almost gleefully, it seemed to me), [this abjuration](#)³⁹⁷ as part and parcel of its article constituting part of the marketing campaign for the new study.

³⁹⁵ <http://www.downes.ca/post/63823/rd>

³⁹⁶ <http://www.elearnspace.org/blog/2015/04/30/on-research-and-academic-diversity/>

³⁹⁷ <http://chronicle.com/blogs/wiredcampus/what-is-being-learned-from-moocs-new-report-takes-stock/56487>

When MOOCs emerged a few years ago, many in the academic world were sent into a frenzy. Pundits made sweeping statements about the courses, saying that they were the future of education or that colleges would become obsolete, said George Siemens, an author of the report who is also credited with [helping to create](#) what we now know as a MOOC.

“It’s almost like we went through this sort of shameful period where we forgot that we were researchers and we forgot that we were scientists and instead we were just making decisions and proclamations that weren’t at all scientific,” said Mr. Siemens, an academic-technology expert at the University of Texas at Arlington.

Hype and rhetoric, not research, were the driving forces behind MOOCs, he argued. When they came onto the scene, MOOCs were not analyzed in a scientific way, and if they had been, it would have been easy to see what might actually happen and to conclude that some of the early predictions were off-base, Mr. Siemens said.

This recantation saddens me for a variety of reasons. For one this, we - Siemens and myself and others who were involved in the development of the MOOC - made no such statements. In the years between 2008, when the MOOC was created, and 2011, when the first MOOC emerged from a major U.S. university, the focus was on innovation and experimentation in a cautious though typically exuberant attitude.

Yes, we had long argued that colleges and education had to change. But none of us ever asserted that the MOOC would accomplish this in one fell swoop. Those responsible for such rash assertions were established professors with respected academic credentials who came *out* of the traditional system, set up some overnight companies, and [rashly declared](#)³⁹⁸ that they had reinvented education.

It's true, Siemens has moved over to that camp, now working with EdX rather than the connectivist model we started with. But the people at EdX are [equally rash and foolish](#)³⁹⁹:

(Anant) Argarwal (who launched EdX) is not a man prone to understatement. This, he says, is the revolution. "It's going to reinvent education. It's going to transform universities. It's going to democratise education on a global scale. It's the biggest innovation to happen in education for 200 years." The last major one, he says, was "probably the invention of the pencil". In a decade, he's hoping to reach a billion students

³⁹⁸ <http://hackededucation.com/2013/10/15/minding-the-future-openva/>

³⁹⁹ <http://www.theguardian.com/education/2012/nov/11/online-free-learning-end-of-university>

across the globe. "We've got 400,000 in four months with no marketing, so I don't think it's unrealistic."

Again, these rash and foolish statements are coming from a respected university professor, a scion of the academy, part of this system Siemens is now attempting to join. As he recants, it is almost as though he recants for them, and not for us. But the Chronicle (of course) makes no such distinction. Why would it?

But the saddest part is that *we never forgot* that we were scientists and researchers. As I have often said in talks and interviews, there were things before MOOCs, there will be things after MOOCs, and this is only one stage in a wider scientific enterprise. And there *was* research, a lot of it, careful research involving hundreds and occasionally thousands of people, which was for the most part ignored by the wider academic community, even though peer reviewed and published in academic journals. Here's [a set of papers](#)⁴⁰⁰ by my colleagues at NRC, Rita Kop, Helene Fournier, Hanan Sitlia, Guillaume Durand. An additionally impressive body of papers has been authored and formally published by people like [Frances Bell](#)⁴⁰¹, [Sui Fai John Mak](#)⁴⁰², [Jenny Mackness](#)⁴⁰³, and [Roy Williams](#)⁴⁰⁴. This is only a sampling of the rich body of research surrounding MOOCs, research conducted by careful and credible scientists.

I would be remiss in not citing [my own contributions](#)⁴⁰⁵, a body of literature in which I carefully and painstakingly assembled the facts and evidence leading toward connectivist theory and open learning technology. The Chronicle has never allowed the facts to get in the way of its opinions, but I have generally expected much better of Siemens, who is (I'm sure) aware of the contributions and work of the many colleagues that have worked with us over the years.

Here's what [Siemens says about these colleagues](#)⁴⁰⁶ in his recent blog post on the debate:

One approach is to emphasize loosely coupled networks organized by ideals through social media. This is certainly a growing area of societal impact on a number of fronts including racism, sexism, and inequality in general. In education, alt-ac and bloggers

⁴⁰⁰ <http://ritakop.blogspot.ca/2012/01/research-publications-on-massive-open.html>

⁴⁰¹ <http://independent.academia.edu/FrancesBell8>

⁴⁰² <https://suifaijohnmak.wordpress.com/about/>

⁴⁰³ https://www.researchgate.net/profile/Jenny_Mackness/publications

⁴⁰⁴ <http://www.lancaster.ac.uk/fss/organisations/netlc/past/nlc2010/abstracts/Mackness.html>

⁴⁰⁵ <http://www.downes.ca/me/mybooks.htm>

⁴⁰⁶ <http://www.elearnspace.org/blog/2015/04/30/on-research-and-academic-diversity/>

occupy this space. Another approach, and one that I see as complimentary and not competitive, is to emphasize research and evidence. (My emphasis)

In the previous case he could have been talking about the promulgators of entities like Coursera, Udacity and EdX, and the irresponsible posturing they have posed over the years. But in this case he is talking very specifically about the network of researchers around the ideas of the early MOOCs, connectivism, and related topics.

And what is key here is that he *does not believe* our work was based in research and evidence. Rather, we are members of what he characterizes as the 'Alt-Ac' space - "Bethany Nowviskie and Jason Rhody 'alt-ac' was shorthand for 'alternative academic' careers." Or: "the term was, [in Nowviskie's words](#),⁴⁰⁷ 'a pointed push-back against the predominant phrase, 'nonacademic careers.' 'Non-academic' was the label for anything off the straight and narrow path to tenure.'" ([Inside Higher Ed](#)⁴⁰⁸). Here's Siemens again:

This community, certainly blogs and with folks like Bonnie Stewart, Jim Groom, D'Arcy Norman, Alan Levine, Stephen Downes, Kate Bowles, and many others, is the most vibrant knowledge space in educational technology. In many ways, it is five years ahead of mainstream edtech offerings. Before blogs were called web 2.0, there was Stephen, David Wiley, Brian Lamb, and Alan Levine. Before networks in education were cool enough to attract MacArthur Foundation, there were open online courses and people writing about connectivism and networked knowledge. Want to know what's going to happen in edtech in the next five years? This is the space where you'll find it, today.

He says nice things about us. But he does not believe we emphasize research and evidence.

With all due respect, that's a load of crap. We could not be "what's going to happen in edtech in the next five years" *unless* we were focused on evidence and research. Indeed, the reason why *we* are the future, and not (say) the respected academic professors in tenure track jobs is that *we, unlike them*, respect research and evidence. And that takes me to the second part of my argument, the part that states, in a nutshell, that what was presented in this report does *not* constitute "research and evidence." It's a shell game, a con game.

Let me explain. The first four chapters of this study are instances of what is called a 'tertiary study' (this is repeated eight times in the body of the work). And just as "any tertiary study is limited by the quality of data reported in the secondary sources, this study is dependent on the methodological qualities of those secondary sources." (p. 41) So what are the 'secondary sources'? You can find them listed in the first four chapters (the putative 'histories') (for example,

⁴⁰⁷ <http://nowviskie.org/2010/alt-ac/>

⁴⁰⁸ <https://www.insidehighered.com/advice/2013/05/22/essay-defining-alt-ac-new-phd-job-searches>

the list on pp. 25-31). These are selected by doing a literature search, then culling them to those that meet the study's standards. The secondary surveys round up what they call 'primary' research, which are direct reports from empirical studies.

Here's [a secondary study](#)⁴⁰⁹ that's pretty typical: 'How does tele-learning compare with other forms of education delivery? A systematic review of tele-learning educational outcomes for health professionals'. The use of the archaic term 'tele-learning' may appear jarring, but despite many of the studies being from the early 2000s I selected this one as an example because it's relatively recent, from 2013. This study (and again, remember, it's typical, *because* the methodology in the tertiary study specifically focuses on these types of studies):

The review included both synchronous (content delivered simultaneously to face-to-face and tele-learning cohorts) and asynchronous delivery models (content delivered to the cohorts at different times). Studies utilising desktop computers and the internet were included where the technologies were used for televised conferencing, including synchronous and asynchronous streamed lectures. The review excluded facilitated e-learning and online education models such as the use of social networking, blogs, wikis and Blackboard™ learning management system software.

Of the 47 studies found using the search methods, 13 were found to be useful for the purposes of this paper. It is worth looking at the nature of this 'primary literature':

⁴⁰⁹ <http://www.publish.csiro.au/paper/NB12076.htm>

Table 1. Randomised controlled trials (RCT) and comparative studies of learning outcomes – tele-learning vs face-to-face education, 2000–2012

| Study | Study design | Intervention (sample size) | Study population | Outcome measure | Controlled for potential confounders | Results |
|-------------------------------|--------------|---|---------------------------------|--|---|--|
| Stain et al. ⁸ | RCT | Videoconference plus PowerPoint materials delivered via the internet (n = 12) Face-to-face lecture (n = 98) | Medical students | Mean exam results (mark out of 100) taken from 4 exams administered weekly across 4 weeks | Yes (participants' prior knowledge and ability) | Mean scores Videoconference = 70.5% Face-to-face = 71.4% No significant difference (p = 0.65) |
| van Boxel et al. ⁹ | RCT | 15 participants randomly allocated to attend 4 alternating workshops (2 via video-conference and 2 face-to-face) | Nurses | Qualitative evaluation and learning effectiveness (pre- and post-test) | No | Mean percentage increase in learning effectiveness Videoconference = 17% Face-to-face = 18% No significant difference (p > 0.5) |
| Spickard et al. ¹⁰ | RCT | Online lecture (n = 48) Face-to-face lecture (n = 47) | Medical students | Knowledge (mark out of 16), time, and student satisfaction | Yes (pre-test knowledge) | Summary post-test knowledge scores Online = 10.8 Face-to-face = 10.7 No significant difference (p = 0.91) |
| Solomon et al. ¹¹ | RCT | Two courses delivered across two platforms Digital lecture (n = 17) Face-to-face lecture (n = 12) | Medical students | Exam (5–6 questions) for each course | No | Mean exam results Course 1 Digital = 4.88 Face-to-face = 4.42 No significant difference (p = 0.22) Course 2 Digital = 9.00 Face-to-face = 9.25 No significant difference (p = 0.41) |
| Latour et al. ¹² | Comparative | <i>Undergraduate course</i> Videoconference (n = 145) Face-to-face (n = 24) <i>Graduate course</i> Videoconference (n = 5) Face-to-face (n = 17) | Animal science students | Exam results (out of a possible 100) | No | Mean results <i>Undergraduate course</i> Videoconference = 78.9 Face-to-face = 81.0 <i>Graduate course</i> Videoconference = 86.1 Face-to-face = 83.6 |
| Loewen et al. ¹³ | Comparative | Videoconference (n = 26) Face-to-face (n = 30) | Health care professionals | Post-test (mark out of 62) | No | Mean post-test scores Videoconference = 57.0 Face-to-face = 54.7 Significant increase in knowledge for both groups (p < 0.001) |
| Markova et al. ¹⁴ | Comparative | Up to 36 participants split between videoconference and face-to-face on 17 occasions | Resident physicians | Pre- and post-test marks in percentages | No | Percentage difference between pre-test and post-test Videoconference = 14.9% Face-to-face = 15.2% No significant difference (p = 0.922) |
| Kidd et al. ¹⁵ | Comparative | Videoconference (n = 75) Face-to-face (n = 38) | Undergraduate pharmacy students | Course grade (out of 100) | No | Mean course grade Videoconference = 87.8% Face-to-face = 90.7% Significant difference (p = 0.024) |
| Bertsch et al. ¹⁶ | Comparative | 52 participants attended 6 series of 8 lectures in 2-month blocks: 4 face-to-face and 4 via videoconference | Third year medical students | Exam at end of each 2-month block (out of 100) | No | Mean score across 12 months Videoconference = 78% Face-to-face = 76% No significant difference (p = 0.66) |
| Kerns et al. ¹⁷ | Comparative | Combination of face-to-face and video-conference (n = 10) Face-to-face (n = 26) | Nurse anaesthesia students | Exam (out of 600) | No | Mean scores Combination = 401 Face-to-face = 392 No significant difference (p = 0.52) |
| Chen et al. ¹⁸ | Comparative | 59 participants took part in up to 4 different modalities of 2 courses: live, videocast, audiocast, and prerecorded computer-based format | Health professionals | Pre- and post-test knowledge tests (identical) for each modality in each course | No | Mean score gains <i>Course 1</i> Live = 1.44 Video = 1.00 Audio = 0.64 Computer = 0.20 Significant increases in live (p = 0.050) and video (p = 0.046) modes <i>Course 2</i> Live = 0.67 Video = 1.43 Audio = 1.60 Computer = 1.17 Significant increases in video (p = 0.000), audio (p = 0.000) and computer (p = 0.003) modes |
| Haythornthwaite ¹⁹ | Comparative | 32 participants undertook training program delivered via videoconference with 20 completing assessment Face-to-face (n = 11) | Rural youth workers | Comparison of videoconference participants' pre- and post-scores on 2 knowledge modules (both out of 10) and satisfaction levels with outcomes previously achieved by face-to-face participants of same program. Only those results with significant differences were reported | No | Mean improvement between pre- and post-scores <i>Module 1 knowledge</i> Videoconference = 1.05 Face-to-face = 0.50 Significant improvement in videoconference group (p < 0.02) |
| Umble et al. ²⁰ | Comparative | Videoconference (n = 116) Face-to-face (n = 196) | Health professionals | Comparison of 5 outcome indicators including knowledge (5 multiple choice questions with maximum score of 5) administered pre, immediately post, and at 3-month follow up | No | Mean knowledge results Face-to-face = 3.82, 4.48, 4.52 Videoconference = 2.68, 4.19, 4.24 Significant increases across all results (p < 0.001) |

(Sorry about the small size - you can view the data in the [original study](#), pp. 72-73⁴¹⁰)

Here's what should be noticed from these studies:

- They all have very small sample sizes, usually less than 50 people, with a maximum size less than 200 people
- The people studies are exclusively university students enrolled in a traditional university course
- The method being studied is almost exclusively the lecture method
- The outcomes are assessed almost exclusively in the form of test results
- Although many are 'controlled' studies, most are not actually controlled for "potential confounders"

This is what is being counted as "evidence" for "tele-learning educational outcomes." No *actual* scientific study would accept such 'evidence' for any conclusion, however tentative. But this is *typical* and *normal* in the academic world Siemens is attempting to join, and this is by his own words what constitutes "research and evidence."

Why is this evidence bad? The sample sizes are too small for quantificational results (and the studies are themselves inconsistent so you can't simply sum the results). The sample is biased in favour of people who have already had success in traditional lecture-based courses, and consists of only that one teaching method. A very narrow definition of 'outcomes' is employed. And other unknown factors may have contaminated the results. And all these criticisms apply *if* you think this is the appropriate sort of study to measure educational effectiveness, which I do not.

I said above it was a con game. It is. None of these studies is academically rigorous. They are conducted by individual professors running experiments on their own (or sometimes a colleague's) classes. The studies are conducted by people without a background in education, subject to no observational constraints, employing a theory of learning which has been for decades outdated and obsolete. These people have no business pretending that what they are doing is 'research'. They are playing at being researchers, because once you're in the system, you are rewarded for running these studies and publishing the results in journals specifically designed for this purpose.

What it reminds me of is the [sub-prime mortgage crisis](#)⁴¹¹. What happened is that banks earned profits by advancing bad loans to people who could not afford to pay them. The value of these mortgages was sliced into what were called 'tranches' (which is French for 'slice', if you ever

⁴¹⁰ http://www.publish.csiro.au/?act=view_file&file_id=NB12076.pdf

⁴¹¹ <http://stat.columbia.edu/~gelman/research/published/ChanceEthics10.pdf>

wondered) and sold as packages - so they went from primary sources to secondary sources. These then were formed into additional tranches and sold on the international market. From secondary to tertiary. By this time they were being offered by respectable financial institutions and the people buying them had no idea how poorly supported they were (I'm not the first⁴¹² to make this comparison).

Not surprisingly, the reports produce trivial and misleading results, producing science that is roughly equal in value to the studies that went into it. Let's again focus on the first chapter. Here are some of the observations and discussions:

it seems likely that asynchronous delivery is superior to traditional classroom delivery, which in turn is more effective than synchronous distance education delivery. (p. 38)

both synchronous and asynchronous distance education have the potential to be as effective as traditional classroom instruction (or better). However, this might not be the case in the actual practice of distance education (p. 39)

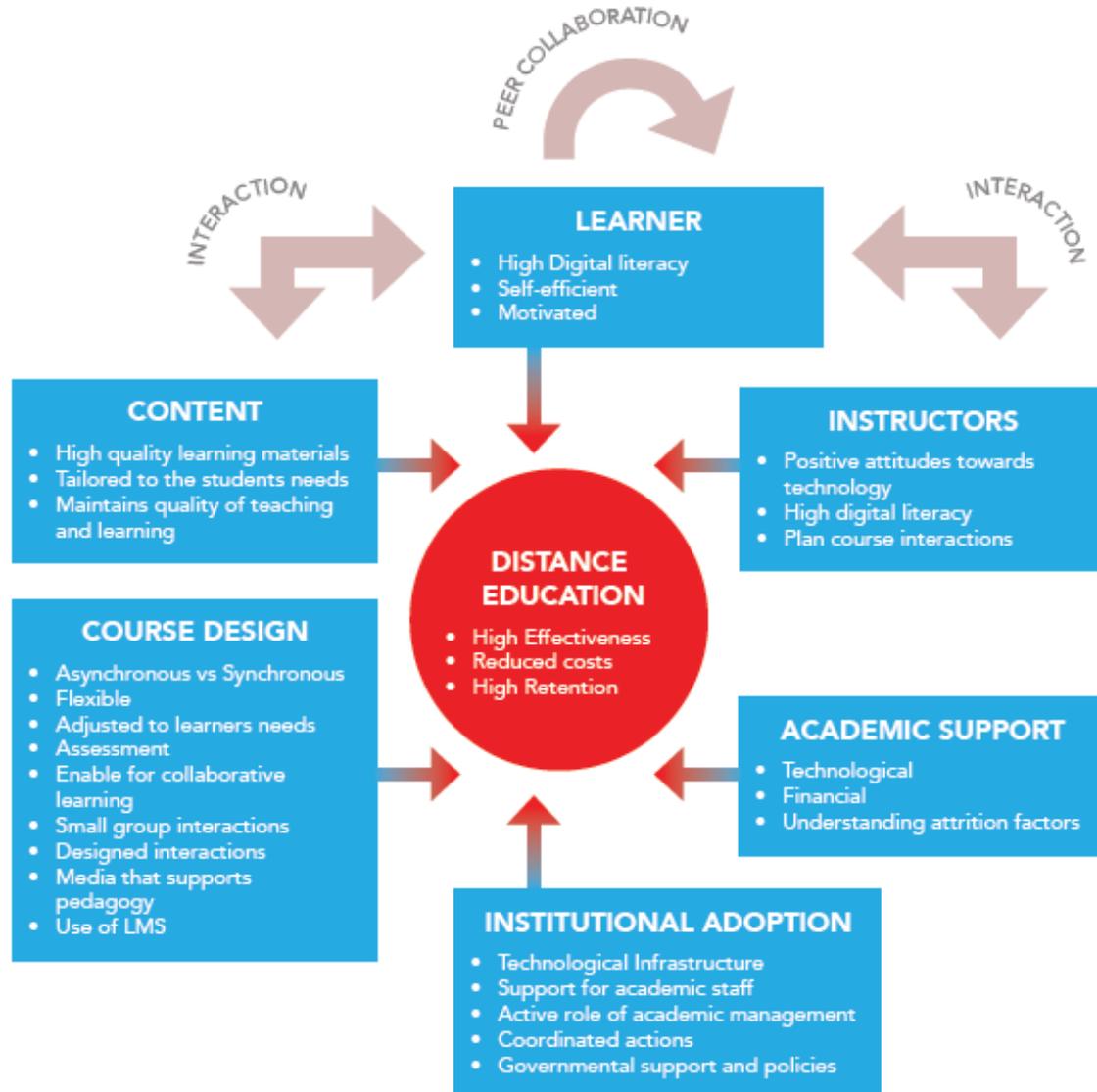
all three forms of interaction produced positive effect sizes on academic performance... To foster quality interactions between students, an analysis of the role of instructional design and instructional interventions planning is essential.

In order to provide sufficient academic support, understanding stakeholder needs is a main prerequisite alongside the understanding of student attrition (p.40)

I'm not saying these are *wrong* so much as I am saying they are *trivial*. The field as a whole (or, at least, as I understand it) has advanced far beyond talking in such unspecific generalities as 'asynchronous', 'interaction' and 'support'. Because the studies themselves are scientifically empty, no useful conclusions can be drawn from the metastudy, and the tertiary study produces vague statements that are worse than useless (worse, because they are actually pretending to be new and valuable, to be counted as "research and evidence" *against* the real research being performed outside academia).

Here is the 'model' of the field produced by the first paper:

⁴¹² <http://stat.columbia.edu/~gelman/research/published/ChanceEthics10.pdf>



It's actually more detailed than the models provided in the other papers. But it is structurally and methodologically useless, and hopelessly biased in favour of the traditional model of education as practiced in the classrooms where the original studies took place. At *best* it could be a checklist of things to think about if you're (say) using PowerPoint slides in your classroom. But in reality, we don't know what the arrows actually mean, the 'interaction' arrows are drawn from Moore (1989⁴¹³), and the specific bits (eg. "use of LMS") say nothing about whether we should or whether we shouldn't.

⁴¹³ http://aris.teluq.quebec.ca/portals/598/t3_moore1989.pdf

The fifth chapter of the book is constructed differently from the first four, being a summary of the results submitted from the MOOC Research Institute (MRI). Here's how it is introduced:

Massive Open Online Courses (MOOCs) have captured the interest and attention of academics and the public since fall of 2011 (Pappano, 2012). The narrative driving interest in MOOCs, and more broadly calls for change in higher education, is focused on the promise of large systemic change.

The unfortunate grammar obscures the meaning, but aside from the citation of that noted academic, Laura Pappano of the New York Times, the statements are generally false. Remember, academics *were* studying MOOCs prior to 2011. And the interest of academics (as opposed to hucksters and journalists) was not focused on 'the promise of large systemic change' nearly so much as it was to investigate the employment of connectivist theory in practice. But of course, this introduction is not talking about cMOOCs at all, but rather, the xMOOCs that were almost exclusively the focus of the study.

Indeed, it is difficult for me to reconcile the nature and intent of the MRI with what Siemens writes in his article:

What I've been grappling with lately is "how do we take back education from edtech vendors?". The jubilant rhetoric and general nonsense causes me mild rashes. I recognize that higher education is moving from an integrated end-to-end system to more of an ecosystem with numerous providers and corporate partners. We have gotten to this state on auto-pilot, not intentional vision.

Let's examine the [MOOC Research Institute](http://www.moocresearch.com/)⁴¹⁴ to examine this degree of separation:

MOOC Research Initiative (MRI) is funded by the Bill & Melinda Gates Foundation as part of a set of investments intended to explore the potential of MOOCs to extend access to postsecondary credentials through more personalized, more affordable pathways.

To support the MOOC Research Initiative Grants, the following Steering Committee⁴¹⁵ has been established to provide guidance and direction:

Yvonne Belanger, Gates Foundation
Stacey Clawson, Gates Foundation
Marti Cleveland-Innes, Athabasca University
Jillianne Code, University of Victoria
Shane Dawson, University of South Australia

⁴¹⁴ <http://www.moocresearch.com/>

⁴¹⁵ <http://www.moocresearch.com/research-initiative/steering-committee>

Keith Devlin, Stanford University
Tom (Chuong) Do, Coursera
Phil Hill, Co-founder of MindWires Consulting and co-publisher of e-Literate blog
Ellen Junn, San Jose State University
Zack Pardos, MIT
Barbara Means, SRI International
Steven Mintz, University of Texas
Rebecca Petersen, edX
Cathy Sandeen, American Council on Education
George Siemens, Athabasca University

With a couple of exceptions, these are *exactly* the people and the projects that are the "edtech vendors" vendors Siemens says he is trying to distance himself from. He has not done this; instead he has taken their money and put them on the committee selecting the papers that will be 'representative' of academic research taking place in MOOCs.

Why was this work necessary? We are told:

Much of the early research into MOOCs has been in the form of institutional reports by early MOOC projects, which offered many useful insights, but did not have the rigor — methodological and/or theoretical expected for peer-reviewed publication in online learning and education (Belanger & Thornton, 2013; McAuley, Stewart, Siemens, & Cormier, 2010).

We already know that this is false - and it is worth noting that this study criticizing the lack of academic rigour cites a paper titled 'Bioelectricity: A Quantitative Approach' ([Belanger & Thornton, 2013](#)⁴¹⁶) and an unpublished paper from 2010 titled 'The MOOC model for digital practice' ([McAuley, Stewart, Siemens, & Cormier, 2010](#)⁴¹⁷). A lot of this paper - and this book - is like that. Despite all its pretensions of academic rigour, it cites [liberally and lavishly](#)⁴¹⁸ from non-academic sources in what appears mostly to be an effort to establish its own relevance and to disparage the work that came before.

I commented on this paper in my [OLDaily post](#)⁴¹⁹:

⁴¹⁶ <http://dukespace.lib.duke.edu/dspace/%20handle/10161/6216>

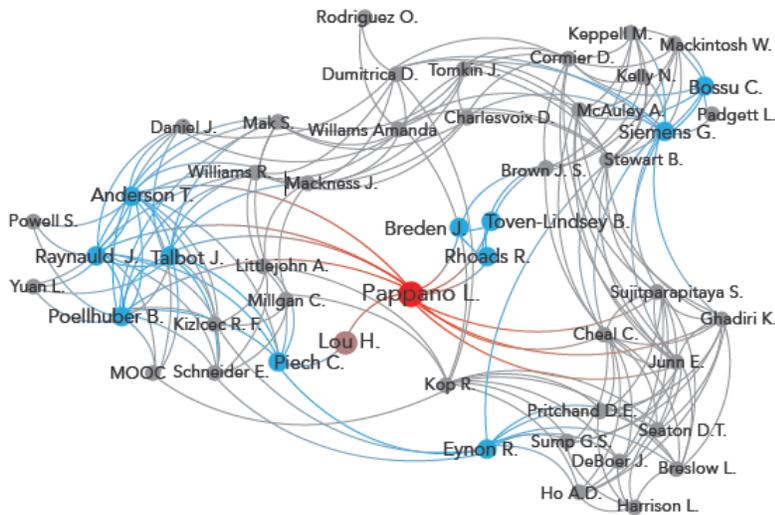
⁴¹⁷ http://www.elearnspace.org/Articles/MOOC_Final.pdf

⁴¹⁸ <http://halfanhour.blogspot.ca/2015/04/non-research-citations-in-siemens.html>

⁴¹⁹ <http://www.downes.ca/post/63823>

The most influential thinker in the field, according to one part of the study, is L. Pappano (see the chart, p. 181). Who is this, you ask? The author of the New York Times article in 2012, 'The Year of the MOOC'. Influential and important contributors like David Wiley, Rory McGreal, Jim Groom, Gilbert Paquette, Tony Bates (and many many more)? Almost nowhere to be found.

Here is the chart of citations collated from the papers selected by the committee for the MOOC Research Network (p. 181):



Here is the citation frequencies from the same papers (p. 180):

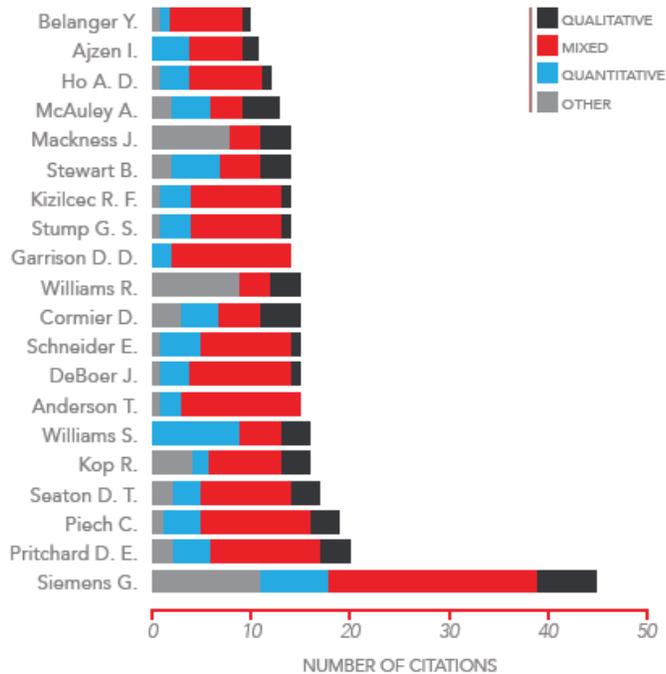


FIGURE 3 Phase 2 most cited authors

What is interesting to note in these citations is that the people who Siemens considers to be 'Alt-Ac' above - Mackness, Stewart, Williams, Cormier, Kop, Williams, Mackness - all appear in this list. Some others - Garrison (I assume they mean [Randy Garrison](#)⁴²⁰, not D.D.) and Terry Anderson, notably, are well known and respected writers in the field. The research we were told several times does not exist apparently does exist. The remainder come from the xMOOC community, for example, [Pritchard](#)⁴²¹ from EdX, [Chris Peich](#)⁴²² from Stanford, [Daniel Seaton](#)⁴²³ (EdX). Tranches.

But what I say about the rest of the history of academic literature in education remains true. The authors selected to be a part of the MOOC Research Institute produced papers with only the slightest - if any - understanding of the history and context in which MOOCs developed. They do not have a background in learning technology and learning theory (except to observe that it's a

⁴²⁰ <https://coi.athabascau.ca/contact/rgarrison/>

⁴²¹ <https://www.edx.org/bio/david-e-pritchard>

⁴²² <http://web.stanford.edu/~cpeich/bio/index.html>

⁴²³ <http://www.rpajournal.com/dev/wp-content/uploads/2013/05/SF2.pdf>

good thing). The incidences of citations arise from repeated references to *single papers* (like [this one](#)⁴²⁴) and not a depth of literature in the field.

What were the conclusions of this fifth paper? As a result, nothing more substantial than the first four (quoted, pp. 188-189):

- Research needs to create with theoretical underpinnings that will explain factors related to social aspects in MOOCs
- Novel theoretical and practical frameworks of understanding and organizing social learning in MOOCs are necessary
- The connection with learning theory has also been recognized as another important feature of the research proposals submitted to MRI
- The new educational context of MOOCs triggered research for novel course and curriculum design principles

This is why I said in my assessment of the paper that "the major conclusion you'll find in these research studies is that (a) research is valuable, and (b) more research is needed." These are empty conclusions, suggesting that either the authors of the original papers, or the authors summarizing the papers, had almost nothing to say.

In summary, I stand by my conclusion that the book is a muddled mess. I'm disappointed that Siemens feels the need to defend it by dismissing the work that most of his colleagues have undertaken since 2008, and by advancing this nonsense as "research and evidence."

*Moncton, Canada
May 2, 2015*

⁴²⁴ <http://www.rpajournal.com/dev/wp-content/uploads/2013/05/SF2.pdf>

The Study, and Other Stuff

There are three separate threads in [Siemens's response to my last post](#)⁴²⁵, all of which are fascinating:

- The thread concerning whether or not the study he published was bad,
- The thread examining the question of whether universities can be a valuable force for social equity, and
- My own experiences of the university system.

Though the latter two threads are of endless interest, I'd really rather only focus on the first, for today.

Whether or not the study he published was bad

Siemens writes, "Stephen expands on his primary concerns which are about educational research in general." Let me be clear: I was making this statement about this study in particular. That's why I cited work from the study itself. Yes, I believe that educational work in general is pretty poor. But my focus was on this particular example.

I think he agrees with me, in part:

Educational research is often poorly done. Research in social systems is difficult to reduce to a set of variables and relationships between those variables. Where we have large amounts of data, learning analytics can provide insight, but often require greater contextual and qualitative data. ... The US Department of Education has a clear articulation of what they will count as evidence for grants. It's a bit depressing, actually, a utopia for RCTs (Randomized Controlled Trials).

And he says:

Stephen then makes an important point and one that needs to be considered that the meta-studies that we used are "hopelessly biased in favour of the traditional model of education as practiced in the classrooms where the original studies took place." This is a significant challenge. How do we prepare for digital universities when we are largely duplicating classrooms? Where is the actual innovation? (I'd argue much of it can be fore in things like cMOOCs and other technologies that we address in chapter 5 of the report). Jon Dron

⁴²⁵ http://www.elearnspace.org/blog/2015/05/03/linearity_downes/

largely agrees with Stephen and suggests that a core problem⁴²⁶ exists in the report in that it is a “view from the inside, not from above.”

So, from this, it appears that he *agrees* with my criticisms.

He nonetheless persists with his defense, focusing on the fifth paper in the study, first suggesting I don't find a lot to disagree with about it, and second, suggesting it is a vehicle for a conversation between two versions of myself. He also finds fault with some other criticisms:

The names listed were advisors on the MOOC Research Initiative – i.e. they provided comments and feedback on the timelines and methods. They didn't select the papers. The actual peer review process included a much broader list, some from within the academy and some from the outside.

Who selected the review committee? Who are the people 'from the outside' that were on it? Here's [the best we have](#)⁴²⁷ on the review process itself. Here are the [project reports](#)⁴²⁸. All of this was set in motion by the committee I named in my previous post. If there's another list of names of people who were responsible for the outcome, they should be named. Otherwise, the people named are the people responsible. You can't name a list of names and then say it wasn't them.

In his defense of the fifth paper (he seems not to defend the first four studies, the 'histories', at all) he also writes:

In my previous post, I stated that we didn't add to citations. We analyzed those that were listed in the papers that others submitted to MRI. Our analysis indicated that popular media influenced the MOOC conversation and the citations used by those who submitted to the grant.

I recognize this. What I am saying is that it seems to me that the 28 winners of a major education research grant competition would have demonstrated more depth of understanding that is apparent from the summary study that resulted. Maybe I should not have expected more from what was essentially an automated and quantitative analysis of the papers (because there are individually some bright spots). But when we look at the citations - which is essentially what we were provided - the results overall are not reassuring.

That's it for Siemens's defense of the study. The core of my criticism, which is addressed mostly at the first four chapters, is not addressed. Let me reiterate them here:

⁴²⁶ <https://landing.athabascau.ca/bookmarks/view/1046726/half-an-hour-research-and-evidence>

⁴²⁷ <http://www.moocresearch.com/mooc-research-initiative-grants-awarded>

⁴²⁸ <http://www.moocresearch.com/reports>

- They all have very small sample sizes, usually less than 50 people, with a maximum size less than 200 people
- The people studied are exclusively university students enrolled in a traditional university course
- The method being studied is almost exclusively the lecture method
- The outcomes are assessed almost exclusively in the form of test results
- Although many are 'controlled' studies, most are not actually controlled for "potential confounders"
- All these criticisms apply *if* you think this is the appropriate sort of study to measure educational effectiveness, which I do not.

I would now like to add that my criticisms are reinforced by two additional authors.

Although [Jon Dron says](#)⁴²⁹ "as such reports go, I think it is a good one," he writes:

For the most part, this report is a review of the history and current state of online/distance/blended learning in formal education. This is in keeping with the title, but not with the ultimate thrust of at least a few of the findings. That does rather stifle the potential for really getting under the skin of the problem. It's a view from the inside, not from above.

And additionally, [George Veletsianos writes](#)⁴³⁰,

One of Downes' criticisms is the following: "the studies are conducted by people without a background in education." This finding lends some support to his claim, though a lot of the research on MOOCs is from people affiliated with education, but to support that claim further one could examine the content of these papers and identify whether an educational theory is guiding their investigations.

I don't think it matters whether the investigation is informed by an educational *theory* - all I care about is that the studies contribute in a useful, relevant and credible way to the field.

Finally, Siemens says, "The appeal to evidence is to essentially state that opinions alone are not sufficient."

It can be allowed that Siemens's use of "we" in the Chronicle article "is about the academy's embrace of MOOCs." But as I pointed out, there's no mistaking his suggestion that the people outside the academy, the Alt-ac people, do not rely on evidence. This is what he says when he

⁴²⁹ <https://landing.athabasca.ca/bookmarks/view/1046726/half-an-hour-research-and-evidence>

⁴³⁰ <http://www.veletsianos.com/2015/05/02/who-studies-moocs-or-thinking-with-siemens-downes/>

says, "Another approach, and one that I see as complimentary and not competitive, is to emphasize research and evidence."

I have never suggested that opinion alone is sufficient, and never would. But he has to cease characterizing the alternatives as not evidence based. Because I believe the opposite. I believe that the controlled trials offered in the study misrepresent what little evidence they provide, and I believe that the alternative approaches offer substantially more evidence than is allowed.

Siemens says, "While Stephen says our evidence is poor, he doesn't provide what he feels is better evidence." I did once author a [Guide to the Logical Fallacies](#)⁴³¹, where I discuss the statistical problems. I've also talked about the same issue of evidence as it related to [public policy](#)⁴³². I've talked about [research methodologies](#)⁴³³ a number of times. And just the other day, [I linked](#)⁴³⁴ to a study I felt did pass muster (and indeed, over the years, I've linked to lots of things that I felt met the appropriate standards of research and evidence). And the body of my work, grounded in practical application and observation, stands as an example of what I feel constitutes "better evidence."

The Other Stuff

It's late and I don't want to longer on the off-topic stuff. But I also want to address a few things.

It's true that I am not a fan of universities and do not feel they support our common objective of "an equitable society with opportunities for all individuals to make the lives that they want without institutions (and faculty in this case) blocking the realization of those dreams."

This does not mean that I want to see them eliminated. And (contrary to Sebastian Thrun) I expect their numbers will multiply exponentially in the future.

But they need to be reformed, and they need to be brought around to the idea that social and economic equity are important. Because as it stands, they are one of the largest bastions in society standing *against* that idea. Here are a few of the ways:

- universities foster the perpetuation of a social elite, especially through exclusive institutions (Harvard, Yale, etc), legacy admissions, and perpetuation of a private social society consisting pretty much only of the one-percent

⁴³¹ <http://www.fallacies.ca/>

⁴³² <http://www.downes.ca/post/60>

⁴³³ <http://www.downes.ca/presentation/341>

⁴³⁴ <http://www.downes.ca/post/63825>

- universities bleed those outside the upper classes by consistently responding to society's demand for access with higher and higher tuition fees
- universities have fostered the creation of a low-paid academic underclass in order to support the students that pay these higher fees, and resist any suggestion that they should be fairly compensated, and actively resist unionization
- universities and professors continue to contribute to mechanisms which keep academic research behind expensive paywalls - indeed, they are so indifferent to these costs that they must be required by mandates and laws to open access to their research
- private universities operate tax-free, raise substantial endowment funds (sometimes in the billions), yet always plead poverty, and are typically the prime recipient of funding provided by governments and foundations attempting to support projects leading to the betterment of social and economic conditions
- they then waste that money, and a lot of other money, padding their own resumes and producing research such as the body of work I find myself criticizing today

Yes, perhaps universities could act as a force that promotes social and economic equity. They certainly have the talent and resources. But they don't, they don't want to, and they resist any attempt to make them do it.

It is true that I was badly treated⁴³⁵ by my PhD committee. But this is not a case of "today affirming that the Stephen in front of the PhD committee made the right decision – that there are multiple paths to research, that institutions can be circumvented and that individuals, in a networked age, have control and autonomy." Why not? A couple of reasons:

On the idea that, individuals, in a networked age, (should) have control and autonomy: I have *always* believed that. I believed that *long* before I ever stood before a PhD committee.

On the idea that "the Stephen that today has exceeded the impact of members on that committee through blogging, his newsletter, presentations, and software writing. "This may or may not be true. But I have never believed that I have been more influential because I have worked outside of academia.

I have been influential *despite* being outside academia. I have been influential *despite* not having a professor's wages, the support of grad students, a year off every seven, tenure, funding from foundations, grants and agencies, book contracts, and the rest. No university in the world would ever hire me, because they consider me unqualified. I don't regard any of this really as an upside.

⁴³⁵ <http://www.downes.ca/post/53399>

p.532

Because that's what academia does. It wields huge sums of money and the support to achieve certain social and economic outcomes. I just wish it was wielding this power for good, rather than indifference. But I don't think it ever will.

Moncton, Canada
May 3, 2015

What I Learned from Philosophy

I [posted](#)⁴³⁶ an item in OLDaily today from Forbes touting the benefits of formerly 'useless' liberal arts degrees. In this item Slack CEO Stewart Butterfield is [quoted](#)⁴³⁷:

“Studying philosophy taught me two things,” says Butterfield, sitting in his office in San Francisco’s South of Market district, a neighborhood almost entirely dedicated to the cult of coding. “I learned how to write really clearly. I learned how to follow an argument all the way down, which is invaluable in running meetings. And when I studied the history of science, I learned about the ways that everyone believes something is true—like the old notion of some kind of ether in the air propagating gravitational forces—until they realized that it wasn’t true.”

It's worth mentioning because the Department of Philosophy at the University of Calgary has a notice posted on the wall to the effect that a philosophy degree was no guarantee of a job and that graduates should not study expecting employment in the field. This wasn't parody or in any way humorous - it was an official memo from the chair and posted in all seriousness. I can still see it in my mind, not a big poster but an 8.5 x 11 memo with typed text.

I have often commented that my work in philosophy left me particularly well-suited to employment in the new economy. It's not merely that sorting out corporate information might be simple after spending years teasing out the nuances in [Wittgenstein](#)⁴³⁸, as the article suggests, though it's partially that. It's about what it is to know and to learn at a deeper level, which can then be applied to new disciplines whatever they may be.

But what, precisely, did I learn from those years of study? That's a hard question to answer. But it's worth a bit of a sketch here.

⁴³⁶ <http://www.downes.ca/post/64245>

⁴³⁷ <http://www.forbes.com/sites/georgeanders/2015/07/29/liberal-arts-degree-tech/>

⁴³⁸ http://www.brainyquote.com/quotes/authors/l/ludwig_wittgenstein.html

Precision

Butterfield said he learned to write clearly. But what does that mean? *Fun with Dick and Jane*⁴³⁹ is written clearly but we want to express thoughts more complex than "see Spot run." Writing clearly means writing with precision, and precision is what philosophy teaches.

For example, it is commonly said that a sentence has a subject and a verb. This proves to be important in clear writing. In clear writing the subject of the sentence is unambiguous. The reader knows exactly what you are talking about. Through the rest of my days I have always been attentive to the identification of the subject. You would be surprised how many people are not.

There are specific ways of naming the subject. One way is to point, in words (that is, to name your subject ostensibly). "*This* is a sentence. *That* was an argument worth hearing."

Wittgenstein did that a lot. Another is to use a definite description. "The present King of France," for example, was the subject of much discussion between Russell and Strawson. Another way is to use names, which may in turn be subject to definitions, for example, "dogs", "millennials" or "Barack Obama".

How many ways are there to be imprecise about the subject? There is always our favourite case, the amphiboly: "One morning I shot an elephant in my pajamas. How he got into my pajamas I'll never know." Another is to refer to something without a definite or indefinite article, for example, saying "Matter of importance is clarity," instead of "*A* matter of importance..." or "*The* matter of importance." Or there is the use of vague terms: "freedom is what defines our approach to software." And on and on the list goes.

Precision is what lies at the root of grammar. In my opinion, the rules of grammar (for the most part) exist in order to ensure precision. A lot of times it is the little things that cause confusion. A single comma⁴⁴⁰ can change the entire meaning of a sentence. As when Johnny said, "It's supper time. We're ready to eat, Uncle Charlie."

Structure

What you learn in philosophy is that sentences - and thoughts generally - are not unstructured streams of consciousness. This is especially clear in languages like French, where you have to

⁴³⁹ http://auburnpub.com/lifestyles/ricci-fun-with-dick-and-jane-and-childhood-reading/article_fbad973d-84f1-5eae-8cd6-b0e2004fcc2f.html

plan your sentences ahead of time, in order to ensure the gender of your words are in accord⁴⁴¹. In all languages, structure indicates not only the subject and verb, as mentioned above, but also logical form leading to such things as inference and explanation.

Why does this matter? Well, as I've written elsewhere⁴⁴², understanding this structure is key to writing useful and meaningful essays. It is also key to being able to analyze and *understand* what other people have written. When you read an editorial containing a whole list of sentences, how to do determine what opinion they are trying to express? It is the structure of the article that tells you this.

Structure is logic, and logic is structure. You can see this by looking at the different kinds of logic; they reveal to you the different kinds of structures you can employ in your reasoning:

- *propositional* - connecting and relating the truth of basic sentences using 'and', 'or', 'if-then' and 'not'.
- *quantificational* - specifying how many of something we're talking about, and inferring about properties of groups of things
- *causal* - understanding the conditions under which one thing is said to cause another
- *modal* - talking about whether things are 'necessary' or merely 'possible'
- *statistical* - understanding probability, that is, how likely something is to happen, or to be true
- *deontic* - thinking about the nature of obligation and permission
- *doxastic* - the logic of beliefs
- *mathematical* - axioms, calculus and set theory
- *computational* - Turing machines and computational processes

Not only did I learn that all these forms of logic *exist* (who knew?) I also actually learned them, which means I can make really complex inferences, but more importantly, know some pretty basic things. For example, if 'P' is necessarily true, is 'P' true? (Yes) Or for example, if 'P is always Q' is true, does it follow that 'P' is true, or that 'P' exists? (No).

Syntax and Semantics

Syntax is the structure of something - its logic - while semantics refers to its meaning, truth or value. Syntax is the fact that ten dimes make up a dollar; semantics is the fact that it takes ten dollars to attend a movie.

⁴⁴¹ <http://french.about.com/library/weekly/bl-agreement.htm>

⁴⁴² <http://www.downes.ca/post/38526>

The very fact that syntax and semantics are distinct is important in itself, for several reasons.

The first is that syntax is arbitrary. We can make up any sort of syntax we want. This is not so easy to see in everyday arithmetic and propositional calculus, where the rules are deeply entrenched. But in modal logic, however, we have various 'systems' such as [T, K, S4 and S5](#)⁴⁴³. Which one of these is 'true'? Well, they all are. Or none of them is. Or, it doesn't even make sense to ask the question. In mathematics, similarly, there are different axiom systems. Which is 'true', [Peano](#)⁴⁴⁴ arithmetic? [Mill's Axioms](#)⁴⁴⁵? Or does it [even matter](#)⁴⁴⁶?

In fact, a syntax, thought in and of itself, can be whatever we want it to be. Usually we set out some basic requirements - the system should not allow contradictions, for example. But there's no *requirement* that we do this, and if we develop a system that does not have truth as its basis (language, say) then the principle of non-contradiction doesn't even make sense! Take a look at my [categorical converter](#)⁴⁴⁷ - do the lines *have* to be drawn that way? Well, no. Or imagine a logic that is falsity-preserving, rather than truth preserving: they look like mirror images, but in falsity-preserving logic, nothing follows from a contradiction, and everything follows from a tautology.

If pressed, we would say that we need to choose one system of logic over another because one of them works in the real world, but the other doesn't. But the relation between logic and the world is far from clear. We 'prove' a system of logic with a semantical argument, but the relation between a semantics and a logic is itself the subject of discussion; these different relations are called 'interpretations'.

What does it mean, for example, to say that "the probability of 'P' is n "? There are three major types of interpretations of this statement:

- the logical interpretation, from Rudolf Carnap - for every possible state of affairs in which P could be true or false, in n of them, P is true;
- the frequency interpretation, from Hans Reichenbach - in all cases in the past where P could be true or false, in n of them, P is true;

⁴⁴³ <https://www.otexts.org/mlo/1>

⁴⁴⁴ <http://www.math.wustl.edu/~kumar/courses/310-2011/Peano.pdf>

⁴⁴⁵ <http://www.gutenberg.org/ebooks/27942>

⁴⁴⁶ <http://www.ditext.com/hempel/math.html>

⁴⁴⁷ <http://www.fallacies.ca/why.htm>

- the subjectivist interpretation, from Frank Ramsay - of you were to make a bet on the likelihood that P is true, you would require odds of n .

So if we are to validate the laws of probability - Bayes Theorem, for example - against an empirical model, which of these is the correct model to choose?

For that matter, what makes a statement P 'true' at all? Alfred Tarski said "the sentence 'snow is white' is true if and only if snow is white." Well, that sounds good. But the sentence "brakeless trains are dangerous" can be true even if there are no brakeless trains. So it seems there are two basic principles of truth - a *correspondence* principle, which requires reference to a physical world of some sort, or a *coherence* theory, which requires consistency with a model.

This is how murky these questions can get when we're talking about something as basic as truth. In the 20th century, however, philosophers focused on other aspects of semantics, such as *meaning* and *value*. Here, the discussion became even more murky.

When someone comes to me and says that some thing or another is 'true', you can see I have a lot to think about regarding what this assertion could possibly mean. When somebody says to me that "We can all agree that *such and such*," I begin to distrust this person, first because the statement is probably false, and second because it's not at all clear to me that 'agreement' is even relevant to the sort of truth, value or meaning that we are discussing.

These are really important lessons, and they apply everywhere.

What are 'Things'?

Philosophy taught me that anything can be a 'thing' - it just depends on how you look at it. And that there are different types of things, and different types of types of things.

Our teachers in school spent a lot of time telling us about the basic types of things - animals, minerals and vegetables - and the different types of each thing that fall neatly into categories beneath them as kingdoms, phyla, species and genera.

In university I learned that the way we define a thing in this system is to identify the category a thing belongs in, and what distinguishes it from other members of that category. "A *cat* is a *mammal* that *purrs*." "A *hammer* is a *tool* used to *drive nails*." That sort of thing. "An x is such that all x are y and only x are z ." Necessary and sufficient conditions. *Essences*.

Then in philosophy I learned that all of this is arbitrary. The beautiful system was upended, most notably, by Wittgenstein. "What is a game?" he asked. Is there any statement that is true about *all* games? No. Is there any statement that is true about *only* games? No. The idea of a 'game' is that it is a bunch of things that are kind of the same, like family resemblances, so you can see that they are sort of alike, but there is nothing unique that defines them.

Language itself is like this. We don't have 'rules' properly so-called, we have "language games". What does a word mean? Well, it depends on how we use it. The meanings of words, the rules of language, the nature of what is true and what isn't - these all *shift* over time, like the bed of a river.

Even more importantly., what a thing *is* depends not on the thing itself, but on how it is observed. Because whether one thing 'resembles' something else really depends on your point of view. We can in one sense say that checkers resembles chess, while in another sense say that checkers resembles mathematics.

There are many ways to define things: we can point to them, we can say what they contain, we can say what properties they have, we can talk about what they do, what they were designed to do, what they actually do, what they might do, we can say what they're for, we can talk about where they're from or who (or what) created them, and on and on.

Viewed this way, anything can be a 'thing', and any group of things can be a thing. George Lakoff talks about the culture that divides the world into two types of things: one class consisting of "women, fire and dangerous things," and another class consisting of everything else.

So much of what we do today involves either working with certain types of things, or understanding that we are defining new types of things. What are 'students'? What is a 'learning object'? How do we define an 'ontology'? Philosophy taught me about the limitations of relational databases long before there were relational databases.

Theories and Models

Quine's [Two Dogmas of Empiricism](#)⁴⁴⁸ taught me (and everyone else) two important things:

- There's no such thing as the analytic-synthetic distinction
- Reductionism is false

Above I discussed the distinction between syntax and semantics. The collapse of the analytic-synthetic distinction means that no statement is wither purely syntactical or purely semantical.

What does this mean? An analytic statement is supposed to be true simply by virtue of the meanings of its terms. We say " $1 + 1 = 2$ " is true, not because of some fact about the world, but because of the *meaning* of the terms '1' and '2' and '+' and '='. But if we put it this way, no statement is purely analytic. "It is obvious that truth in general depends on both language and extra-linguistic fact."

⁴⁴⁸ <http://www.ditext.com/quine/quine.html>

This leads us to the second dogma: reductionism. This is the idea that all true statements can be reduced to 'observation language' or some other basis in pure facts (this could be any set of facts: facts about the world, facts about pure thought, facts about the *Bible*). But in fact, there is no set of 'observation statements'. Every 'fact' carries with it some element of the theory it is purporting to prove. For, without the theory, there is no way to say whether even a simple sentence like "the sky is blue" is true or false.

This taught me, critically, that what a person *sees* depends on what that person *believes*. It means we have to rethink how we approach research and discovery, but also that we have to rethink how we communicate with people, how we appeal to reason and evidence, and even how we regard the world and our place in it ourselves. And it's why education - and how we think of education - is so important.

For example, I say "to teach is to model and demonstrate". These are not idly chosen concepts. *What we model* impacts *how they see* the world. Consider four world views (all of which correspond loosely with different generations in and around my lifetime):

- We're at war. Our heroes are war heroes. When we work, we're at the front line. The challenges we face are battles. The determination of a Churchill or a Patton inspire us.
- We are explorers. We use science and technology to discover new things. When we work, we are solving problems. The challenges we face are mysteries, the unknown. The courage of John Glenn and James T. Kirk inspire us.
- We are players. Our heroes are athletes who bring out the best in themselves. We leave it on the playing field, but experience camaraderie outside the arena. The strength of Gordie Howe or Hank Aaron inspire us.
- We are entrepreneurs. We take ideas and make change in the world, bending vast empires of money and people to our will. We are driven by results, and expect a return on our investment. Our heroes are people like Bill Gates and Steve Jobs.

And there are many more, in different generations of different societies around the world. Each of these does not represent just a different world view or a different paradigm. It represents a different *way of life*. Without philosophy, it's impossible even to understand that there are other ways of life, much less to understand what they could be like.

What are 'evidence' and 'proof' to people in each of these different worlds. I inhabit a workspace where the only measure of whether something has value is whether someone will pay for it - part of that entrepreneurial mindset. I don't agree with that mindset, but I'm also aware that my own mindset, the explorer mindset, isn't *inherently* superior.

People are always saying to me that "*this* counts as a theory, but that doesn't," or that "*this* counts as research, but that doesn't." I recognize such statements as arbitrary, and representing a set of parameters that the speaker has employed to define what will count as 'normal' (or 'standard', or

'appropriate') in their lives and work. I know I won't change their minds on this, probably, because no evidence exists that does not reinforce their world view. That's the nature of world views.

Thought is Associative

Not everybody who studies philosophy will learn this (see the preceding paragraph) but I did, and it was of fundamental importance to me.

There are different ways to make the same point. Other people, for example, will say that they learned that not everyone is rational, or that people don't make rational decisions. Others will say that people think in music and pictures and whatever. These are both true. But for me, it comes down to the idea that thought is associative.

But what does it mean? It's hard to explain in words, but by way of a metaphor, I would say that the principles of knowledge, memory and understanding are basically the same as the principles that apply when you throw a rock into a pond. There is the impact, there is the cascade as waves rush out from the rock, there is the pushback as waves bounce off each other and off the shore, and there is the settling as the pond returns to its level.

Now the human brain is much more complex than a pond, but in both cases, the impact of something new affects the entire system, even though the cause touches only one small part of it. The rock touches some water, which pushes against other water, which pushes against a shoreline, and so on. The water organizes itself through a whole series of molecule-to-molecule interactions. There's no head molecule. There is no 'purpose' or 'order' defining what the waves must be - if the stone had been bigger, the water colder, the shoreline shaped differently, it would have worked out in a completely different way.

We are on the verge of understanding how that process actually works in brains (we understand pretty well already how it works in ponds, to the point that we have an entire discipline built around [fluid dynamics](#)⁴⁴⁹). What we don't have yet is a way of understanding the world consistent with this understanding of how thought works.

For example, I have said frequently, *knowledge is recognition*. Water doesn't really retain the impact of rocks, which is why ponds aren't intelligent. But other more complex and more stable entities will retain traces of the impact. One thing influences the next, and each thing preserves a trace of that influence, such that after a while characteristic patterns of input produce characteristic responses. This is recognition. And it is, to my mind, the basis for all human intelligence.

⁴⁴⁹ <https://www.hydrologystudio.com/if-you-learn-only-three-things-from-your-fluid-mechanics-class/>

This way of thinking is in an important sense post-semantic. I don't see one thing as a 'sign' for another. I don't see mental models as 'representations' of some external reality. I see knowledge, cognition and communications as complex interplays of signalling and interaction, each with no inherent meaning, but any of which may be subsequently recognized by one or another entity.

Remember how Marx said "everything is political"? Well, I think that "everything is a language" (or, alternatively, there's nothing special about language over and above other forms of communication). So when I create a 'scientific theory', which is my job, I create something that consists of language, code, actions, photographs, and a host of other artifacts, all of which are reflections of my interactions with the world, not intended to 'represent' some deeper truth or underlying reality, but rather, intended to offer a set of phenomena that may be usefully employed by others (depending on what they recognize it as being useful for).

Born Free

In any number of recent movies - the Hunger Games, for example, or Divergent - the plot revolves around the idea that society is structured in such a way that we all have our assigned places where we work and live. Sometimes, as in Harry Potter, this is depicted as a good thing. But more often the established order is the subject of resistance.

The concept originates in Plato, who in *the Republic*⁴⁵⁰ argued that society should be run by philosophers, and that the position of each person would be determined by their inner nature. "One man will acquire a thing easily, another with difficulty; a little learning will lead the one to discover a great deal; whereas the other, after much study and application, no sooner learns than he forgets; or again, did you mean, that the one has a body which is a good servant to his mind, while the body of the other is a hindrance to him."

It is true that there are innate variations among humans. But the far greater differences between people are the result of their upbringing, culture and education.

In philosophy I encountered the idea that there is an inborn 'human nature' on a regular basis, from the above-mentioned assertions from Plato to Descartes's ideas about the stamp of God implanted in the human brain to Chomsky's postulation of an innate deep grammar. People argue that there are common things (love of justice, fear of death) that unite us all, and essential properties (mental capacity, physical strength, mathematical abilities) that divide us.

But none of this is true. What we have in common operates at a far lower level than people suppose. It operates at a genetic level, a cellular level, which defines only the most basic principles of human composition. Our heritage determines that we will have leg muscles, but not

⁴⁵⁰ <http://classics.mit.edu/Plato/republic.html>

how string those muscles will be. It determines that we have interlinked neural cells, but not how they will be wired together. It determines that we will have a voice, but not what we will say.

Time and time again I have encountered evidence of this. When we look at physical properties, for example, and even the oft-touted difference between men and women, we see how large a role nutrition plays (women are *tall* and *strong* in nations where they are well-fed and nourished - think about that). The physical differences between *individual members* of any race, class or gender you can name are far greater than any between the races, classes or any other identifiable group.

The same is true of mental properties. Time and time again, the most reliable predictor of educational outcome is socio-economic status. This is not because (as some suggest) the best and brightest become rich (surely we have countervailing evidence of *that*) but because of the advantages they receive in early life, everything from a rich intellectual environment, proper nutrition and stimulation, and social expectations supporting learning and achievement.

How much of philosophy is devoted to determining whether there are natural - or *essential* - properties of things, and most especially humans? Arguably, most of it. The argument that something 'must be X' on the basis that 'X has property or capacity Y' runs through the entire history of philosophy, from Thales to Aquinas to Kant to Fodor. And none of these speculations has ever stood the test of time. There are no innate properties of significance. We are born free.

Value

The word 'value' is a bit loaded as in our entrepreneurial age it has become virtually synonymous with some means of quantification in terms of worth, utility or commodity. There are older senses in which the term 'value' meant something like those properties synonymous with virtue, but those senses of the word are almost inaccessible to us now; we would have had to have been born in a different time and a different place to understand it.

I think philosophy has taught me to think of value a bit more deeply than that, and to at least be able to articulate alternatives that can count as 'value'. These alternatives form the basis of the various systems of morality and justice that have prevailed over the years.

I once wrote to the *Globe and Mail* in a no-doubt long-lost online forum that the underlying value that defines Canada is this: in diversity, harmony.

You need both parts. Harmony is the underlying value (the earth, as the Taoists might say), the receiver of all things, the pond after it has become stable, the mind after it has become calm, uncertainty and turmoil resolved. But rocks and sand crabs and fungus also exhibit large degrees of harmony; we want something more. This is provided by diversity, the possibilities of experience, the creation of the need to adapt, to understand, to grow and to learn.

But hey - it's just a value system. It's not like others haven't tried before me. And this knowledge keeps me humble.

One type of value system revolves around survival. It's an animal value system, an artifact of our lizard-brain, perhaps, brought through centuries of socialization to mean also the survival of the offspring, survival of the tribe, or survival of the species. We see it reflected to day in such philosophies as social Darwinism, survivalism, and various types of rule-based tribalism.

Another type of value system revolves around ideals. We have the Platonic forms, the perfect Christ, Man and Superman- the idea is that the closer we can come to perfection, the greater the value we have realized.

Another type of value system is based on duty and obligation. Perhaps best represented by Kant, it is informed by the idea that each person is an "end in themselves", not a means to an end (today we would say "each person is inherently valuable") and that we ought to act in the manner such that every person could also consistently act in the same manner. Your mother invokes Kant's categorical imperative when she says, "What is everyone else did that?"

Still another is based around the idea of happiness, and of freedom in a manner that enables a person to maximize their own happiness. People like Jeremy Bentham and John Stuart Mill are most closely associated with this philosophy, and Mill famously proposes that the goal of society ought to be to allow each person to pursue their own good in their own way. I have a lot of sympathy with that ideal.

Maybe they all amount to the same thing. There's no shortage of ecumenical authors who like to suggests that, at heart, we all have the same system of values. But if this were true then we would have no satisfactory explanation for a Jeffrey Dahmer or a Clifford Olsen. So even while it feels to me that those perfect moments of harmony are a combination of happiness, obligation and ideals, I think that other people see these values very differently.

This is important to understand. People like to say things like "the truth lies somewhere in the middle" or "the good is what we can all agree on". But there really is no such thing (or if there is, we have utterly no means of finding it just yet).

Justice

I was never really a fan of moral philosophy, because of the force of the observations just presented, and even less of political philosophy, which to my way of thinking was offered for the most part by the powerful to rationalize their exercise of power.

Of course, I have probably been jaded by the fact of being born and raised in an environment where the peak of political philosophy varied between people justifying why we would have enough military might to destroy the entire planet and people giving reason why we should or

should not use it. Political philosophy in my age is and continues to be about the deployment of political power.

Probably the predominate idea in political philosophy is some sort of version of social contract theory. This is the idea (and we see it reflected in school charters and corporate vision statements) that we are united as a society under a set of principles that we have agreed to in order to live together, prosper together or learn together.

The motivation for such a social contract is generally that the alternative is unbearable. Without, for example, the benign power of an absolute sovereign, wrote Thomas Hobbes, our lives would be "solitary, poor, nasty, brutish and short" (or course, given some of the sovereigns he was defending that might be preferable).

The idea that we have *actually* signed such a contract is, of course, absurd. So the nature and standards of conduct in the contract are often implied - Rousseau, for example, appeals to the state of nature in which the noble savage found himself, as compared to contemporary society - "man is born free, but everywhere he is in chains." John Locke, envisioning an endless commons, imagines that the rights of property are established when someone "affixes his labour" to that which may be found in nature (an argument that justified the conquest of North and South America). John Rawls imagines that we could imagine what we would negotiate with each other under a "veil of ignorance" in which no one knew whether they would be a pauper or a king; this would result in a system of "justice as fairness".

And of course there are communitarian theories of political philosophy based around the common ownership of "the means of production" which would ensure that everyone gets "to each, according to his needs, from each according to his means." Other communitarian theories of justice assert the collective rights of women, minorities, language groups, religions, and others.

Interestingly, I don't think that anyone who is *actually* in politics subscribes to any of these philosophies *per se*. Actual observation (if there is such a thing) suggests that most of our social and economic leaders are engaged in one or another version of Machiavellian political theory, loosely stated as "might is right".

For my own part, I don't know whether "man is born free," but I do observe that "everywhere he is in chains," and just as I feel the limitations of my own self-actualization I feel that the other people of the world who have even less advantage than I do must feel more or less the same thing, perhaps more deeply. I do not see us as merely "workers" or even as members of this or that community; from Kant I draw the idea that each person is equally important and equally special, and that our society and our individual lives are most enhanced by realizing that.

But I have no illusions, I don't believe in utopia, and I don't believe we can engineer (as so many political philosophies suggest) a better society, a better company or a better school. In the end,

the political philosophy we employ - the nature of our culture, our social believes, our nation - is the result of a billion individual, decisions made every day, and each of these decisions is based on the many factors I've outlined above.

Good government, in other words, depends as much on things like precision of language, structure of reasoning, appropriate semantics, and all the rest, and even then, there's no guarantee that the government we get will be in any meaningful sense *good* - the best we can hope for, maybe, is government that is *just*, and leave the rest to the people.

In Sum

In sum, philosophy has taught me the basics of what I need to conduct myself in virtually any enterprise or occupation (save perhaps things like Major League Baseball).

I've learned through philosophy that nobody is special, and everyone is special. That nothing is real, and everything is real. That there are infinite ways we can describe and divide up the entities in the world, that in practice we fall into habits of seeing and reasoning about the world based on our experiences and the influence of those around us (and today, that influence includes language and media).

I think that the reason we are alive is because it's possible, and the reason we die is to continue to allow it to be possible, by allowing our form of existence to grow and develop and adapt and flourish.

I'm still trying to embrace diversity, and I'm still seeking harmony.

*Moncton, Canada
July 30, 2015*

Experts and Authority



In an article last year (and soon-to-be [book](#)⁴⁵¹) Tom Nichols [complained](#)⁴⁵² about the new relativism brought about by Wikipedia and Google and bemoaning the declining authority of the

⁴⁵¹ <http://tomnichols.net/blog/2015/06/18/coming-in-2016-the-death-of-expertise-the-book/>

⁴⁵² <http://thefederalist.com/2014/01/17/the-death-of-expertise/>

expert. I [encountered](#)⁴⁵³ his article today via Facebook; I'm not sure whether the source of this information had any impact on its veracity.

"Today," he writes, "any assertion of expertise produces an explosion of anger from certain quarters of the American public, who immediately complain that such claims are nothing more than fallacious 'appeals to authority,' sure signs of dreadful 'elitism,' and an obvious effort to use credentials to stifle the dialogue required by a 'real' democracy."

To be sure, the three things he cites here are all things to be avoided:

- 'Appeal to Authority' is an [actual fallacy](#)⁴⁵⁴; it occurs when an authority is cited in cases where (a) the authorities disagree among themselves, or (b) where the authority is speaking outside the area of his or her expertise.
- Elitism is a [structural defect](#)⁴⁵⁵ in society, representing a state of affairs where those who are in power and authority manipulate the rules in order to maintain their (or their children's) position in society.
- Stifling the dialogue, as [we are seeing](#)⁴⁵⁶ in Canadian society today, is a breakdown of communications that prevents society as a whole from learning about its mistakes, exposing sources of corruption, or uncovering injustice.

How do I know all this? Well, I too am an expert - or, more accurately, I am called an expert by people who are in a position to know, or to recognize, that I am an expert. And the relation between democracy, expertise and authority is, I would say, much less straightforward than described in Nichols's column.

Let's take democracy as an example. Here's what Nichols says about democracy:

But democracy, as [I wrote in an essay about C.S. Lewis and the Snowden affair](#)⁴⁵⁷, denotes a system of government, not an actual state of equality. It means that we enjoy equal rights versus the government, and in relation to each other. Having equal rights does not mean having equal talents, equal abilities, or equal knowledge.

It is true that it does not follow that because we are governed by democracy that we attain an actual state of equality. But it *does* mean, as Nichols suggests, that we are all equal before the

⁴⁵³ <https://www.facebook.com/jburkemaine/posts/10156088875255157>

⁴⁵⁴ <http://www.fallacies.ca/aa.htm>

⁴⁵⁵ <https://en.wikipedia.org/wiki/Elitism>

⁴⁵⁶ http://www.nytimes.com/2015/08/16/opinion/sunday/the-closing-of-the-canadian-mind.html?_r=0

⁴⁵⁷ <http://tomnichols.net/blog/2013/08/02/snowden-manning-and-screwtape/>

law. But what does that mean? A naive interpretation would suggest that the law treats each of us the same. But experts know (having [read Rawls](#)⁴⁵⁸) that democracy means something like "justice as fairness". That is, even though we are not all equal, in a democracy, the law should *tend* toward helping us all become equal.

It's a complex idea but simple enough in practice. It means that society should help improve the talents of the untalented, that it should seek to increase the skills of those with lesser abilities, and to expand the knowledge of those with less knowledge. Yes, there is the presumption that there should be equality before the law (this is the famous dictate of Solon) but what it means in practice is that people in positions of power and authority should not bend the law to their own advantage. There's nothing wrong with using the law to enhance the standing of the poor and disempowered. Or as [Plutarch](#) says⁴⁵⁹:

Thinking it his duty to make still further provision for the weakness of the multitude, he (Solon) gave every citizen the privilege of entering suit in behalf of one who had suffered wrong. If a man was assaulted, and suffered violence or injury, it was the privilege of any one who had the ability and the inclination, to indict the wrong-doer and prosecute him. (Life of Solon, 18.5)

So when Nichols says this:

It assuredly does not mean that "everyone's opinion about anything is as good as anyone else's." And yet, this is now enshrined as the credo of a fair number of people despite being obvious nonsense...

he is wrong. *In a court of law* everyone's opinions are as good as everyone else's. Indeed, we even make allowances to the favour of those who are *not* in a position of authority or high social standing. The facts and justice stand *independently* of anyone's opinions. That is what Solon enshrined, and that is the rule that forms the basis of democracy. And it is the foundational principle of reason, science and enquiry to this day.

As have numerous pedants before him, Nichols appears to be far more concerned about the *source* of knowledge and information than about its [veracity](#)⁴⁶⁰ (that is, its truth or fair representation). "I fear we are witnessing the 'death of expertise': a Google-fueled, Wikipedia-based, blog-sodden collapse of any division between professionals and laymen, students and

⁴⁵⁸ <http://sites.wofford.edu/kaycd/rawls/>

⁴⁵⁹ http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Lives/Solon*.html

⁴⁶⁰ <https://en.wikipedia.org/wiki/Honesty>

teachers, knowers and wonderers," he writes. Google-fueled indeed; that's how I found the references to Rawls and Plutarch.

Yes, experts make mistakes, he concedes. "But an expert is far more likely to be right than you are. On a question of factual interpretation or evaluation, it shouldn't engender insecurity or anxiety to think that an expert's view is likely to be better-informed than yours," he writes. This is true, just as it is true that a rich person has more money than you. But we shouldn't so lightly accept the moral authority of either.

But let's acknowledge this, and agree that "experts have a pretty good batting average compared to laymen: doctors, whatever their errors, seem to do better with most illnesses than faith healers or your Aunt Ginny and her special chicken gut poultice." Quite so.

But notice that it is in a democratic society, where experts are *far more likely to be challenged*, that experts hold the most sway. Before the widespread rise of public information, people were much more likely to purchase snake oil. Old wives tales, in an enlightened society, are exactly that: *tales*. It is when experts are beyond challenged by both the informed and uninformed that the true value of expertise can take hold.

Nichols ought to pause for a moment to consider why this is the case.

He writes, "The death of expertise is a rejection not only of knowledge, but of the ways in which we gain knowledge and learn about things. Fundamentally, it's a rejection of science and rationality, which are the foundations of Western civilization itself."

This to me represents a fundamental misunderstanding of how science and rationality work. The world of the expert - of any expert - is obliged to be subjected to the widest possible criticism. This applies equally to practitioners of snake oil and anti-cancer vaccinations. That is *how* we are able to distinguish between the reasonable and the irrational. And it *does not matter* whether the criticism comes from within the domain of enquiry or from an authoritative source. Because rationality isn't about getting things right, it's about getting the right things right.

Look at his examples: "'Western civilization': that paternalistic, racist, ethnocentric approach to knowledge that created the nuclear bomb, the Edsel, and New Coke, but which also keeps diabetics alive, lands mammoth airliners in the dark, and writes documents like the Charter of the United Nations." These make *my* case far better than they make *his* case.

First of all, those experts who also happen to be paternalistic, racist, and ethnocentric can be questioned on that basis. We know that facts do not exist in isolation, but rather, they are a product of a perspective or a point of view (even an expert's, most especially is he or she is paternalistic, racist, or ethnocentric). We *should* question whether modern physics embodies

a [western perspective](#)⁴⁶¹ of time. We *ought* to ask whether a biological thesis is informed by [racism](#)⁴⁶². Shielding the authority from uninformed questioning is more likely to shield the authority from *these* questions, which come from outside the field.

The [Edsel](#)⁴⁶³ is a really good example of getting the right things wrong. It featured many advances in automotive technology, including engine warning lights, seat belts, and child-proof rear door locks. But it failed on non-technical features such as aesthetics and price. It's the sort of failure experts could have avoided with non-expert opinion (and it's why companies use devices such as [focus groups](#)⁴⁶⁴ to ensure they don't make similar mistakes in the future).

Not trusting the expert is dangerous, writes Nichols. "We live today in an advanced post-industrial country that is now fighting a resurgence of whooping cough — a scourge nearly eliminated a century ago — merely because otherwise intelligent people have been second-guessing their doctors and refusing to vaccinate their kids."

Well yes. But the *reason* people like [Jenny McCarthy](#)⁴⁶⁵ jumped on the anti-vaxxer bandwagon was that an *expert*, British physician Andrew Wakefield, "published a paper in *The Lancet* that purported to identify a link between the measles, mumps and rubella (MMR) vaccine and the appearance of autism in children." And history is such that sometimes the lone expert is more trustworthy: witness the case of [Frances Oldham Kelsey](#)⁴⁶⁶, who protected the United States from the horror of Thalidomide poisoning.

Had Jenny McCarthy been right, she would today be hailed as 'an expert'. But she was wrong; Wakefield's paper was revealed as a hoax, and there is no link between vaccines and autism. But in the same breath, we would be dismissing Kelsey as a crank had Thalidomide turned out to be same. One of the features of expertise is that it is typically revealed only *after the fact*, when it is too late to be of any use. Before that time, we have to make use of argument, evidence and statistics, and not credentials.

⁴⁶¹ <http://www.britannica.com/topic/philosophy-of-physics>

⁴⁶² <http://www.britannica.com/topic/social-Darwinism>

⁴⁶³ <https://en.wikipedia.org/wiki/Edsel>

⁴⁶⁴ https://en.wikipedia.org/wiki/Focus_group

⁴⁶⁵ <http://www.thenation.com/blog/175388/jenny-mccarthys-vaccination-fear-mongering-and-cult-false-equivalence>

⁴⁶⁶ <http://www.theglobeandmail.com/life/health-and-fitness/health/frances-oldham-kelsey-averted-a-thalidomide-tragedy-because-she-wouldnt-be-rushed/article25976972/>

Nichols displays an increasing impatience with the rigour of disproving the Kelseys of the world. "You will get snippy and sophistic demands to show ever increasing amounts of 'proof' or 'evidence' for your case," he writes, "even though the ordinary interlocutor in such debates isn't really equipped to decide what constitutes 'evidence' or to know it when it's presented."

But Nichols confuses between making the case generically, and making the case to the satisfaction of a particular individual. As an expert with a long history of engaging in arguments with people, I can say with assurance that it will not be possible to convince everybody of anything. People - experts and non-experts alike - have their own '[riverbed propositions](#)'⁴⁶⁷ from which they will not budge no matter how reasonable the evidence. When an expert responds to an argument, it should be done publicly, as the intent is to demonstration to the public as a whole, not the individual in question. As a society, we decide.

And we need to be clear about the nature of the two assertions Nichols is making. First, he is arguing that there are things that count as evidence and things that do not. And second, he is arguing that non-experts are incapable of drawing this distinction. I think that on both counts he is wrong.

Sure, people may make unreasonable demands of science. For example, they may criticize evolution on the grounds that it is "only a theory", or demand "proof" of human-caused climate change. This does not mean these are not forms of evidence; it merely means they are unattainable (scientists would love to be able to refer to the *law* of evolution, or point to *proof* of global warming, but it's just not forthcoming).

And things like Biblical references, the missing link, the little ice age, and other such non-evidence are *not* non-evidence: they are anomalies that the theory must explain. The coincident increase in diagnosis of autism with vaccination is a real thing, and it needs to be shown that this is the result of the better diagnosis of autism over time, not the needle. This is what [Carnap](#)⁴⁶⁸ calls the principle of total evidence, and recognizes that new evidence, even seemingly unrelated, might impact whether something being considered is true or not.

And when Nichols argues that non-experts are incapable of making that distinction, he must explain the countervailing fact that *society as a whole*, which consists mostly of non-experts, *has* made that distinction, and that our medical system, our code of justice, and social infrastructure in general are built around the fact that vaccines are helpful and thalidomide is dangerous. And Nichols has to explain why societies where experts are *more likely* to be questioned and challenged are societies which are more likely to make this distinction.

⁴⁶⁷ <http://www.edtechpost.ca/readings/Ludwig%20Wittgenstein%20-%20On%20Certainty.html>

⁴⁶⁸ http://xeny.net/how_to_apply_the_Principle_of_Total_Evidence

And he can't just argue that these counterexamples are coming from a non-expert, that the evidence here cited does not count as the right evidence, and that this is only a blog. Such responses would quite rightly be dismissed as fallacies by both experts and non-experts alike (and it is indeed the prevalence of fallacies in non-expert responses that is one of the major ways non-experts can spot frauds in the ranks of experts).

And what of those people who are not even able to distinguish between a valid argument and a non-sequitur? Nichols has no time for them and finds them exhausting. I find them exhausting too, but I make my case for all to see, and have taken the time and effort to make the basis for argumentation and reason [available to all](#)⁴⁶⁹. Because *I value* the contributions of non-experts, and would like to help them formulate their objections in the most effective manner possible. This is called the [principle of charity](#)⁴⁷⁰, and is a fundamental rule in logic and reasoning.

To get to the point of Nichols's argument, he wants a return of the gatekeepers:

the journals and op-ed pages that were once strictly edited have been drowned under the weight of self-publishable blogs. There was once a time when participation in public debate, even in the pages of the local newspaper, required submission of a letter or an article, and that submission had to be written intelligently, pass editorial review, and stand with the author's name attached. Even then, it was a big deal to get a letter in a major newspaper. Now, anyone can bum rush the comments section of any major publication. Sometimes, that results in a free-for-all that spurs better thinking. Most of the time, however, it means that anyone can post anything they want, under any anonymous cover, and never have to defend their views or get called out for being wrong.

Yes. Anybody can publish whatever they want. This has resulted in a lot of clutter. But it has also resulted in [Assange](#)⁴⁷¹, [Snowden](#)⁴⁷² and [Manning](#)⁴⁷³, among many other notable examples.

To understand why this is important, it is necessary to understand the *role* of gatekeepers. And - frankly - it was never the role of the gatekeepers to keep out the cranks. A brief look at the letters sections of most any newspaper before the days of the internet is evidence of that. It was

⁴⁶⁹ <http://www.fallacies.ca/>

⁴⁷⁰ <http://philosophy.lander.edu/oriental/charity.html>

⁴⁷¹ <https://justice4assange.com/>

⁴⁷² <http://www.theguardian.com/commentisfree/2015/jun/14/edward-snowden-hero-government-scare-tactics>

⁴⁷³ https://www.washingtonpost.com/world/national-security/judge-to-sentence-bradley-manning-today/2013/08/20/85bee184-09d0-11e3-b87c-476db8ac34cd_story.html

to *protect the newspaper from retribution*⁴⁷⁴ from the rich and powerful should seriously damaging evidence or allegations be published.

Let us be clear: the time before the internet was a time when the elite entrenched and protected each other. Even Nichols makes this point (though it is not clear he knows he is making it):

There was once a time when presidents would win elections and then scour universities and think-tanks for a brain trust; that's how Henry Kissinger, Samuel Huntington, Zbigniew Brzezinski and others ended up in government service while moving between places like Harvard and Columbia.

Yes. There was pretty much a closed walkway between positions of power and authority and the elite institutions like Harvard and Columbia. And when Nichols writes that "I have a hard time, for example, imagining that I would be called to Washington today in the way I was back in 1990" he fails to understand that this is a *good* thing, and that calling people like George Siemens⁴⁷⁵ (an itinerant blogger born in Mexico, former restaurant owner, and self-made PhD in education) instead is far far better.

And consider how Nichols regards those other gatekeepers, teachers and university professors:

One of the greatest teachers I ever had, James Schall, once wrote many years ago⁴⁷⁶ that 'students have obligations to teachers,' including 'trust, docility, effort, and thinking,' an assertion that would produce howls of outrage from the entitled generations roaming campuses today.

And despite the lupine *ad hominem*, students should indeed protest such instructions. Nobody has an obligation to produce trust and docility. Far better to be a nation of wolves than a nation of sheep! There are good reasons⁴⁷⁷ to eschew docility; women especially understand the need to challenge the orthodoxy of thinking emanating from the professorial pulpit. A requirement of trust and docility is in itself a betrayal of trust.

But what Nichols is really worried about is that the experts might become servants of the people. This shows up in a number of ways near the end of his article. Consider this language:

⁴⁷⁴ <http://ideas.time.com/2013/01/07/yelp-reviewers-beware-you-can-get-sued/>

⁴⁷⁵ <http://www.elearnspace.org/blog/2015/08/03/white-house-innovation-in-higher-education/>

⁴⁷⁶ <http://thefederalist.com/2014/01/17/the-death-of-expertise/www.catholiceducation.org/articles/education/ed0003.html>

⁴⁷⁷ <http://www.nytimes.com/1997/02/24/us/radcliffe-women-once-docile-prod-harvard-sharply-on-equality-of-sexes.html>

The idea of telling students that professors run the show and know better than they do strikes many students as something like uppity lip from the help

Or this:

many academic departments are boutiques, in which the professors are expected to be something like intellectual valets.

But the argument is a bit more subtle than that. It's that we *would* be happy serving the people, but the people are not *good enough* to be masters.

When citizens forgo their basic obligation to learn enough to actually govern themselves, and instead remain stubbornly imprisoned by their fragile egos and caged by their own sense of entitlement, experts will end up running things by default.

And so this is a "terrible" thing, he will oh so reluctantly take his position as expert, and step into his natural place as the ruler of society. Or so he thinks.

But he's wrong, and worse, he is *dishonestly* wrong. He is disappointed he is no longer getting calls from the White House, he yearns for the days when professors demanded docility and respect, and he would much rather return to the days when the only public discourse was that vetted by the editorial guardians of society. He does not actually want the non-expert to contribute to the governance of society, for if he did, this column would be a call or education and empowerment, and not a declaration to the effect that the masses are revolting.

His kind *just is* the kind that brought us the excesses of the 20th century, and more recently the [debacle in Iraq](#)⁴⁷⁸. He most properly should be ashamed of himself for setting himself above the likes of you and me. But as is so common among the realm of the self-declared expert, he feels no shame.

*Moncton, Canada
August 15, 2015*

⁴⁷⁸ <http://www.federalistjournal.com/fedblog/2006/08/26/debunking-the-bush-lied-us-into-war-slander-once-again/>

Scaling the Heights of Language, Its Learning, and Its Teaching



This is a summary of a talk by Diane Larsen-Freeman at TESL 2015. It was a treat to listen to. Errors and omissions are entirely my own.

This is a beautiful location - and I hear that Canadians are fond of nature. And you'll hear a lot today about ecology and nature.

Complex dynamic systems. They have captured my attention. I've been talking about it for 21 years. I will start there, but the central focus of my remarks will be about fractals.

I'm going to try to make the case that language is a fractal - and if that is true, what does that tell us about language learning and teaching?

Complexity theory - scientists seek patterns and relations within systems. Complex is not the same as complicated - an automobile is complicated, but not complex. In complex systems you have systems made up of components which interact, and give rise to patterns at other levels of complexity. The example of a murmuration is an example of complexity.

I think of language that way. The interactions of people communicating creates patterns.

The perturbation - addition of an element to a system around which organization occurs. Eg. puppies forming a pinwheel around a bowl of milk. 'Emergence' is the arising of these patterns out of a complex system.

Mandelbrot described the inability of traditional geometry to describe natural phenomena - clouds, mountains, coastlines, bark, lightning. (Photos of fractals in nature). The term is from the Latin 'fractus'.

Anuradha Matur and Dilip de Cunha were asked to devise a strategy to build resilience in the face of rising sea levels in Norfolk, VA. They thought, think of the coastline not as a line but as discontinuous 'fingers of high ground'. They augmented the coast with similarly shaped engineered landforms.

Controlling or imposing from the top down does not work with natural systems.

Fractals are self-similar at every level of scale. If you look at the whole thing and see a certain design, as you look at each smaller piece you see the same (similar) pattern repeating.

These patterns are generated as a result of iteration. Eg. the Koch snowflake. See also the animated fractal mountain. Also, I've been told that the paintings of Jackson Pollack are fractals. Also, rhythm in nature. Christopher Joyce, Feb 21, 2012.

Fractals are modeled with differential equations - the output of one iteration becomes the input of the next. Eg. Mandelbrot set, sample zoom. Algar 2005 p. 20 - structure of patterns from the repeated applications of a single algorithm.

Nature uses fractals - they are a very efficient means of squeezing a lot of material into a small amount of space. Eg. the lungs have an enormous surface area. Eg. the brain is a fractal.

So...

Language is no different from other natural phenomena in that form follows function. For example, Zipf's power law - the frequency of any word is inversely proportional to its rank in the frequency table. The most frequent word occurs twice as often as the second, which occurs twice as often as the next, and so on. Eg., in the Brown corpus, the words the, of, etc. The other half is composed of the hapax legomena - words that only occur once.

Why is this? Zipf argues for the conservation of speaker effort, which would prefer that there only be one word, contrasted with conservation of listener effort, in which each word has a specific meaning. This is a trade-off. So here is where the fractal effect is clearest. Zipf's law accounts not only for a large corpus as well as for specific writers - the 10 highest-frequency words account for 24 percent of a text (Schroder, 1995).

Zipf's law is not controversial. Fractals follow a power law as they reduce in size by a fixed ratio. See eg. the words of Tom Sawyer, Moby Dick.

Fractals emerge from dynamic processes that are recurrent. In similar fashion, patterns in language emerge from meaningful recurrent interaction among language users.

Language learning:

Humans are sensitive to the frequency of linguistic features they are exposed to which is reflected in their language development. So structures latent in language usage make language usable.

Eg. Goldberg (2004) L1 - mothers (% of tokens) proportional to children (% of tokens). Eg verb locative. ('go') Verb object locative ('put'). VOO ('give').(MacWhinney 1995). It's not behaviourism - it's not a 100% match - but clearly the mother's use is leading the child's use.

Second language acquisition (or development). Language processing in all domains is sensitive to frequency of usage. But exposure is not enough. Learners need to experience language as a dynamic system, molding and using it to adapt to the current situation.

But language emerges 'upwards' in the sense that innovative language-using patterns emerge from a person using the language interactively. It's a socio-cognitive process. Think of the phenomenon of 'emergence from exemplars' Eg. examples of fuzzy images of Tiananmen Square, Brandenburg Gate, Mt. Fuji, or the great Pagoda. Corinne Vionnet - compiles them from many different photos. The image, the view, etc., is 'socially negotiated' - we are around that spot, but no two people are in the same spot.

We all have our own language resources, they're overlapping, but they're all unique as well.

Larsen-Freeman and Cameron (2008) - the cognitive processes are inextricably interwoven with their experiences in the social and physical world. The context of language is socially constructed and negotiated on a moment to moment basis.

This counters the tendency to portray learner language as being an incomplete and deficient version of the native speaker language.

But it is also important that this implicit process be accompanied by explicit guidance in noticing and practicing features of the target language, especially where L1 operates differently from L2. But how can we cooperate with the natural processes as defined by nature, just as we don't want to build a wall against the rising tides?

If we think about fractal patterns, we're going to think about iterations. So how about designing activities where language-using patterns as defined by context of use, in keeping with learners' goals, are iterated - not repeated, not the same thing, but similar.

Eg. as a model - 36 views of Mt. Fuji - under the wave off Kanagawa. Sanjurokkei.

Complex systems are built up through iterations. They encounter and use the patterns repeatedly. But not repetition. navigating the tension between convention and iteration. Eg. a text. read. Then do a cloze analysis. Remove a few words.

And teach adaptation. What is learned in one context needs to be used in another. Take what they know and (not 'transfer') transform it. How can we teach adaptation? Take their present system and mold it to a new context. Maybe Earl Stevick's idea of technemes. Change the conditions slightly for completing a task - eg. change the time allowed, etc. Same task, use the 4-3-2 technique. (Tell a story in 4 minutes, in 3 minutes, in 2 minutes - forces them to be more fluent, they extend their usage of lexical items, etc).

Also - bilinguals' languages are nit separate and complete, but create a repertoire emerging out of local practices. Use bilingualism as a resource. We are, after all, teachers of learners, not only teachers of language. Eg: allow a student to read a text in their own language first, or provide many opportunities for low-stakes writing in any language they wish. Eg June 2015 - Juan Pelipe Herrera - mixture of English and Spanish.

Also, create multilingual spaces (Helot, 2014), where students are not silences because they cannot use their L1.

And finally, assess earners' progress in a self-referential way, not against some idealized target, but looking at what the learner is doing over time.

It's not about conformity to uniformity. Through iteration and adaptation learners find the balance, and help all of us along the way.

*Lake Louise, Canada
October 31, 2015*

That Old Canard

In yesterday's New York Times the [Arthur C. Brooks argues](#)⁴⁷⁹ that there is systemic bias against conservatives in academia. This is my response.

It must be coming around to election time again, as this old canard (complete with a 1975 study) makes the rounds again.

First of all, it should be no surprise to find more left-leaning people in a public service industry, just as it is no surprise to find that the boardrooms of banks and corporations are staffed almost entirely by people from the right wing.

It should also be no surprise to see people from the left in occupations with a focus on reason and intellect, as generally the more educated a person is, the more left wing they tend to become.

Third, it should be no surprise to see people in academia adopting a more liberal stance because, as they say, "reality leans left." The right is known for its support for creationism, climate change denialism, anti-vaxxing, an apocalyptic world view, and a host of non-reality-friendly positions.

Finally, it's not even clear that the data brought forward by the right actually supports the contention that there is a right wing bias in academic. The cases are carefully selected, picking from research in sociology rather than, say, schools of business or medicine. And they compare apples and oranges; the same data set might *not* lead to the same conclusion when studying poverty and skin rashes, as these are very different phenomena.

This sort of reasoning is reflective of differences in the way the left and the right regard science, just as we saw here in Canada under ten years of conservative rule. On the right, science follows policy. It follows politics. It is managed to show support for conclusions (and for industries) that have already won political support. But on the left, policy is derived from science. The political positions supported are those, typically, which are supported by evidence and research in the field.

Indeed, the idea that diversity is a virtue in society is a left-wing idea, not typically supported by conservatives. The great movements that created and shaped a more inclusive society - from feminism to anti-racism to aboriginal rights to GLBTQ-friendly policy - are left-wing movements.

It is typical of the right that it would view diversity not as a policy end in itself, but a piece of 'science' that can be taken out of context and used to prop up and rationalize the unsubstantiated

⁴⁷⁹ <http://www.nytimes.com/2015/10/31/opinion/academias-rejection-of-diversity.html>

conclusion that academia is out to get them. Why would they reason the left would work this way? Because that's what they, the right, would do in a similar position.

I have no objection to the existence of academics and professionals who can articulate and advance the right-wing argument. I personally do not believe such arguments can be sustained. But I don't think that 'diversity' means that we should promote conservatives to positions of academic responsibility simply on the ground that they are conservative. That's not how diversity works. And if the right were concerned with *understanding* diversity, rather than using it to promote their own self-interests, they would understand this.

*Ottawa, Canada
November 1, 2015*

Role for Educators in MOOCs

*My comments to the Networked Learning Conference 'hot seat' on the role of educators in MOOCs. [Read the full discussion here.](#)*⁴⁸⁰

###

At the risk of self-reference, I'd like to contribute to this discussion by pointing to something I wrote on the role of the educator a few years ago - [The Role of the Educator](#)⁴⁸¹ - which was based on a few talks, including [We Don't Need No Educator](#)⁴⁸².

The point of these presentations is to say two things: first, that as the learning environment is reshaped by technology, it doesn't make sense to think of it as being provided by a single artisan manually performing a wide (and increasing) range of professional tasks; and second, that the role of the educator(s) is far more varied than one might think, even in the age of the MOOC.

After all, it's not as though the one task of the educator was to present content, and it's not as though the educator disappears once a person begins to be able to manage their own learning and find and view resources for themselves. Rather, it means that the same number of professionals (probably more) can now begin to offer specialized services to a much larger number of people.

###

[@hsp](#)⁴⁸³ writes, "I have no issue with social constructivism per se, but I do have an issue with the relative and subjective knowledge that it can generate. It leaves room for groups of people to come to different conclusions based on the same facts."

We've digressed a lot from the topic of 'the role for educators' but in an interesting and necessary way. And indeed, many of my discussions of MOOCs begin with a discussion of the nature of knowledge.

Allow me to begin, though, by dividing the discussion into a practical thread and a theoretical thread:

⁴⁸⁰ <http://forum.networkedlearning.net/t/role-for-educators-in-moocs/168/36>

⁴⁸¹ <http://www.downes.ca/post/54312>

⁴⁸² <http://www.downes.ca/presentation/311>

⁴⁸³ <http://forum.networkedlearning.net/users/hsp>

- the practical matter of whether educators ought to see themselves as conveyors of authoritative knowledge, whether or not such knowledge actually exists, and
- the nature of truth, and whether there are truths that can be known in an absolute sense, as opposed to the relativism described by [@Zerove](#)⁴⁸⁴

With respect to the second matter, I think that the net result of some 2600 years of philosophical enquiry into the nature of knowledge and truth is that knowledge and truth are *at best* relative to a community, a symbol system, a model, a perceiver, or some such *non-global* entity.

It does not matter that "a further dialectic process towards a global understanding of facts" is hampered by this. [x] Arguably, this is beyond our reach - we could engage in the process forever, but never know whether we are even getting closer to a conclusion.

We could discuss the state of knowledge and truth at length, but that might best be a separate thread.

The practical question is whether, despite this, and for more pragmatic reasons, teachers out to be seen as conveyors of authoritative facts and knowledge.

Several reasons have been advanced in the discussion this far:

- it may be the case that students are unable to learn unless facts and knowledge are presented in this way, ie., there are *pedagogical* reasons
- it may be the case that there are cultural reasons for presenting knowledge and information this way, ie., there are *cultural* reasons
- it may be that the stability and prosperity of society as a whole may depend on a common understanding (or, if you read Rawls, agreement) on certain propositions, ie., there are *social* reasons

Against these arguments I offer my own proposition that social, pedagogical and cultural issues are better addressed by encouraging learner autonomy than by encouraging teachers to act as sources of authoritative facts and knowledge.

- first, it is arguable that students learn better if they are able to understand and reconstitute the knowledge for themselves, rather than having it distributed to them as already known and authoritative. There have been some [recent discussions](#)¹ around the Common Core approach to mathematics that are illustrative of this.
- second, it is arguable that culture, rather than being harmed by a decline of authority, is actually strengthened by it. This is a long digression which I won't explore here, but a significant topic worthy of discussion.

⁴⁸⁴ <http://forum.networkedlearning.net/users/zerove>

- third, society as a whole is more stable if the individuals in it are viewed as autonomous, pursuing (as Mill says) "their own good in their own way". There has been a lot of recent discussion showing the quality of decisions and stability of social systems are increased when organized as networks of diverse autonomous members.

One final note. We will not doubt touch on the distinction between 'authority' and 'expert'. The two are very different. The former represents a perspective that is *imposed* on the learner. The latter represents a perspective that is given weight by being *recognized* as such by the learner.

Contrary to the perspective of cMOOCs offered in the paper cited by @Vivian below, the position of connectivists (or, at least, of me) is that while teachers should not take on an *authoritative* role, they can and certainly should function as *experts*.

Their role is *not* merely to facilitate - that is a conflation of connectivism with constructivism. Their role is, to put in slogan form, to model and demonstrate.

[x] In the same way the assertion that "we do not have wings" hampers our ability to fly. But no much it hampers our ability to fly, it does not follow that we have wings.

###

[@Fleur Prinsen](#)⁴⁸⁵ I guess I would ask first of all why it is wrong for people to come to different conclusions based on the same facts. This is a very common phenomenon, and it is indeed this diversity of opinion that strengthens our own cognitive processes and the cognitive processes of a society as a whole.

But also, secondly, I challenge the presupposition that there is such a thing as the "same facts". To my knowledge everybody experiences the world in different ways, and while there may be social and linguistic conventions concerning our shared experiences (eg., the sentence "Paris is the capital of France") even these are experiences by different people in different ways.

What we call 'facts' are theory-laden representations of the world and experience, and are literally different depending on whether one believes in spiritual entities or not, on whether one believes in an underlying reality or not, on whether one interprets the perceptions as particles or waves. They vary from perspective and point of view, in significant and importance and relevance, in salience, and with reference to background knowledge, context or understanding.

So I do not think that it is an objection that people come to different conclusions. I think it is a strength.

⁴⁸⁵ http://forum.networkedlearning.net/users/fleur_prinsen

###

[@jeffreykeefe](#)⁴⁸⁶ Most of the research on 'theory-laden data' was actually done on research in the hard sciences. This [slide show](#)⁴⁸⁷ outlines some of the foundational work by people like Popper, Kuhn, Lakatos and Feyerabend to establish this. Even the nature of observations themselves, much less theoretical statements, are interpreted differently depending on one's theoretical perspective.

This is important not because it puts astronomy and astrology on the same level - it doesn't - but because it corrects a persistent misunderstanding about the nature of knowledge and scientific theory.

There is no 'foundation', there are no 'basic truths', no particular 'facts of the matter' carry a special status over and above the rest. Knowledge is not an edifice, construct, or canonical representation of the world. It is far more complex (and far more interesting) than that.

A couple of examples, one from Lakatos, and one from my own writing:

- the [Millikan oil drop experiment](#)⁴⁸⁸ was one of the foundational moments in chemistry and physics. It involved dropping oil drops between two charge plates, measuring the effect of the plates, and deducing the value of the charge of a single electron. Previous efforts had attempted the same with water, but because the results were so fickle, Millikan employed oil instead. "The Millikan–Ehrenhaft controversy can open a new window for students, demonstrating how two well-trained scientists can interpret the same set of data in two different ways."
- 'basic' mathematics. It has long been held that children should learn 'basic arithmetic', such as addition and subtraction, multiplication and division. But the selection of these as 'foundational' is completely arbitrary (and are not surprisingly challenged by Common Core). Mathematics itself may be thought to be based on a foundational set of axioms, such as are represented by [Peano arithmetic](#)⁴⁸⁹, based in the concepts of set theory, identity, and succession. Or perhaps we could employ [Mill's methods](#)⁴⁹⁰, which derive mathematics from as a set operations on a series of pebbles. In view of modern

⁴⁸⁶ <http://forum.networkedlearning.net/users/jeffreykeefe>

⁴⁸⁷ http://philosophyfaculty.ucsd.edu/faculty/wuthrich/teaching/2013_145/Lect07_PopperEtAl.pdf

⁴⁸⁸ http://www.umich.edu/~chemstu/content_weeks/F_06_Week4/Mullikan_Erenhaft.pdf

⁴⁸⁹ <http://www.cs.toronto.edu/~sacook/csc438h/notes/page96.pdf>

⁴⁹⁰ <http://www.philosophyideas.com/files/papers/Mill%20defended%20against%20Frege.pdf>

computation (and to help in their later understanding of modal logic) perhaps the core concepts taught ought to be transitivity, substitutivity, and symmetry.

*Ottawa, Canada
November 5, 2017*

Analysis and Support of MOOCs

My contributions to the Network Learning 'Hot Seat' addressing the question, "How do we analyse and support the networked interactions of thousands of people learning together?" View the [whole discussion here](#)⁴⁹¹.

###

These are two very different questions and I'm not sure it's useful (or even appropriate) to ask them together.

With respect to the analysis of the networked interactions, it's not clear to me that we should even be doing this, at least, not in the sense suggested by the question. If someone had said "how do we analyze the conversations of university students one to another" or "how do we analyze the thousands of phone calls between people" we would quite rightly question the breach of confidence required to undertake such a task, beyond very gross calculations about the numbers of calls and conversations (and even then, we're treading on dangerous grounds). One of the differences between mass courses (at least the way I see them) and more traditional forms of online learning is that students discussions are not automatically located in the LMS not subject to ownership and use by the institution.

I'll leave discussion of the second point until later.

###

[@jonathanbishop](#)⁴⁹² I would be more inclined to say that Etienne Wenger was drawing some the same foundational concepts as George Siemens and I, though I was aware of Wenger's work as far back as 2004 (you can hear me mispronounce his name through [this entire presentation](#)⁴⁹³, the first I ever recorded, from 2004).

The ideas of connectivism, communities of practice, etc., are derived from a network view of the world, and are rooted in ideas of network theory, 'small pieces loosely joined', the computational

⁴⁹¹ <http://forum.networkedlearning.net/t/analysis-and-support-of-moocs/169>

⁴⁹² <http://forum.networkedlearning.net/users/jonathanbishop>

⁴⁹³ <http://www.downes.ca/presentation/102>

theory of connectionism, and the work of people like Francisco [Varela](#), Paul and Patricia [Churchland](#)⁴⁹⁴, [Stephen Kosslyn](#)⁴⁹⁵ and [J.J. Gibson](#)⁴⁹⁶.

It has been occasionally suggested that MOOCs have their origin in the work of Ivan Illich. I'm sympathetic with his view, but his work has no influence on the development and design of either connectivism nor the MOOC. If people *must* credit someone writing specifically in the educational domain, then I would say I was far more influenced by John Holt's *How Children Fail*. But for me, the origins are from the scientific and philosophical domain, not from educational theorists or social scientists.

###

Connectivism is another neologism. It is essential Barry Wellman's work from the 80s and 90s with the rhetoric of Vygotsky, and indeed Ivan Illich.

No it isn't. [Wellman](#)⁴⁹⁷ is interested in the formation and definition of community, and social network theory. This work is interesting, but is not the same as connectivism, which is a theory about knowledge and learning.

What you'll find in connectivism, but not in Wellman:

- 'to know' is to be organized in a certain way, as in a set of connections (such that 'to know x' is to *recognize* x)

- 'to learn' is to to grow, adapt and change that organizations, ie., to grow and shape connections

Contrast with Wellman, who when he talks about knowledge, talks in information-theoretic terms, such as 'knowledge transfer' or 'knowledge mobilization'. He depicts networks as *conduits* of knowledge, rather than as *instances* of knowledge.

Finally, though I am indeed the person who coined and described [e-learning 2.0](#)⁴⁹⁸ (based on the earlier concept of web 2.0) I am not trying to "sell" it, or MOOCs, or connectivism. People can decide for themselves, based on the evidence, whether any of these concepts has any merit.

⁴⁹⁴ <http://www.newyorker.com/magazine/2007/02/12/two-heads>

⁴⁹⁵ <http://isites.harvard.edu/icb/icb.do?keyword=kosslynlab>

⁴⁹⁶ <http://ione.psy.uconn.edu/~cespaweb/docs/MC.pdf>

⁴⁹⁷ <http://groups.chass.utoronto.ca/netlab/barry-wellman/>

⁴⁹⁸ <http://www.downes.ca/post/31741>

###

I see MOOCs as "Closed Educational Resources" for the reason that they are stand alone, unlike say SCORM packaged learning objects.

This may be true for xMOOCs. It is certainly not true for the cMOOCs George Siemens and I created. Indeed, you could attend one of our MOOCs from beginning to end without even visiting the platform, solely through the use of syndication technologies like RSS. Moreover, our MOOCs were not in one place, like an xMOOC, but were distributed across a web of connections linking students' resources, OERs from multiple locations, groups and conferences, and more.

*Ottawa, Canada
November 5, 2017*

What Else Can Work At Scale? And Techniques from Social Media

My contribution to the Networked Learning Conference 'Hot Seat' discussion. You can read the [whole discussion here](#)⁴⁹⁹.

###

Anything that can be automated works at scale. Anything that cannot be automated must be distributed, and if so, works at scale. Only centralized non-automated things do not work at scale.

###

This is a good question:

"Humans scale, and have scaled before any automation existed, so what made us scale? Localized transmission of knowledge (oral tradition), the automated cell/gene replication in combination with adaptations? "

And I think that the answer is inherent in the nature of life: that we are autonomous, and interactive, so we create a distributed network of diverse activities, adapting to local conditions, and scaling naturally.

Life seeks conditions of success. Humans, crickets, birds, plants - we migrate to the places where we flourish and avoid the places we don't, each making our decisions one by one.

Too dense a network and society fails. Too sparse a network and society fails. Autonomy is productive; eliminate it and society fails. But where autonomy is extended to point where it disrupts the network, society fails. (These aren't truisms; they are empirical observations, and subject to verification.)

###

Also, comments from the thread titled '[Educational Designers and Techniques from Social Media](#)'.⁵⁰⁰

⁴⁹⁹ <http://forum.networkedlearning.net/t/what-else-works-at-scale/170>

⁵⁰⁰ <http://forum.networkedlearning.net/t/educational-designers-and-techniques-from-social-media/167>

I have argued that the design for MOOCs should take more from games than from social media (though there are some pretty strong overlaps), including in a talk [just last week](#)⁵⁰¹. My point was that instead of trying to design learning, which is focused on content, we should create environments in which people can practice.

Social media is a bit like an environment. It is a space (mostly) not bounded by structured presentation of material or decision trees (Facebook's stream is an oft-criticized exception). People are able to try out new ideas and new personals. The problem with social media is that the interaction is (mostly) limited to conversation. I would much rather see people interact by solving problems, figuring out puzzles, playing games, and creating things.

###

Again, I have not clearly stated my point.

I use games as a metaphor to talk about MOOCs:

There are two types of games:

- those that depend on programmed design and memorization, and
- that create an environment where players and objects interact

In the same way, there are two types of MOOC:

- those that depend on programmed design and memorization – xMOOC
- that create an environment where participants and objects interact – cMOOC

The first type of game was a failure. They could be defeated by mere memorization and were not interesting. They disappeared from the market.

The second type of game was a success, and should be used as a model for MOOCs (and indeed, were a part of the model George and I used when we developed cMOOCs).

So this second type of games is the type of games I am talking about.

When comparing this second type of games and social networks, I agree with you that there are many elements in common. They are both environments, they are based on the interaction between participants, and they can be used to solve problems, negotiate and communicate.

⁵⁰¹ <http://www.downes.ca/presentation/367>

But there are also some important differences:

- games are *inherently* about solving problems or responding to challenges, while social networks can be much more passive.
- games typically involve a wide range of different types of objects (even objects in the physical world) while social networks involve conversational elements only.

This not to say that we must choose between either games or social networks. Both inform the theory of environmentally-based learning, where participants interact in a common space with objects and with each other.

But it is to say that a model based on social networks *alone* will be insufficient to inform the design of successful MOOCs. The elements of a successful networking environment need to be taken into account.

Because, yes, the connections are of the utmost importance. We cannot learn from each other without connections.

But the manner, organization and structure of those connections must be designed with the intent of creating the most interesting and accessible environment. People will learn from *each other*, not from the MOOC.

###

I don't agree with this: "It's important what the discussion is about, what the goal of the discussion is..." I think there is too much desire on the part of educators to shape the learning of individuals. We should see our function as more supportive than directive.

###

You say: "The content - or the concrete problem - should be the center in dialogue for learning." And yet: "not that this should be determined by the instructor/teacher/facilitator."

Two things:

- First, I don't think both things can be true. If you are going to say something *should* be the case in learning, then you cannot say that it *should not* be determined by the instructor/teacher/facilitator.
- Second, there are many cases wher this need not be the case. Where someone is learning merely for pleasure, for example (which explains how I acquired a knowledge of the Roman Empire). Or where different people are working on *different* problems, not a common problem.

Ottawa, Cannada
November 5, 2015

Ought and Is

Experts are typically expert in two types of things:

- what *is* the case
- what *ought to be* the case

And for that matter, we all have attitudes and beliefs regarding both types of statement. For example:

- it's 20 degrees in here
- it ought to be warmer

That's fair enough.

Science and research are sometimes depicted as consisting necessarily only of the first sort of statement: that is, researchers should confine themselves to discussing what *is*, and not what *ought* to be the case.

I don't agree with this. I think that unless research is guided by some sense of *ought* there is no motive nor even mechanism for determining what *is*. For example, if it didn't matter what the temperature is, why would anyone bother measuring it, and indeed, what sort of scale would we even use?

Indeed, it's pretty hard to make sense of any human endeavour without invoking both an *is* and an *ought*. Any action plan, indeed, contains these two elements: the action plan is a description of the route from the *is* to the *ought*. And all research is based on this formulation.

Having said all of this, there are two hard and fast rules that apply regarding inferences involving *is* and *ought*:

1. You cannot derive an *ought* from an *is*

Suppose it's 20 degrees in here. Does it follow that it should be warmer or colder? No. It depends on your *point of view*. If you're a duck, you're probably OK with 20 degrees. But if you're me, you want it warmer. And if you're a rock, it doesn't matter at all.

It's sometimes hard to see this. "Look at that starving child," someone will say. Well, yes, the child is starving. But that *by itself* doesn't allow us to infer that the child should be fed. The inference follows *only if* we have an expression of need or value, for example, "allowing children to starve is wrong."

This is sometimes called the 'naturalistic fallacy'. People say, for example, "It's human nature to do such-and-such, so such-and-such is OK." Or, conversely, they say something is wrong because "it's not natural."

2. You cannot derive an *is* from an *ought*

"If wishes were horses," goes the old saying, "then beggars could ride." There's wisdom in that. Certainly we may believe things ought to be one way or another. But this belief doesn't mean that anything actually *is* one way or another. This would be nothing more than wishful thinking.

These lead to a third rule:

3. An *ought* is derived only from an *ought*, and an *is* is derived only from an *is*.

It follows from these two rules that the veracity of *is* and *ought* statements is determined very differently for each.

There are two very different forms of logic. The first - the logic of wants and desires - is called [deontic](#)⁵⁰² logic. Other forms of logic (propositional logic, for example) describe the other sort of inference.

So why is all this important?

Well, as I said, or pretty much any enquiry, including scientific research, you need both an *is* and an *ought*. So, on the one hand, you need *data*, to tell you what is the case, and on the other hand, you need some sort of *problem* or domain of enquiry, which tells you why you need the data and what you hope to do with it.

This means that the citations for any research should include some from column A and some from column B. Good research requires a clear context, problem, or domain of application, and it requires facts, data and evidence. And - even more importantly - the references supporting each of these need to be of the right type.

4. Define context, problem or domain of application from expressions of need or obligation, including social, political and economic perspectives, and *not* from data.

This should be obvious, but isn't. Even your *unit of measurement* is going to incorporate these perspectives, and will in some sense define the desired state. The units of measurement are not inherent in the facts of the matter.

⁵⁰² https://en.wikipedia.org/wiki/Deontic_logic

We often hear sentences like "the data dictates that...". No. *The data does not dictate anything*. The only thing a set of data can produce for you is more data.

For example, the data may say "5 percent of the people finish the course." *Nothing* about the quality of course design follows from this. You only get this sort of statement if you've already agreed that "not finishing reflects a design flaw" or some similar *ought* statement (which in turn needs to be substantiated).

I see in the academic community a lot of expressions of value or obligation criticized on the basis that it's *not* derived from data. The idea these critics express is that all reference in an academic paper ought to be peer reviewed, and the statements of value and obligation therefore grounded in some sort of *fact*. But that's an error. There is not some sort of fact-based mechanism for determining value or obligation.

5. Define data in terms of empirical measurement, and not in terms of expression of need or obligation.

This is probably the most consistent flaw of research provided by the education policy 'think tanks'. The 'data' they provide owes as much to the center's political orientation as it does to 'facts'.

Take a statement like this: "The professional expectations for today's teachers are undoubtedly high." This looks like data; it looks like a statement of fact (as indicated by the word 'undoubtedly'). But it's a statement of what *ought* to be, in two senses: first, it describes 'expectations', and second, it uses a relative value-laded term of measurement, specifically, 'high'.

Of course, it's OK to make statements like that. But they need to be understood as expressions of what *ought* to be the case, and subject to assessment in terms of value and obligation, rather than represented as data and misused as the starting point for an action plan.

There's a lot more that could be said on the subject of *ought* and *is*, but I'll leave it here for now, happy if I've managed to alert the reader to be sensitive to these two types of statement.

More reading:

[Is ought](#) - University of Texas⁵⁰³

[The Is-Ought Problem](#) – Wikipedia⁵⁰⁴

⁵⁰³ <http://www.txstate.edu/philosophy/resources/fallacy-definitions/is-ought.html>

⁵⁰⁴ https://en.wikipedia.org/wiki/Is%E2%80%93ought_problem

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[The Is-Ought Gap](#) – YouTube⁵⁰⁵

[Hume on Is and Ought](#) - Philosophy Now⁵⁰⁶

[Is/Ought Fallacy](#) - Fallacies Files⁵⁰⁷

*Casselman, Canada
January 8, 2016*

⁵⁰⁵ <https://www.youtube.com/watch?v=eT7yXG2aJdY>

⁵⁰⁶ https://philosophynow.org/issues/83/Hume_on_Is_and_Ought

⁵⁰⁷ <http://fallaciesfiles.weebly.com/the-isought-fallacy.html>

What I Learned Using Paypal

Doug Belshaw wrote an item this week called [3 things I've learned from 200 weeks of sending out an email newsletter](#)⁵⁰⁸ which made me smile and think "newbie" to myself. That's not even four years!

But it's actually a major commitment and I respect anyone who can carry out something on a regular basis for 200 weeks. I have a good sense of what it takes, not only in terms of effort, but also in terms of computing power and servers.

He draws three lessons:

- "You are the most important audience". By "you" he doesn't mean "you, the reader," he means "you, the author." If the newsletter didn't mean something to me personally, I would not keep it up. Belshaw has learned the same lesson.

- "People like commentary". I can attest to this. I've run [surveys](#)⁵⁰⁹ a couple times over the years, and I always ask whether people like the commentary or whether I should shut up and just deliver the news. The responses are unanimous. Readers want the opinion. *Informed* opinion.

- "A little bit of personality goes a long way." Like Doug, I don't just stick to a narrow diet of education technology tools and applications, or some similar specialization. My items reflect an interest in a range of disciplines, and the articles orbit around a set of core ideas, not some market managers conception of a vertical.

But also, like Doug, I have asked for donations. As I explained in my Donations page, my website costs me \$200 a month to run, or \$30,000 over the years. The [traffic](#)⁵¹⁰ demands it; I have tried to run OLDaily and the rest of the website on a cheaper server, and simply crashed the server. It has created some financial stress, so I asked for help.

But I was also curious. Some people say that you simply have to ask, and you will receive, but I don't really fit the demographic. I'm not private-school pretty, I'm prickly and annoying, I'm not exactly a supporter of the corporate and entrepreneurship agenda, and I don't really have an interest in self-promotion (that doesn't mean I don't do it, it just means I feel guilty whenever I do).

⁵⁰⁸ <http://doughbelshaw.com/blog/2016/01/22/200-week-newsletter/>

⁵⁰⁹ <https://downes.typeform.com/to/UpU7FJ>

⁵¹⁰ <http://www.downes.ca/stats/2016/awstats.downes.html>

But, you know, I always wonder, if I ever wanted a backup gig, could this be it? I look at some of the other people who started out as ed tech pundits and became self-employed as writers or consultants. There are some who make a living doing it, but I don't see people retiring early on the money. It looks like a tough life, with a lot of work in the trenches.

So how did I do?

From 30 donors I received about \$1478. Most of the donations were the minimum \$25 but I receive a large number of \$75 contributions and a couple of people gave \$250. Nobody selected the \$1000 option (I thought maybe a company or two might want their name and link on the logo, but it didn't happen). It really is a tremendous response, and it comes close to covering my server costs for the year, and I'm grateful.

Here's what I did: when I redesigned the site to make it mobile-friendly over the holiday break, I added a donation page. I put a donate button on the [home page](#)⁵¹¹, and ran [one link](#)⁵¹² in the January 4 issue of OLDaily. That was it for advertising. I thought anything more would be crass. But given that the link had (as of this writing) 67 views, maybe it wouldn't have been so crass.

I thought I would get a flurry of donations right away, and then nothing, but that's not what really happened. I've had a steady flow of donations spaced out over the last three weeks. Sure, I got 12 donations in the first two days, but it's averaged a steady one-a-day since then, in varying amounts.

I got my thank-you emails sent out today. At first I didn't think I could even send them - while PayPal faithfully reports the incoming donations, it downplays the sender's email. It has a co-branded service whereby it will print shipping labels and handle delivery for you - for a fee. Smart. But that was more than I wanted to pay just to send an email.

Sending out 30 individual emails took some time, and I was always afraid I would get the person's name wrong (happened once) or misrepresent the amount they donated (happened once). Cut-and-paste seems so impersonal, but retyping the same message would have been too much, but I was able to add some personal touches. Were the frequency of donations to increase, I would create a 'thank you' script.

I received a few comments on the list of options. Feeling very clever, I created the following range of choices: \$25, \$75, \$250, \$1000. And as we see on donation pages everywhere, I offered incremental rewards for each level (I resisted calling them 'gold', 'platinum', 'sustaining', etc.). Within a day I had to add two additional notes on the donations page: one telling people they

⁵¹¹ <http://www.downes.ca/>

⁵¹² <http://www.downes.ca/post/64848>

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could choose whatever amount they wanted, and another telling them they did not have to have their name listed on the page. A few people chose their own amounts, and two people took the extra effort to mail me a cheque instead of using PayPal.

Would I do it again? Definitely. I feel people appreciated the opportunity to say thanks. The money was significant. And server costs aren't going away. And hey, maybe a few companies will start using that \$1000 option. :)

*Casselman, Canada
January 22, 2016*

Personal and Personalized Learning

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We hear the phrase ‘personalized learning’ a lot these days, so much so that it has begun to lose its meaning. Wikipedia tells us that it is the “tailoring of pedagogy, curriculum and learning environments by learners or for learners in order to meet their different learning needs and aspirations.”ⁱ

Even this short definition provides us with several dimensions across which personalization may be defined. Each of these has been the subject of considerable debate in the field:

- Pedagogy – do we need to differentiate instruction according to student variables or ‘learning styles’, or is this all a big myth
- Curriculum – should students study the same subjects in the same order, beginning with ‘foundational’ subjects such as reading or mathematics, or can we vary this order for different students
- Learning environments – should students work in groups in a collaborative classroom, or can they learn on their own at home or with a computer?

In personalized learning today, the idea is to enable technology to make many of these decisions for us. For example, *adaptive learning* entails the presentation of different course content based on a student’s prior experience or performance in learning tasks.

What these approaches have in common, though, is that in all cases learning is something that is *provided* to the learner by some educational system, whether it be a school and a teacher, or a computer and adaptive learning software. And these providers work from a standard model of what should be provided and how it should be provided, and adapt and adjust it according to a set of criteria. These criteria are determined by measuring some aspect of the student’s performance.

This is why we read a lot today about ‘learning analytics’ and ‘big data’. The intent behind such systems is to use the data collected from a large number of students working in similar learning environments toward similar learning outcomes in order to make better recommendations to future students. The ‘optimized learning path’ for any given learner is found by analyzing the most successful path followed by the most similar students.

It’s an open question whether we improve learning employing such methods. Presumably, using trial and error, and employing a wide variety of pedagogical, curricular and environmental

variables, we could come upon some statistically significant results. But the question is whether we *should* apply these methods, for two reasons.

First, individual variability outweighs statistical significance. We see this in medicine. While, statistically, a certain treatment might make the most sense, no doctor would prescribe such a treatment without first assessing the individual and *making sure* that the generalization actually applies, because in many cases it doesn't, and the doctor is sworn to 'do no harm'.

Second, and perhaps more importantly, it shouldn't be up to the education system to determine what a person learns, how they learn it, and where. Many factors go into such decisions: individual preferences, social and parental expectations, availability of resources, or employability and future prospects. The best *educational* outcome isn't necessarily the best outcome.

For these reasons, it may be preferable to embrace an alternative to personalized learning, which might be called *personal* learning. In the case of personal learning, the role of the educational system is not to provide learning, it is to *support* learning. Meanwhile, the decisions about what to learn, how to learn, and where to learn are made outside the educational system, and principally, by the individual learners themselves.

Personal learning often begins informally, on an *ad hoc* basis, driven by the need to complete some task or achieve some objective. The learning is a means to an end, rather than the end in itself. Curricula and pedagogy are selected pragmatically. If the need is short term and urgent, a simple learning resource may be provided. If the person wants to understand at a deep level, then a course might be the best option.

Personalized learning is like being served at a restaurant. Someone else selects the food and prepares it. There is some customization – you can tell the waiter how you want your meat cooked – but essentially everyone at the restaurant gets the same experience.

Personal learning is like shopping at a grocery store. You need to assemble the ingredients yourself and create your own meals. It's harder, but it's a lot cheaper, and you can have an endless variety of meals. Sure, you might not get the best meals possible, but you control the experience, and you control the outcome.

When educators and policy-makers talk about personalized learning, they frequently focus on the quality of the result. But this is like everybody should eat at restaurants in order to be sure they always get the healthiest meal possible. It may seem like the best option, but even the best restaurant can't cater to the wide range of different tastes and nutritional needs, and no restaurant will help the person learn to cook for themselves.

Ultimately, if people are to become effective learners, they need to be able to learn on their own. They need to be able to find the resources they need, assemble their own curriculum, and forge

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their own learning path. They will not be able to rely on education providers, because their needs are too many and too varied.

ⁱ https://en.wikipedia.org/wiki/Personalized_learning

Ottawa, Canada

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New Models of Open and Distributed Learning

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Historically most learning that has ever taken place has taken place in a classroom with a teacher giving instruction and students reading books and writing on paper. Though the 20th century, however, more and more learning has been taking place outside the classroom, using technology to reach students at a distance. For example, Australia's 'School of the Air' used wireless radio transmissions to send lessons to children growing up on isolated sheep stations.⁵¹⁴ And of course institutions like Britain's Open University became expert providing learning by correspondence.

The first online classes were offered starting in the 1980s and over the last 30 years the internet has been used to offer lessons at all levels all over the world. These new technologies have

⁵¹³ BBC. Victorian Schools. http://www.bbc.co.uk/schools/primaryhistory/victorian_britain/victorian_schools/

⁵¹⁴ School of the Air. Website. <http://www.assoa.nt.edu.au/>

changed the way educators look at learning. The need to adapt to students working from home and at a distance caused educational institutions to examine their practices more closely.

For example, one of the first technological developments was the 'course pack'. This was typically a package of printed material containing all the guidance that would normally be provided in class by a teacher: lessons, readings, quizzes. Course packs are still used to this day; the Open University offers them online as part of its OpenLearn initiative.⁵¹⁵ These packs need to be created ahead of time, so their authors had plan every detail of a distance education class ahead of time. As they did so, their understanding of the process changed.

From Passive to Active

The first and most important lesson learned by distance educators concerns the role of the student in his or her own learning. Where students were once thought as passive recipients of learning, today it is understood that they must be willing collaborators in the educational process. And where once it was thought that an education consisted mostly of the facts and data to be remembered, today it is understood that becoming educated is a developmental process, like becoming physically fit.

Understanding the student's role is important because it directly informs the design and methodology employed by online learning technology. At one time, learning may have been thought of as the simple transfer of information from one person to another. In such a model, online learning could then consist just as the presentation of information - put up some videos, give students some texts, and they will learn. But because learning is more than just the transfer of content, online learning must consist of something more than the presentation of content. These define some of the major design criteria for any learning system online today:

Prior learning - learning resources may need to be adapted to a learner's background and culture, their work, their language, and their understanding of the world, and so history and coherence are important element of online learning;

- Learning styles - learning materials may need to match the individual's preference to learn visually, or through concrete experience, or by solving problems, and so on, so choice and variety are important;
- Motivation - the learning environment may need to stimulate a student's interest and engagement, so there needs to be a way to stimulate social presence and interaction with people they can relate to;

⁵¹⁵ Open Learn. The Open University. Website. <http://openlearn.open.ac.uk/>

- Knowledge-formation - the student's environment may need to help a student visualize or construct internal models or representations of the content being learned, so there needs to be a way to compose or construct or create objects to share with others;
- Community - the student may need social engagement to comprehend the implicit and unwritten aspects of a discipline, such as a feeling for what is relevant, ways of observing and approaching problems, and standards for success.

When online learning technologies were first being developed in the 1990s their designers sought to incorporate not only the presentation of content and learning materials, but also to support these other aspects of the learning experience. Consequently, learning management systems consisted not only of text-readers and video players but also additional tools supporting the active engagement of students.

These systems - with names like Atutor and Blackboard and WebCT (short for 'Web Course Tools') sought to encourage student participation by replicating the classroom experience. They included at a minimum discussion boards or online conferencing tools, a conversation or chat area, online exercises and quizzes, personal profiles and activity lists, and scheduled activities involving readings, exercises, interactions and assessments.

Through the first decade of the 21st century, traditional learning management systems came under increasing criticism precisely because by emulating the classroom experience online they did not sufficiently support student engagement and participation. The new models of open and distributed learning described in the remainder of this chapter can be seen largely as attempts to reinforce the student's active and participatory role in learning, to move beyond what is possible in an online classroom, and to embrace the potential of the wider internet.

Today, though, the learning management system (LMS) remains the dominant model for online learning. Virtually every institution along with most large corporations and governments use LMSs to manage training and education. The LMS market is worth \$925 million in the U.S. and more than a billion dollars worldwide.⁵¹⁶ Learning online today means taking a course from an LMS, which means being led through a series of lessons and activities by oneself or with a cohort of classmates.

Learning tomorrow, though, will mean something very different as learners and education providers push the limits of the traditional LMS in an effort to make learning increasingly personalized and active.

⁵¹⁶ David Mallon, Learning Management Systems 2011, Bersin & Associates, 2011.
http://www.bersin.com/uploadedFiles/121410_ES_LMS2011_DM_Final.pdf

From Formal to Informal

A second major trend in recent years concerns the management of learning. For the most part, learning is managed formally under the auspices of departments of education, college or university administrations, or corporate training departments. Formal learning involves the statement of specific learning objectives or curricula, a rigorous mode of teaching such as classroom instruction, and evaluation or assessment leading to credential or certification.⁵¹⁷

Whether offered through an in-class or distance education setting, one of the central issues of formal learning revolves around its cost.⁵¹⁸ Savings expected through the use of distance or online media do not materialize due to the expense of course design, formal instruction, and assessment or evaluation. Through the 1990s as well criticisms began to be voiced regarding the formal and inflexible nature of learning management systems.

A distinction between formal learning and a more bottom-up or democratic form of learning has existed for more than 20 years. In 2007 an OECD report defined two additional forms of learning in addition to informal learning⁵¹⁹:

- *Non-formal learning* refers to a type of learning that may still be offered by an educational institution but which does not have a formal credential or certification as an outcome. Non-formal learning may thus be more loosely structured and delivered than formal learning.
- *Informal learning* by contrast is not managed by an institution at all, but is rather managed by the individual learner. Consequently, it may be thought of (from an institutional perspective) as lacking any form of organization or objective.

Informal learning in particular has received increasing attention because of its relation to lifelong learning. It may be thought of as ‘learning on the job’ or ‘experiential learning’. In particular, learning occurs as individuals make sense of the experiences that arise during their daily lives on the job. It is rooted in a person’s existing knowledge, skills and interests, and often adapted to meet a participant's specific needs.

As a result, the development of informal learning systems managed by learners themselves tend to focus less on the presentation of information and the remembering of facts and more on

⁵¹⁷ <http://www.eric.ed.gov/PDFS/ED511414.pdf> also <http://www.knowledgejump.com/learning/informal.html>

⁵¹⁸ Knowledge Jump. The True Cost of Informal Learning. May 20, 2007.
<http://www.knowledgejump.com/learning/cost.html>

⁵¹⁹ Werquin, Patrick. (2007) Recognising Non-Formal and Informal Learning: Outcomes, Policies and Practices. OECD. http://www.oecd.org/document/25/0,3746,en_2649_39263238_37136921_1_1_1_1,00.html

descriptions of experience, discussions about practice, response to requests for advice, and conversations of a more general nature. These systems arise outside the traditional learning infrastructure and often outside learning institutions entirely.

The emergence of the Internet, and specifically the free and open source software movements, have shown that peer-to-peer communications technology can put people in symbiotic, ‘you answer my question, I’ll answer yours’ relationships.”

For example, self-organizing social systems arise in discussion web sites such as Slashdot and Yahoo Groups.⁵²⁰ These are essentially learning communities organized around some topic of interest, whether it be knitting or learning disabilities or bee-keeping. Instead of there being one teacher leading instruction, people ask questions and are engaged by the community. Sometimes an answer is provided, but just as often more questions are asked as people try to narrow the context or reframe the question entirely from a more informed perspective.

Informal learning is often viewed less as a means of acquiring some body of knowledge and more as a means of enabling or fostering some future action. In other words, informal learning serves a different purpose from traditional learning. In formal systems, there is a greater emphasis on educational progression through a body of knowledge, perhaps leading to a diploma or other form of recognition, while in the case of informal learning the effort generated leads to some form of community involvement, action or even activism.⁵²¹

The principles of informal learning apply to any form of environment where informed and effective action is the desired outcome.

Jay Cross, for example, writes about Company Command, an informal learning community developed by two American company commanders who knew each other from West Point.⁵²² The Company Command website states, “We are a grass-roots, voluntary forum that is by and for the profession with a specific, laser-beam focus on company-level command.” Cross cites some of the very specific advice found in comments on the site, varying from taking off armour

⁵²⁰ Wiley, D. and Edwards, E.K. (2002) Online self-organizing social systems: The decentralized future of online learning. *The Quarterly Review of Distance Education*, Vol. 3, No. 1. (2002), pp. 45-59.

<http://www.oercommons.org/community/online-self-organizing-social-systems-the-decentralized-future-of-online-learning>

⁵²¹ McGivney, Veronica. (1999) *Informal Learning in the Community: A Trigger for Change and Development*. National Institute of Adult Continuing Education (NIACE) See

<http://ebooks.niace.org.uk/BookStore/pagedisplay.do?bookInfo=true&pub=niace&id=9781862015111>

⁵²² Company Command. Website. <http://cc.army.mil/index.htm>

in tents to wearing seatbelts in the vehicles. “Every community needs a clubhouse where members can discuss things and draw conclusions,” he says.

Informal learning has become increasingly associated with the concept of online community or, more formally, communities of practice. A good example is the Australian Research Council funded project ‘Uncovering Learning in the Workplace’. This project emphasizes the role of community in online learning, seeking to increase social interaction among staff at different educational institutions in Australia. It points to the extent of everyday learning in workgroups created in the educational system and their importance in ‘getting the job done’.⁵²³

Open and Distributed Learning

A major element in the development of informal learning through the early 2000s has been the emergence and development of open learning.

The term ‘open learning’ originally referred to “Policies that permit open entry to learning, liberal transfer of credits and recognition of prior learning.”⁵²⁴ Institutions such as Britain’s Open University and Canada’s Athabasca University were created in order to offer access to learning without admission barriers by offering distance and online learning, though in a formal mode, with clear learning objectives leading to a certificate or degree.

That said, open learning has over time come to be associated with flexible or distributed learning and in particular to be associated with the following characteristics:

- separation of teacher and learner in time or place
- use of mixed-media courseware
- two-way communication between teacher and learner
- industrialized processes including development and delivery teams⁵²⁵

A significant proportion of the investment in open learning is toward the learning materials to be used in course packages and other delivery media. The course packages would be constructed out of reusable modules of digital learning content called ‘learning objects’. Beginning in the late 1990s the development of these ‘learning objects’ and associated infrastructure has become

⁵²³ Leontios, M., Boud, D., Harman, K., Rooney, D. (2003) Everyday learning at work: communities of practice in TAFE. The sixth Australian VET Research Association Conference “The Changing Face of VET” 9-11 April 2003. <http://avetra.org.au/publications/conference-archives/conference-archives-2003/2003-papers>

⁵²⁴ Farrell, Glen (ed.). 2003. A Virtual University for Small States of the Commonwealth. Vancouver: The Commonwealth of Learning. <http://www.col.org/resources/publications/Pages/detail.aspx?PID=269>

⁵²⁵ The Commonwealth of Learning. (2000) An Introduction to Open and Distance Learning. <http://www.col.org/SiteCollectionDocuments/ODLIntro.pdf>

central to online learning. Consequently, open learning has come over time to also be associated with the concept of open access, which is to say, a lowering of barriers to the access to these educational materials themselves.

A number of academic and technological initiatives emerged in support of open access. The concept of open access covered not only learning objects but also any resource involved in education, including for example books and journal articles. Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions.⁵²⁶ An early advocate of open access was the Scholarly Publishing and Academic Resources Coalition (SPARC), formed in 1997 by the association of research libraries. The Budapest Open Access Initiative (BOAI) was the first major statement by scholars in support of open access.

The first major technological development in support of open access was probably the Open Archives Initiative (OAI, 2011). This project described a set of specifications for the provision of open content through repositories, and included methods for submission, indexing, search and retrieval of content. The initiative was designed primarily for research materials, but its wider applicability to educational materials is apparent.

The Open Archives Initiative was the basis for the DSpace Project, founded at MIT as “a turnkey institutional repository application.” Numerous journals have declared themselves to be ‘open access’ journals, either by making their content freely available online (this is known as the ‘Gold’ model) or by allowing authors to self-archive their content (the ‘Green’ model).⁵²⁷

The expansion of open access over the last decade has been nothing short of dramatic. The Bielefeld Academic Search Engine (BASE) indexes 36 million documents from 2,000 repositories. The Directory of Open Access Journals lists 8,000 titles. The Internet Archive contains 670,000 movies, 100,000 concerts, 1.3 million audio recordings, and 3.5 million texts.⁵²⁸

⁵²⁶ Suber, Peter. (2004) Open Access Overview. Web page. <http://www.earlham.edu/~peters/fos/overview.htm>

⁵²⁷ Harnad, S., Brody, T., Vallieres, F., Carr, L., Hitchcock, S., Gingras, Y, Oppenheim, C.,

Stamerjohanns, H., & Hilf, E. (2004) The green and the gold roads to Open Access.

Nature Web Focus. <http://www.nature.com/nature/focus/accessdebate/21.html>

⁵²⁸ Morrison, Heather. (2012) June 30, 2012 Dramatic Growth of Open Access. The Imaginary Journal of Poetic Economics. Weblog. <http://poeticeconomics.blogspot.ca/2012/07/inevitability-of-open-access-june-30.html>

Open Licensing

In addition to lobbying and the provision of technological infrastructure, the primary mechanism employed in support of open access, and therefore open learning generally, is open licensing. This term may be used to refer to any of a number of licenses that support open access.

Open licensing is based on the similar innovation in software development, the open source license. These licenses were based originally on the four freedoms outlined by Richard Stallman in 1996:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to distribute copies of your modified versions to others (freedom 3)

A core element therefore of open licensing is not merely access to the content in question, but also the ability to share the content thus accessed.

In the realm of educational content, the license most frequently used to support open access is Creative Commons. This form of licensing preserves copyright in the material thus licensed, but allows free access and distribution with, as the website notes, “some rights reserved.” Creative Commons licensing allows the author or copyright holder to stipulate some or all of the following conditions:

- that the author of the work be attributed
- that the work be used non-commercially
- that the work be shared under the same license it was granted
- that the work be shared as a whole, without a derivative being made

| Name | Characteristics |
|--------------------------------------|---|
| Version 3.0 Licenses: | |
| Attribution |  |
| Attribution-NoDerivs |   |
| Attribution-NonCommercial-NoDerivs |    |
| Attribution-NonCommercial |   |
| Attribution-NonCommercial-ShareAlike |    |
| Attribution-ShareAlike |   |

Numerous funding institutions have begun to require that materials produced under their programs be released as open access, typically under a Creative Commons license. These open access mandates, as they are known, have been implemented by such agencies as the Wellcome Trust, the US National Institutes of Health, the World Bank, and others.

The development of learning management systems, discussed above, led to the development of repositories of learning resources similar to the Open Archives Initiative. These learning resources, called 'learning objects', were designed in such a way as to be discoverable, sharable and reusable in learning management systems. Examples of learning object repositories include the Multimedia Educational Resource for Learning and Online Teaching (MERLOT),⁵²⁹ Europe's ARIADNE project,⁵³⁰ Canada's Campus Alberta Repository of Educational Objects (CAREO) and Australia's EdNA (Education Network Australia).

Many of the resources offered through these repositories were licensed under Creative Commons or more specific licensing schemes, such as the Open Content License⁵³¹, created by David Wiley in 1998, or the GNU Free Documentation License (GFDL), created to support open source software. Then in 2002 MIT launched the Open Courseware (OCW) project, offering open access to teaching and learning resources under the Creative Commons 'Attribution Noncommercial Share Alike license' (CC By-NC-SA). By 2003 materials from 500 courses had been posted online. To date OCW has seen 140 million visits by 100 million visitors from around the world.⁵³²

In 2002 the global effort to begin formally recognizing open educational resources began. The term Open Educational Resources (OER) was adopted at a global forum convened to study OERs, and the UNESCO OER project has been active since⁵³³ focusing on research into development, distribution and sustainability, and launching OPAL, an initiative to investigate the quality of OERs.

Even with these initiatives, the number of open educational resources is dwarfed compared to the number of open resources available generally. The Internet Archive, mentioned above, collected millions of audio, video and text resources. Additionally, sites like Flickr and YouTube store

⁵²⁹ Website: <http://www.merlot.org/merlot/index.htm>

⁵³⁰ Website: <http://www.ariadne-eu.org/>

⁵³¹ Open Content License, David Wiley, 1998. <http://opencontent.org/opl.shtml>

⁵³² MIT OCW project web page, July 21, 2012. <http://ocw.mit.edu/about/site-statistics/>

⁵³³ UNESCO. Open Educational Resources. <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/>

millions more photos and videos: Flickr, for example, has more than 220 million photos licensed under Creative Commons⁵³⁴ in addition to hundreds of millions more with all rights reserved.

YouTube sees 3 billion hours of video viewed each month.⁵³⁵ Additional services with millions of openly licensed resources include Jamendo and CCMixer (music), Open Clip Art Library, Photopedia and Pixabay (images), as well as Wikimedia, Europeana and SopinXpress (media).⁵³⁶

The impact of open licensing over the last decade is that hundreds of millions of high-quality educational materials have been made available without charge to the educational community. In some cases, these resources may be reused or incorporated into course materials. This was the type of use envisioned by the developers of learning object repositories and open educational resources. The resources would become a part of a course package; open licensing was used to allow the resources being adapted into course packages and to allow for resale, if necessary.

But the growing ubiquity of web access begged the question: why incorporate materials into course packages at all? Why not just send the student to the resource? This would make many more resources available instantly. Some objections present themselves immediately: questions about the persistence of materials was raised, their quality and provenance, as well as privacy and security concerns. But the possibly suggests new models of online learning, and these began to appear with the articulation of E-learning 2.0.

E-Learning 2.0

In 2005 the concept of ‘Web 2.0’ was first articulated. It represented a shift in the way developers looked at the World Wide Web. Before, the Web was thought of as a collection of documents. These documents were collected and hosted on web servers, and readers would navigate from one document to the next to the next. After, the Web was thought of as a body of interconnected data. Rather than viewing pages, Web users were thought of as using applications. These applications might have a location, the way a web page does, but it could draw data from anywhere else on the web.⁵³⁷

A good example of web 2.0 was the way Flickr worked with other services, such as Piknik. As mentioned above, users uploaded and stored their photos on Flickr. So Flickr was like a big database of photos. But if the user wanted to edit their photo, they could go to a different service

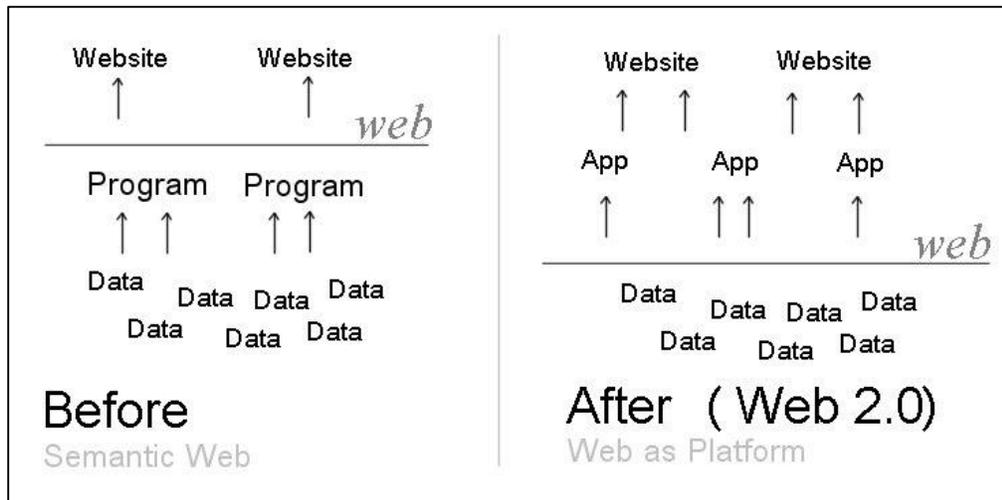
⁵³⁴ Flickr. Creative Commons. July 21, 2012. <http://www.flickr.com/creativecommons>

⁵³⁵ YouTube. Statistics. Viewed July 21, 2012. http://www.youtube.com/t/press_statistics

⁵³⁶ Creative Commons. Media Search. <http://search.creativecommons.org/>

⁵³⁷ Tim O’Reilly. What is Web 2.0? O’Reilly Web. September 30, 2005. <http://oreilly.com/web2/archive/what-is-web-20.html>

called Piknik. Once they logged in and gave Flickr permission, Piknik could access their photo data. The user would use Piknik to edit the photo, and then the photo would be sent back to Flickr, all behind the scenes.⁵³⁸ Flickr was one of a group of websites - two other notable examples are Twitter and Del.icio.us - which gave users access to each other's data. This allowed users to use the sites socially - they could share links, information and photos. Because the data was interlinked, these services came to be known as social networks rather than simply websites.



Before web 2.0, online services were provided by heavy enterprise programs (like a learning management system) that would access data either locally or using web services to obtain it from other systems. These programs would present that data as web pages, much like a course page that might be viewed on an LMS. After web 2.0, online services began to be provided by lightweight web applications (or 'apps') that could access data directly from the source and manipulate it inside the web browser.

The concept of E-Learning 2.0 was based on this idea. It merged the idea of the 'net generation' learner with the concept of social networks and 'web 2.0' developed by Tim O'Reilly. The idea was that individual learners could find and share resources with each other using social networks. For example, they could each create their own blogs and use these blogs to link to photos or videos they may have found on the web. These blogs were saved as data feeds that could be read using feed readers. Thus a student could use a web application, such as 'Google Reader', to read everyone else's blogs.

While much of the attention paid to e-learning 2.0 focused on social networks, it is important to understand how e-learning 2.0 changed the data model underlying online learning:

⁵³⁸ Piknik was eventually purchased by Google and closed in April, 2012. <http://www.picnik.com/>

- Before - learning resources were collected by institutional learning management systems and stored locally; these resources would then be combined to form course packages, that would be presented to students as an online course
- After - students would link to resources wherever they may occur around the web and make these links available to other students; these resources would be viewed individually with no preset order or organization.

E-learning 2.0 thus represents an unbundling of educational resources; what was once presented as a single package is now presented as a set of discrete resources. It marked the transition from the World Wide Web as a medium for presenting documents and other static content to the web as a platform for social networking, interactive applications, and communications networks.

Social Learning

As noted above, examples of informal learning could be found in communities like Slashdot, Yahoo Groups and content management systems. These communities followed the development of the World Wide Web through the evolution of social networks and web 2.0. Though large and informal, these communities became cohesive and offered substantial value to their members.

One example of a distributed social learning community is the “Webheads in Action” community⁵³⁹. The Webheads, a community of language instructors, emerged out of online sessions held at the Electronic Village prior to the community’s annual TESOL conference. Eventually some conference sessions were held online as speakers presented remotely using Wimba for voice and Yahoo for webcam broadcasts. By 2004 the community had created its own Yahoo group⁵⁴⁰, which was active for about a year. They used a variety of media to collaborate, including a PBWorks wiki⁵⁴¹, online chats and more.

Another example is the ‘Edubloggers’ community. The community began as a loose collection of individuals who blogged about education and found each other through comments on each other’s blogs. Over time, loose networks of edubloggers developed. Those who attended the NECC conference in the United States created an ‘edubloggercon’ ahead of the conference, and a large informal network of school teachers using blogging⁵⁴². Another branch developed with

⁵³⁹ Webheads website. <http://webheadsinaction.org/>

⁵⁴⁰ Becoming a Webhead. Yahoo group. <http://groups.yahoo.com/group/becomingwebhead/>

⁵⁴¹ Webheads 2011 PBworks wiki. <http://baw2011.pbworks.com/w/page/29929454/FrontPage>

⁵⁴² Edubloggercon. Website. <http://www.edubloggercon.com/>

James Farmer installed a multi-user version of WordPress, an open source blogging tool, and set up edublogs.org and invited teachers to join for free. Edublogs now hosts 1.3 million blogs created by and for educators.⁵⁴³

Another important example is Wikipedia. Most readers will be familiar with Wikipedia, created by Jimmy Wales and Larry Sanger in 2001⁵⁴⁴. It has 22 million articles (over 4 million in English alone) and about 100,000 regularly active contributors. The principle behind Wikipedia is that any reader may contribute to, or edit an article (this process has become more formalized over time). Wikipedia has expanded in other ways as well; the Wikimedia Commons, mentioned above, is a branch of Wikipedia and hosts several million images and other resources.

Wikipedia is just one example of a wiki. The wiki has become an alternative form of content management and can be found everywhere from corporate intranets, school divisions, and informal learning. They are a popular way for a learning community to gather and store knowledge and resources. One example of this is the Audacity Wiki⁵⁴⁵. Audacity is a widely used open source audio editing application. The Audacity wiki is used by the community to share notes and tips about the software.

Some major education wiki initiatives have emerged as well:

- *Wikiversity* – an extension of Wikipedia, “devoted to learning resources, learning projects, and research for use in all levels, types, and styles of education from pre-school to university, including professional training and informal learning.”⁵⁴⁶
- *Curricki* – “the result of work done for GELC - the Global Education and Learning Community - an online project started by Sun Microsystems to develop works for education in a collaborative effort.”⁵⁴⁷ Curricki is focused on K-12 schools and contains about 43,000 resources.
- *WikiEducator* – “WikiEducator is a community project working collaboratively with the Free Culture Movement towards a free version of the education curriculum by 2015.” This wiki is focused on offering full online courses in collaboration with participating institutions.

⁵⁴³ Edublogs. Website. <http://edublogs.org/> See top of the page for the blog count.

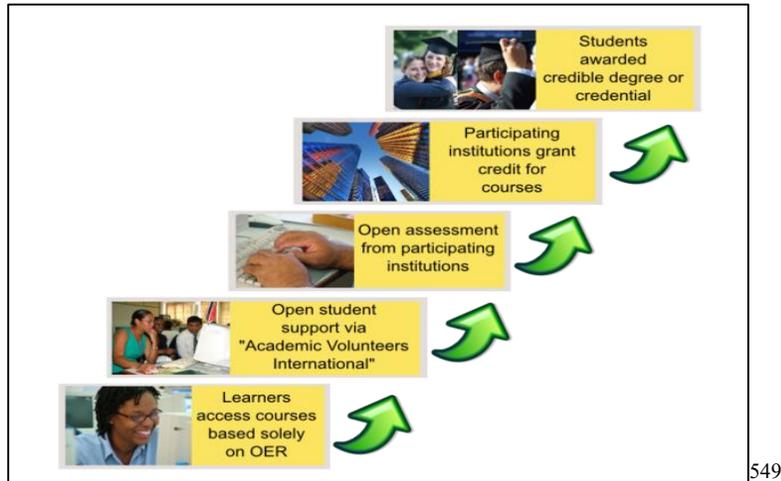
⁵⁴⁴ Wikipedia page on Wikipedia. <http://en.wikipedia.org/wiki/Wikipedia>

⁵⁴⁵ Audacity Wiki. http://wiki.audacityteam.org/wiki/Audacity_Wiki_Home_Page

⁵⁴⁶ Wikiversity. http://en.wikiversity.org/wiki/Wikiversity:Main_Page

⁵⁴⁷ About Curricki. <http://www.curricki.org/xwiki/bin/view/Main/About>

These wiki-based initiatives have led to what may be called the *hybrid-institutional* model of online learning. There are several versions of this model, but it is most clearly articulated by the ‘logic model’ authored by James C. Taylor and adopted by WikiEducator and illustrated below⁵⁴⁸:



The idea is that educational institutions and other collaborators provide free online learning materials, much along the model of Open Courseware. These resources are used to create online courses with learning support and tutoring provided by a network of volunteers. Finally, credentials are provided by accredited educational institutions through some sort of learning assessment. This logic model was used as the basis for *OERu*, founded by the Commonwealth of Learning with Wikipedia and formally inaugurated by founding partners at a meeting in New Zealand in 2011.

Another example employing a similar model is P2P University⁵⁵⁰ which “provides an online space for people to work together to learn a particular topic by completing tasks, assessing individual and group work, and providing constructive feedback.” Yet another example is CodeAcademy⁵⁵¹, which provides community-contributed resources helping people learn to write software. Yet another is Khan Academy⁵⁵², which features about 3,000 resources on

⁵⁴⁸ James C. Taylor. Open Courseware Futures: Creating a Parallel Universe. e-Journal of Instructional Science and Technology (e-JIST) Vol. 10 No. 1, October 2007. http://www.ascilite.org.au/ajet/e-jist/docs/vol10_no1/papers/full_papers/taylorj.htm

⁵⁴⁹ WikiEducator. About OERu. http://wikieducator.org/OER_university/About

⁵⁵⁰ P2P University. <http://info.p2pu.org/about/how-we-learn/>

⁵⁵¹ Codecademy. Website. <http://www.codecademy.com>

⁵⁵² Khan Academy. Website. <http://www.khanacademy.org/>

mathematics and physics. Once again, the model is to offer a set of open and freely accessible learning resources, and then to provide some degree of coaching or tutoring offered by volunteers.

Personal Learning

A major objective of online learning has always been to provide more personalized learning. As indicated above, new pedagogies enabled by internet technologies allows designers to adapt to an individual's learning styles, adapt to prior learning, and respond to a students' needs and interests. Learning management systems adapted to these needs through a combination of customization and personalization#:

- personalization is the process of tailoring content and presentation to an individual's characteristics or preferences. For example, when Google logs what sites you've visited and tailors search results, that's personalization
- customization is provision of mechanisms that allow a user to explicitly state what content they want and how they want it presented. For example, when you narrow a Google search range to 'Creative Commons only', that's customization.

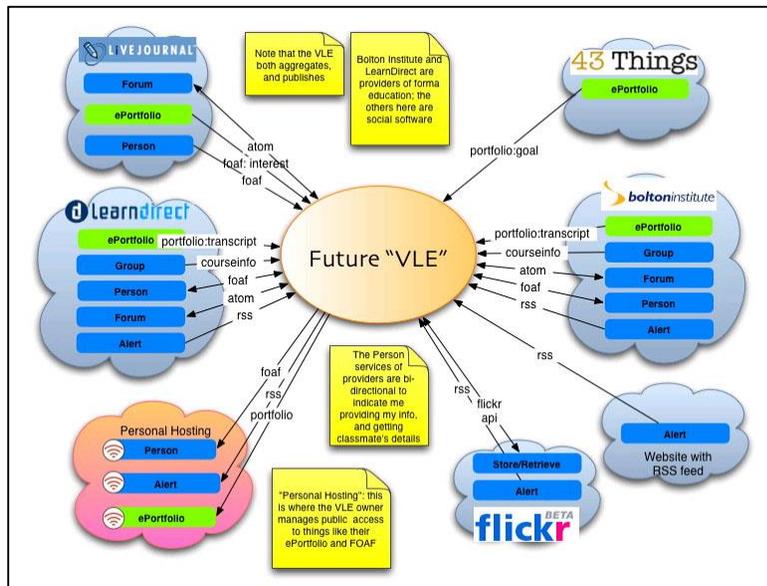
The combination of customization and personalization provide some, but not all, of the objectives set my new pedagogies. Students are limited by the capacity of the LMS. Community-formation is limited to the students enrolled in the course. Students can participate and interact, but their creativity is limited by the LMS environment, and they lose access to their work at the end of the semester.

Many LMS developers adapted by adding e-portfolio capability. An e-portfolio is a collection of a student's work presented for display to an external audience, much like the way an artist would collect a portfolio of her work to show to prospective clients. Students can select their best work and customize how the work is presented. LMS vendors began offering e-portfolio applications as extensions to learning management systems. Additionally, open source e-portfolio systems, such as Mahara, were developed for use with open source e-learning software.

But what if the e-portfolio were a web 2.0 application instead of just another part of a learning management system? This idea led to the development of what has come to be known as the personal learning environment, or PLE. Although no commercial PLE software yet exists, the concept of the PLE represents a significant transformation in the idea of online learning:

- the PLE uses lightweight data and communication standards characteristic of web 2.0 rather than the server-side application based LMS software
- the PLE is centered around the person rather than around the institution; each person has his or her own PLE, which they customize according to their own tastes
- the PLE connects to a variety of services and resources around the Web rather than being limited to course contents contained in a single LMS

The idea of the personal learning environment is that it takes advantage of the many sources of open educational resources available on the Web, including not only those available in formal learning repositories, but also those contained in sites such as YouTube and Flickr. In addition, the design of the PLE encourages students to create and contribute to this wider community by creating blog posts and uploading images and videos. Finally, the PLE supports participation in open social networks to a much greater extent than the traditional LMS, for example by reading from and sharing to social network services such as MySpace, Twitter and Facebook.



While the PLE is thought of as being based on a particular application, a secondary concept, that of the Personal Learning Network has also emerged, this not being based on an application at all. The idea of the PLN is that a learner uses existing social network applications, the most popular being Facebook and Twitter, and assembles a network of contacts with whom to share educational experiences such as discussions, live chat sessions, and learning resources.

Both the PLE and the PLN emphasize learning as something that takes place in a network. As such, PLEs and PLNs support informal learning based on open educational resources (indeed, it is arguable that they require open educational resources, in order to support modification and resharing). But in addition, learning networks differ from traditional LMS-based learning in four major respects:

- **Autonomy** - because each learner supports and manages his or her own learning environment, PLEs and PLNs support a great deal of individual autonomy, with each learner making his or her decision about which resources to use and what course of studies to follow.

- Diversity - while an LMS and the resources offered in traditional courses tend to be standardized and formalized, learning networks support a diversity of resources, online learning systems, pedagogical styles and formats, and more. In addition, the members of a learning network will use diverse technologies and resources.
- Openness - a learning management system is typically a closed environment, meaning that only those with appropriate credentials may access the resources and community, typically by means of a login. A network, by contrast, is formed by means of peer-to-peer communications between its members, which means that any person may join and share resources.
- Interactivity - in a learning management system, the same content is passed from an instructor to all participants; this content forms the core of the learning, and communications are distributive, that is, from the centre distributed to the whole. In a network, however, there is no centralized content, and consequently communications are interactive, with diverse contents being passed from many distinct sources.

Connectivism

Concurrent with the development of e-learning 2.0 and the personal learning environment was the development of a web pedagogy known as connectivism. Coined by George Siemens in 2004#, the term captures the essence of a new model of online learning based on networks and community.

As Siemens writes, connectivism integrates some important properties of networks such as chaos, complexity and self-organization. Learning, meanwhile, is a process that occurs within these networks, “nebulous environments of shifting core elements”.

Importantly, knowledge is something that does not simply exist inside a learner - it exists as well in the wider community or network. Learning therefore can occur in any network, not merely in the individual. Learning is constantly changing, constantly shifting, and as Siemens says, “the connections that enable us to learn more are more important than our current state of knowing.”

Siemens summarizes the principles of connectivism as follows:

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process.

Connectivism offers a new model of online learning because it presents a different view of the nature of knowledge and learning themselves. It draws not only on the formal theory of networks but also on recent work in artificial intelligence and neuroscience.

Normally we think of knowledge as something that is concrete and discrete. A sentence like “Paris is the capital of France” is a typical example. The meaning is contained in the sentence, it is true by virtue of correspondence or reference to the external world, and ‘learning’ this bit of knowledge is tantamount to acquiring or remembering the sentence that contains the information.

But as noted above, educators have come to view learning as more than merely remembering bits of knowledge. Connectivism explains why. The knowledge that “Paris is the capital of France” is not *actually* contained in the sentence itself. Understanding the sentence requiring understanding an entire language, and understanding the language requires knowing things about thousands of other words, the people that speak them, and the community that gives those words meaning. The knowledge, in other words, is *distributed* – it doesn’t exist in any one place, but is rather spread out across a network of interconnected entities, whether these entities are words, brain cells, textbooks or computer circuits.

The theory of connectivism therefore amounts to this: the knowledge is *itself* a set of connections in network, a pattern of connectivity. A person cannot simply acquire this pattern of connectivist, it has to be *grown* through repeated interactions. Learning therefore needs to be active, it needs to be network-based, and it needs to be constituted essentially of interactions between networks of users.

Massive Open Online Courses

In the fall of 2011 Sebastian Thrun, a professor of Computer Science at Stanford University, and Peter Norvig, Director of Research at Google, announced that they would offer an open online course in artificial intelligence. No credit would be offered, but students who finished the course would be issued a Statement of Accomplishment. 160,000 people signed up, and the world took notice of what had become a phenomenon, the Massive Open Online Course, or MOOC.

The MOOC had two major precedents: the Wiley Wiki and the open course. The Wiley Wiki pioneered the idea of open online content that can be edited by course participants; created by David Wiley in 2007. Like other wiki course initiatives, it could be edited by participants and accepted contributions from the web as a whole. What made the Wiley Wiki different was that the wiki was the online home for a university course being offered at Utah State University.

Participants from outside and people enrolled in the course would enjoy the same resources and the same interactions.⁵⁵³

Open Teaching, meanwhile becomes possible when you take the synchronous conferencing application you are using and open it up to visitors from across the internet. The model was pioneered by Alec Couros in his online Social Media and Education class beginning in 2007.⁵⁵⁴ Sessions were offered using the Elluminate conferencing system (now Blackboard Collaborate) and typically featured guest presenters as well as visitors from around the world.

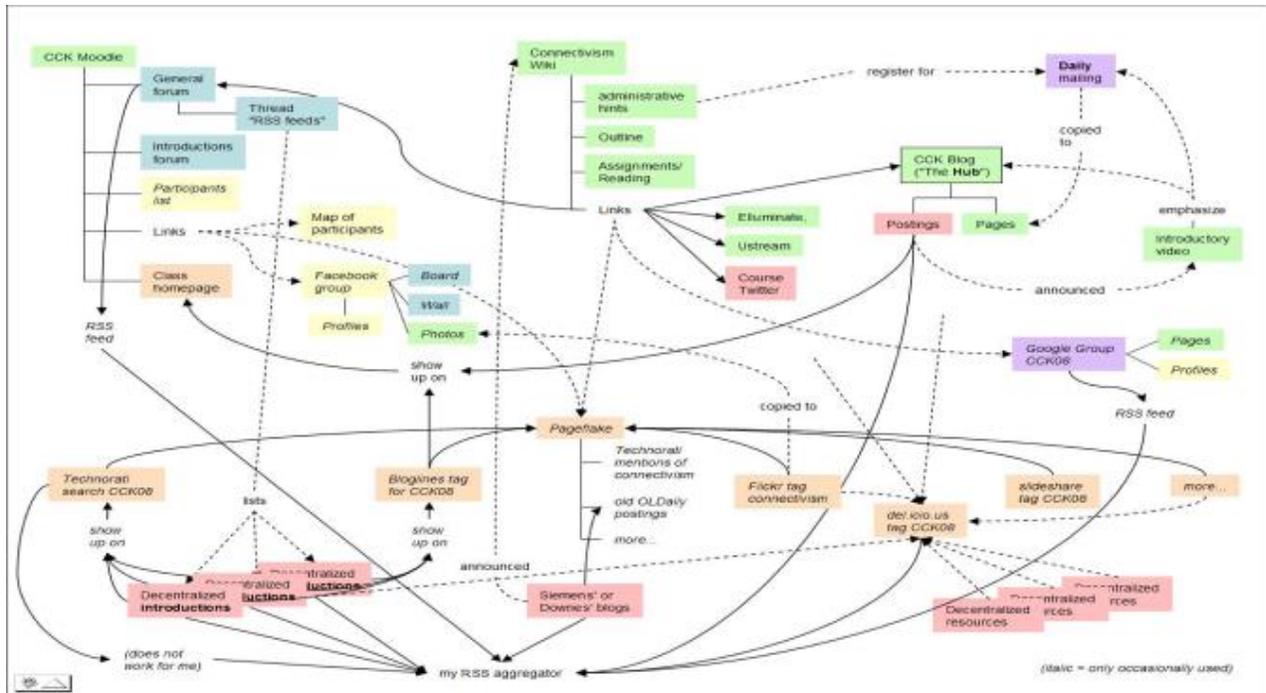
The first MOOC was offered by Stephen Downes and George Siemens at the University of Manitoba in 2008. Originally planned as a small course on connectivism, 24 students signed up for credit. When the course was opened to anyone who was interested, however, an additional 2200 signed up. This large contingent of students helped create some of the innovations that made the course a MOOC, rather than simply a large course online.

When the course – called ‘Connectivism and Connective Knowledge 2008’, or CCK08 – was set up, the authors decided to follow an explicitly connectivist model. This meant that thought here would be a start date and an end date with a list of course topics in between, there would be no ‘official’ curriculum. Additionally, the course was designed as a network, with participants encouraged to use their own websites and weblogs and to register RSS feeds with the central course website. An application designed to aggregate feeds and distributed the results as a daily email newsletter, gRSShopper, was incorporated into the course design.

One of the course participants created a map of the course on launch day:

⁵⁵³ Wiley, David. Wiley Wiki Design Courses. Open Content. Website. 19 February 2010. Retrieved 12 July 2012 from http://www.opencontent.org/wiki/index.php?title=Wiley_Wiki_Design_Courses

⁵⁵⁴ Couros, Alec. (2010) EC&I 831: Social Media & Open Education. Website. Retrieved 14 July 2012 from <http://eci831.wikispaces.com/Session+List>



In the upper left of the diagram are the last vestiges of a formal course structure: the structured design of a learning management system, in this case, an open source Moodle installation. Another square structure, at the top middle of the diagram, is the course wiki, on which the planning for weekly course topics took place. The remainder of the structure of the MOOC consists of distributed services linked together by the RSS aggregator: a Technorati search on the #CCK08 tag, a Bloglines harvester, a PageFlakes web portal, Flickr, del.icio.us and Twitter tags, a Google Group, a CCK08 blog, and *The Daily*, the course newsletter.

The second year the same course was offered, a new wrinkle to the model was added. Students returned from the first year, began adding their own materials, and in many ways began to teach the course themselves. This mirrors a phenomenon that was beginning to be seen in traditional classrooms: the idea of the 'Fisch Flip'⁵⁵⁵ whereby students watch videos, read books, and otherwise receive instruction on their own time, outside of class, and then bring their knowledge and insight into the class, which is focused on students relating these insights to one another in discussions and other activities.

In 2010, two MOOCs combined the idea of personal learning with the MOOC. Offered by Will Richardson and Dave Warlick (educational consultants who were influential in the edublogger movement), the 'Personal Learning Networks' course used a PBWiki for course content and

⁵⁵⁵ Daniel Pink, Think Tank: Flip-thinking - the new buzz word sweeping the US, the Telegraph, September 12, 2010. <http://www.telegraph.co.uk/finance/businessclub/7996379/Daniel-Pinks-Think-Tank-Flip-thinking-the-new-buzz-word-sweeping-the-US.html>

offered a series of ‘challenges’ leading participants to construct their own personal learning networks (PLNs).⁵⁵⁶ Downes and Siemens were joined by Dave Cormier and Rita Kop to offer ‘Personal Learning Environments, Networks and Knowledge’ (PLENK2010) to explore the idea of the personal learning environment and related concepts.⁵⁵⁷

Another MOOC of note, offered by Jim Groom at Mary Washington University, was ‘Distributed Storytelling 106’. This MOOC was based on a WordPress blog. Students (and participants from around the world) were asked to submit storytelling assignments (for example: describe a movie in four icons; create an animated image; rewrite a movie poster to reflect a current event). Participants would complete the assignments; these were then aggregated and displayed on the central DS106 blog⁵⁵⁸. The course spawned some innovative side-projects, such as DS106 Radio, a live web radio service created by participant to share their audio projects.

The MOOC Model

The structure of the MOOC was essentially established by these early MOOCs. The course could be as short as 8 weeks or as long as 30. Each week would have its own topic, would be introduced with a set of readings, would involve a guest speaker or host, and would invite participants to add their own resources and build on the comments offered by the hosts.

Basic MOOC technology entailed the following elements:

- *A host web site* – very often a wiki, either hosted at an institution website or using a free wiki services; a content management system such as Drupal or Joomla could also be used, or a site hosting service such as Google Sites.
- *A synchronous conferencing environment* such as Elluminate, Big Blue Button, WizIQ, Adobe Connect or Wimba. Some MOOCs used what might be called the ‘WorldBridges’ option, broadcasting audio using ShoutCast or IceCast, and video using UStream or LiveStream. In more recent years, Google Hangout has been widely used.
- *An RSS aggregation service* – the Downes-Siemens courses used gRSShopper, and thus added an email newsletter to the mix; other courses used WordPress, which has a feed aggregation module, or Drupal, which has the same.

Students used:

⁵⁵⁶ Dave Warlick and Will Richardson. Personal Learning Networks online course. <http://plnlab.pbworks.com/w/page/17277257/FrontPage>

⁵⁵⁷ Downes, Siemens, Cormier, Kop. PLENK2010. <http://connect.downes.ca/>

⁵⁵⁸ DS106 course website: <http://ds106.us>

- *Blogging tools*, for the participants: recommended services include Blogger, WordPress, EduBlogs, Tumblr, or Posterous.
- *Media upload sites* such as Flickr or YouTube.
- *Social networking services* such as Twitter or Facebook (the open source identi.ca service was also used)
- *Discussion boards* such as Google or Yahoo Groups; some MOOCs also offered discussion boards through LMSs such as Moodle (but these tended to be less useful with large numbers of participants).

As important as the basic MOOC model was the structure of activities. Participants in MOOCs were expected to interact with each other and the wider web, actively searching for relevant learning materials. The overall structure of MOOC participation is the ‘ARRFF model’:

- *Aggregate* – though the course hosts might provide a central email newsletter or feed, participants in the course were encouraged to find their own sources and aggregate their own learning materials. As Siemens explains in his Connectivism paper, the decision of what to select is as important a part of the learning process as reading what’s inside it.
- *Remix* – this refers to the idea of combining resources from different sources to create a new resource. This could consist either of assembling them in the same environment, like a *bricolage*, or to meld them into a single new entity, called a *mash-up*.
- *Repurpose* – this refers to the idea of shaping the aggregated and remixed materials into a new form or adapting it to a new purpose. For example, two images might be combined into a single graphic, thus remixing them, and then turned into a cartoon image, thus repurposing them.
- *Feed Forward* – this refers to the practice of sharing the new creation with a wider network, most easily accomplished by posting it into a blog, where the blog contents are harvested or aggregated by the course hosts and other participants.

Also in 2010 Downes and Kop offered another MOOC, ‘Critical Literacies’. “The intent of the course was to determine whether it would be possible to use a MOOC in order to teach the skills needed to be successful in a MOOC. But what were these skills? We determined that they would be described by critical literacies, as described by six major elements of language and cognition: syntax, semantics, pragmatics, cognition context and change.”

Learning Environments

Though the design and development of personal learning environments and massive open online courses have caught most of the attention in the online education community, the reality is that the same design and structure can be observed in a wide range of applications varying from corporate communications to arts to fire management.

For example, Cisco's own internal learning network, called the Integrated Workforce Experience (IWE), is based on open and distributed learning resources (albeit behind a corporate firewall). Company employees established their own network of informal tools, including a wiki, microblog tools, and video sharing. These tools were combined to give each employee a "single place to access tools for asking questions; finding and sharing documents, videos, and other content; and exploring ideas with colleagues."

Lessons learned in the Cisco experience were similar to those observed elsewhere. Staff will not participate in online social learning if it becomes burdensome or involves a lot of overhead. They need to be able to customize their experience. Subcommunities will form, and in some cases, will not be visible to the wider community as a whole.⁵⁵⁹

In another example, the the Royal Society for the encouragement of Arts, Manufactures and Commerce in Great Britain (RSA, 2012) conducted an analysis of social networks used by its members. Its Connected Communities action research programme was established in 2009 "to explore how social networks and social capital can be better understood, visualised and mobilised to address local social and economic problems." It identified a thickly clustered network core, "the ideal network structure through which to address community problems and make change."⁵⁶⁰

Emergency services in Australia employed learning networks to facilitate the development of adaptive management to deal with rapidly changing situations. They write, "successful adaptive management depends on effective facilitation. When individual conversations are strategically linked for broader learning and sharing they become a learning network." The networks link not only firefighters but also residents, friends' groups and staff from other government organizations. The same learning dynamic exists in this case as in connectivist courses: "As people shared their different perspectives, a broader understanding of the land and fire management 'picture' evolved. As understanding grew, participants' perspectives began to change."

Ottawa, Canada

August 18, 2016

⁵⁵⁹ Cisco Systems. (2011) How Cisco IT Evolved Enterprise Social Software and Collaboration. Case Study. http://www.cisco.com/web/about/ciscoitatwork/collaboration/docs/Cisco_IT_IWE_Deployment_Case_Study.pdf

⁵⁶⁰ Broome, Steve. (2010) RSA - Connected Communities. Case Study. Social Care Institute for Excellence (SCIE). <http://www.thinklocalactpersonal.org.uk/BCC/BuildingTheBigSociety/GrassrootsDevelopments/?parent=7820&child=7865>

Looking at the Future of Online Learning: a rejoinder to Contact North 2016 Report

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Abstract

Although we have entered the era of online learning, the era of change in learning has not ended. Indeed, most of the structures and institutions of the pre-internet age of learning remain. It is unlikely that this will continue to be the case. In this paper, I argue in general that the development of online learning will increase engagement and empowerment, allowing people to manage their own learning, rather than propelling us to a new enterprise driven education marketplace in which this valuable social support system is placed under the control of private industry.

This discussion is addressed specifically toward a Contact North article looking at the future of online learning in Canada in 2016. However, each of the points made by the Contact North author reflects a widespread and commonly held point of view. The intent therefore is not only to offer a second look at one particular article, but to offer a greater perspective on an array of presuppositions.

Keywords

Learning, internet, future, education, technology

Introduction

In *The Future of Online Learning* (Downes, *The Future of Online Learning*, 1998) I took into account three major sets of factors. The first was the obvious basis in technology. Internet and digital systems were advancing rapidly, in ways that could be known. The second was human nature. Here I refer not only to the inherent conservatism in society, but also in the infallible human inclination to use new things in new and unexpected ways. So while I did not predict that the internet would become the largest distribution network for cat photos in history, this development would not have surprised me a bit.

Contact North's look at the future of online (Contact North, 2016) learning captures the first part, I think, but misses completely on the second part. And it's too bad, because the internet is now rich in lore that makes the second part easier to predict and project than ever. From the outburst of Napster, fan fiction, selfies, friending, phishing and LOLcats, the internet serves up a daily dose of humanity, served on a platter for all to see. It's a beautiful thing.

In this article we examine the Contact North predictions (note that I refer to the 'Contact North Author' throughout because the author is not named). We'll take them in the same order they do, but we'll paint, I think, very different pictures.

Let us look at the actual predictions The Contact North author predictions will be stated in italics, with my own commentary following.

Seven Key Technology Patterns

1. Machine learning and artificial intelligence will increasingly be used to enable adaptive learning.

There is a mismatch here. 'Adaptive learning' is essentially a name for differentiated instruction. The idea is that, based on your previous work, you will be presented with new content or assignments. Neither machine learning nor artificial intelligence are needed for this, and for the most part, adaptive learning won't simply be a new form of differentiated instruction..

Existing adaptive learning systems are a lot like computer programs. (Dreambox Learning, 2016) The student is guided through a set of decision trees and loops, and the processor serves up resources according to a pre-defined algorithm. To the extent that these will improve (and they will!) they will become more like sites such as CodeAcademy (www.codecademy.com) in an environment that responds to the student's input.

2. Handheld, mobile and integrated devices will continue to develop and become the de facto tools for learning, communication and peer networking.

The evidence disagrees. It is true that for communication nothing beats the handheld. And the tablet is an invaluable work environment for people who need to be mobile (we see cases such as tablets for pilots (Reddit, 2015) and health care workers (Adil, 2012) for example). But the future lies not in extending the utility of such devices through apps, it involves the integration of these into other devices, for example, the tennis racket that teaches you. (Serafin, 2014) And the large computer isn't going away; people need their space. (Meyer, 2014)

Third party apps and add-ons, meanwhile, are in the midst of a transition from a centralized computing environment, where everything is based on the single device, to the distributed computing environment, where applications live in the cloud and are accessed on an as-needed basis. It would be a mistake to expect today's world of proprietary platform-dependent apps to

continue into the long term. Nobody's making money on them - except the platforms. (Taves & Tibken, 2015)

3. Predictive analytics will grow in significance in terms of student retention and learner support.

This is another class of analytics that instead of recommending resources, as in adaptive learning, is employed to predict what students will do. The ability to predict student achievement is core to the future of the instructor-led model of learning, but the instructor-led model of learning will be on the decline. So the need for prediction in education will decline.

Where analytics will be *really* useful in learning is in the environment of personal knowledge networks and feedback mechanisms. Outside education there is a boom in the quantified self movement (Watters, 2012) (I use RunKeeper (www.runkeeper.com) myself). And we don't need predictive analytics, we just need good sensors and good calculation mechanisms - how many calories did my 13 km walk burn? What blood pressure does my heartbeat indicate? How can I track my increasing knowledge of French. We need *feedback*, not prediction.

4. Interconnectivity of devices and systems will be a significant feature of the "Internet of things" and activities.

"Imagine these developments for learning," writes the Contact North author. "Instant flagging of new developments in fields of study, on the fly testing for competencies and skills, instant connections to global expert presentations on topics studied in a course, and real-time viewing of skills in action for apprentices are among the possibilities.

These developments are promising, but pose risks. It's great to have a car that is connected with the mobile phone, but it is not so great when my driving habits are reported to the insurance company. (Gollom, 2013) It may be fun to use 23andMe (www.23andme.com) to do genetic tests, but no fun to be denied health coverage because of family history. (Schultz, 2013) As we develop devices that support real-time assessment, we will have to adapt in two significant ways:

First, the exchange of information - whether it be performance results, test results, environment and infrastructure, or any other personal data - must be genuinely *voluntary*. A system that creates a mandatory form of assessment is very likely to be misused. For example, a car insurance service that reduces premiums for people who use a GPS to monitor performance raises premiums for all those who don't participate. But arguably, people not using the GPS should not be penalized in this way. (CBC News, 2013)

Second, people need to be protected in some way from the *consequences* of these assessments. For example, it should be unacceptable to simply deny insurance coverage or sharply raise rates merely on the basis of automated assessment. The use of automated assessment should arguably be coupled with the public and *non-discriminatory* services, such as public health and auto insurance.

5. Gamification and virtual reality will enable significant advances in teaching a range of subjects, especially laboratory based subjects.

By 'gamification' we mean the addition of game elements (such as points, competition ladders, badges, etc.) to traditional learning. As Yu-kai Chou writes, "Gamification is the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities." (Chou, 2016) A really good example from the Gamification Wiki is the use of frequent flyer points. (Gamification Wiki, 2016) Gamification is not the same as converting learning into games (this is known as serious gaming, which is a very different thing (Marczewski, 2013)). I think both will play a role, but that their impact will be limited and will be quite different.

Gamification is a motivation mechanism. It feeds back into performance. Eventually, it will be subsumed into the quantified self. People will begin to mistrust gamification after being subjected to disappearing points or diminishing prizes (Miller, 2014) too many times. Serious games will move through various phases, from simple memorization games (such as versions of Jeopardy) to simple branching storyline games (Riedl & Young, 2006) to more complex gaming environments intended to stimulate deep knowledge and causal reasoning.

Serious gaming is a presentation mechanism. It involves setting up a challenge or problem for the learner in a virtual environment of some sort, which may be more or less realistic. This, though, is a specialized use of simulations and virtual environments generally, and so the discussion of serious gaming is likely to be restricted to niche applications requiring very specific uses of these environments.

6. Translation engines will continuously improve and become embedded in a great many applications.

Translation will be everywhere. I can use my phone to translate Turkish signs. But for a while it will be really interesting, because people express themselves very differently in different languages.. It will be interesting to see how translation services are able to approach direct translation without losing the cultural and metaphorical flavour behind different languages.

7. Collaborative technologies and knowledge sharing will emerge as key resources for all forms of learning.

We will need to think in terms of cooperation, rather than collaboration. (Harvard University, 2016) Collaboration is based on common goals and implemented through management, where people sacrifice their own needs in interests for the group. Collaboration requires a leader and output is often for the benefit of the leader, while in cooperation each person contributes and each person benefits.

The leaders in this space - Slack, (slack.com) or Atlassian (www.atlassian.com/software/jira) - are based around the idea that groups are self-organizing, that each person defines their own contribution, and that the purpose of the software is to help with communication rather than coordination, to *share* rather than to direct. It's the digital instantiation of digital-age forms of organization such as agile development (Martin, 2002) or wirearchies. (Husband, 2015)

Five Key Features of *Online* Learning Which Technology Patterns Will Enable

1. Learning is Mobile – Anywhere and Anytime

It is true that learning will be available anywhere and any time. Learning will be like a utility, like electricity in a plug, or water in the pipe. But this is only half the story. In order to make this work, we need to have an advanced understanding of environment and especially context. (Gómez, Zervasb, Sampsonb, & Fabregat, 2014) People trying to rescue a crashing airplane, do not have time for a three-week course. People working in an explosive environment can't just pull out a mobile phone. Sometimes people need to figure out how something works, and sometimes they just have to remember the code.

2. Learning is Interactive and Engaging

This prediction from the Contact North author is unclear. Does the author mean that learning will be engaging *because* it is interactive? Why link these together? Or perhaps it is a restatement of this point: "Given (that) collaboration is the key, not just to knowledge development and learning, but also to finding work, students will use the emerging technologies to collaborate and connect." But engagement and interactivity are two very different things. Learning is engaging only if it's something *you want* to do. And it's interactive only if it includes exchanges with other people (and maybe devices).

It would make more sense to say that learning is *immersive* and engaging. By 'immersive' I don't mean simply based in virtual reality (though others do (Burns, 2012)), I mean that the learning and the *doing* become one and the same. 'Learning by doing' is a well-recognized and increasingly popular approach to learning. (Felder & Brent, 2003) Indeed, we can't imagine learning how to play sports or acting or baking without doing). People need more than artificial and mechanical 'interaction' - it's support, competition, reassurance, and someone to taste my latest pie.

Educators who talk about collaboration (or even 'personal learning networks') often depict other people as agents to be *used* to support something or another. (Wheeler, 2010) But this is to misunderstand the motivation for working with other people. Mostly, when we work with other people, it's because we *like* other people. Educators have to stop objectifying them with notions like 'interaction' and 'collaboration'.

3. *Learning is Personal and Instruction is Differentiated*

What the Contact North author is writing about is *personalized* learning, and we read the list of the newest personalization darlings: Knewton, ALEXS, Capterra, DreamBox, Cognitive Tutor, Knowillage LeaP, Planet Sherston and Grockit. These all focus on *differentiated instruction*. But the jury is still out on whether it works. And the early evidence is that it will not. (Jarrett, 2015) We've been through this with learning objects, with learning design, and more: the problem of learning is not a search problem. The problem of learning will not be solved by discoverability. (Berkun, 2012) *At best*, it will improve material selection. But ultimately, learning is not something that's done for you, it's something that you do for yourself. I wrote an article recently drawing the distinction between 'personal' and 'personalized'. (Downes, 2016) In a nutshell, something is 'personal' if you do it for yourself, while it's 'personalized' if someone (or some system) does it for you. Learning is improved, not with *less* learner control (which is what these systems provide), but with more *learner control*. (Kay, 2001)

4. *Learning is Intelligent*

The Contact North author writes "Doctoral students can be connected not just to their own instructors, but to the communities of interest and practice associated with their field and up-to-the-minute developments. They can be much more engaged researchers, especially if the volume of new material is filtered through intelligent filters. Imagine courses which automatically update themselves, based on new research and newly available, quality assured open educational resources."

These are useful, but as I suggested above, they don't solve the problem of learning. Moreover, we are being told *what* happens, but far more interesting is *why* it happens, as it gives us clues to the affordances these new systems will offer. Without a definition of 'intelligent', it's difficult to understand what exactly is meant. There are various types of intelligent systems. Here's a quick (and partial) taxonomy:

- decision engines - these are expert systems (Engelmore & Feigenbaum, 1993) that are based on rule-driven strategies (Newell, 1984) drawing on an established knowledge base that assists the user in making decisions.
- pattern recognition - these are neural-network type perceptual systems that identify patterns from partial or disorganized data (Bishop, 1995) (sometimes even if the pattern is not actually there) (Hern, 2015))
- cluster detection - these are graph-based algorithms for detecting nearest neighbours (Körting, 2014) and categories of things (Sayad, 2016)

Notice that these are *ways* that machines can be intelligent. But they do not speak to assisting *human* learning at all. It's nice to have a tool that will recognize patterns or divide things into

clusters. But we will want to be able to use these tools to do far more interesting things than to simply pick out the best movie to watch. What sort of things? For one, helping us understand the thing we are studying by *using* these algorithms, tweaking their major parameters, to see different things, organize data differently. It's when *we do stuff* that we learn, not when stuff does something for us.

5. *Learning is Global*

Very few people are actually global. We may interact with marginally more people internationally than we used to, but we remain rooted in our families and our communities. These connections may help us *think* globally, which is good, but human nature forces us for the most part to act locally. (Jocz & Quelch, 2012)

We may *think* we can have a global impact through the internet, but this impact is limited. For example, there's a phenomenon called 'hashtag activism'. (Augenbraun, 2011) I think that the Arab Spring taught us very clearly the limits of that concept – the well-intentioned intervention of people worldwide on their computers was overwhelmed by physical events in the countries themselves. Even as I write in the relative peace of Istanbul we watch helplessly while the remnants of hashtag activism play out in a violent and destructive civil war just a few hundred kilometers away in Syria. The same holds true for online learning. The actions and interests of people working locally will always prevail.

It's easy, for example, to say, "There is no reason for a student to be disconnected from peers, experts or sources of knowledge and understanding from anywhere in the world, especially given the growing efficacy of translation engines." But it takes the disappearance of only one long-distance friend to realize how tenuous that connection may be. When a physical intervention is required, even one so simple as a hug or a pat on the back, the person at a distance is helpless. (Experience Project, 2010)

Institutional Context for the Development of Online Learning

Most pundits focus on the future of institutions such as universities or governments. But there's nothing special about them. Institutions have played both positive and negative roles through history; civilization as we know it is impossible without institutions, but so also is fascism.

Having said that, there is no doubt that new technology, and the social and environmental context in which it is developed, is causing significant changes to institutions. It is causing some to retrench (Mohler, 2016), others to adapt (Coe, Paquet, & Roy, 2001), and others to disappear. (LaFrance, 2015) The word 'institution' connotes defiance to change. But with institutions changing all around us, society is far more fluid than people realize. Longtime institutions like newspapers and churches are becoming less and less important, while new forces, such as wireless networks and mass transportation come to dominate our lives.

1. Institutions are Complex and Competitive

The writer means *more* complex and *more* competitive. It's not clear that either is true. After all, the word 'byzantine' refers to an institution (or more accurately, a set of institutions) that organized around this very city of Istanbul a thousand years ago, and is today a synonym for 'complex'. (Byron, 2014)

We should say institutions are becoming more interdependent. Complexity is a byproduct of interdependence. (Chenciner, 2012) Increased interdependence is a natural result of increased communication (increased interactivity, if you will).

What interdependence means is that competition is a very bad idea; hurt your neighbour and you may well find you have hurt yourself. The concepts of collaboration and competition are artifacts of the days when society was organized into large and largely independent corporations, nation-states and other institutions bumping against each other like giant icebergs in a global sea. Today, however, the heat has literally increased, and bodies that collide are just as likely to shatter into nothingness. (Investopedia, 2016)

The only way to succeed in an era of interdependence is to cooperate, to disregard parochial interests, and work toward the betterment of society as a whole.

2. Resources are Constrained

What is meant by the Contact North author is that "public per capita funding for post-secondary institutions in some parts of the developed world is falling at a time when demand for student places (at least in most jurisdictions) is rising."

In fact, there has never been enough money to offer everyone a university-level education, at least, not using the mechanism of universities. This has been true as long as there have been universities. This shortage was originally addressed by reserving universities for the rich. (Fitzgerald, 2008) The post-war universities were fueled by the post-war boom and veteran's spending. (U.S. Department of Veterans Affairs, 2016) The last forty years have been funded through debt (which many of us spent decades paying back). (Project on Student Debt, 2015)

What has changed is the demand. In my lifetime, a post-secondary education has changed from being optional to being mandatory. A modern technological and industrial economy cannot function without highly skilled labour. The more labour is squeezed - both in terms of funding for education, and in terms of wages and benefits - the harder it becomes to run a modern economy. Skills shortages develop, and the skills shortage becomes a barrier developing nations find it increasingly difficult to surmount. (Bessen, 2014)

3. Demographic Shifts Impact Activity

The 'demographic shift' is mostly a phenomenon of the western world (that is, North America and Europe). (Winkeljohann, 2015)

That is to say, the phenomenon in which the proportion of older and retired people is increasing rapidly is a phenomenon seen only in North America and Europe. Through the rest of the world, if there is a demographic shift at all, it is toward youth. In countries like India and Colombia, for example, the vast majority of the population is young, and the problem isn't too few people to do the jobs, as in North America and Europe, it is too few jobs for the people to do.

4. Quality Is an Imperative

This is more of an opinion than it is a projection of a future state. It is based on the presumption that institutions are now "in a highly competitive environment" where only the best will survive. But this is often not what actually results from competition. "Sometimes, the increase in competition does not increase quality where one expects it should. Further, in some unique cases, more competition actually reduces quality and may give rise to significant health and safety issues." (Ezrachi & Stucke, 2015)

Even more to the point, students are assuming more of the cost, and states today fund a minority of the costs of state universities. (Douglas & Lombardi, 2006) With this decline in public support, it is difficult to justify demands that universities satisfy public objectives such as "learning outcomes based on achievement measure." And students begin to act like customers (not surprisingly when they are paying the freight). (MacIvor, 2016)

Colleges and universities will be increasingly torn between their two major constituent groups: rich students who are looking for a lifestyle experience, and less affluent students looking to learn. They will probably divide into two types of institution. If history is any judge, the lifestyle institutions will continue to be subsidized by the state, while the learning institutions will be on their own.

5. Change Is Inevitable, but Difficult for Colleges and Universities

I think the educational system will fragment, with different entities taking on different roles. (Downes, 2010) To a large degree, the massive institutions will be replaced with an interconnected network of specialized providers. In particular, we will find networks of individuals and small companies offering the following services:

- hands-on tutoring and support services (a lot like Sylvan learning centres)
- educational testing services, ranging from test-prep to proctoring to certification agencies
- content and resource providers
- advanced privately and publicly funded research organizations

A century from now, the word 'university' will have as much of its original meaning as the word 'guild' does today (and for the same reasons).

6. Relevance and Value Shape Strategy

There is no model in which the university as a business-value driven organization has a future as an academic or research-driven enterprise.

The conversion from academic principles to business principles is driven by what is called 'value-based management'. (Koller, 1994) According to this principle, the purpose of all activities is to 'create value'. Value is measured by revenues; the enterprise is customer-driven, and customers recognize value by providing revenues. In turn, the description of the product or service to the customer is not in terms of process or features, but rather, in terms of *outcome*, which is the value realized by the customer.

The university environment is not configured to operate in this way. The bulk of academic staff has made the conscious decision to *avoid* the value-driven workplace, often at the cost of lower salary expectations. People study physics because they are interested in physics, not because they want to teach or work for some business enterprise. The majority of professors prefer scientific, conceptual or cultural challenges rather than business challenges.

The structure of publicly funded research will either collapse entirely or be reshaped significantly. Most likely, public funding will accrue to *individual* researchers or researcher *cooperatives*. Only in the worst case scenario will research become the domain of private corporations where all public funding of research is driven to those corporations.

Transformations in Students, Programs, Teaching and Learning, and Policy and Government

This moves us into the second part of the Contact North article, and the structure of the presentation in the article changes somewhat, it will be kept consistent here.

Student demand will continue to grow and change

The bulk of the predictions offered by our writer are as regards demographics: more older students, more international students, etc., which have been observable for the last decade. (Seurkamp, 2007)

If we want to understand the 'changing nature of the student' we need to understand the following:

- there will be more people than jobs; at a certain point the increased productivity created by the information age will have to be returned to people, rather than companies, in the face of growing economic instability, either through guaranteed incomes or dramatically shorter work days.

(Bivens & Mishel, 2015)

- at the same time, those jobs that remain will demand higher order skills, not the sort of skills you can get from short-term training; this is what produces the skills shortage. There seems to be an expectation that students will pay to acquire these higher order skills, but this expectation will be thwarted by the students' inability to pay. (Laucius, 2016)

- as indicated before, we are shifting from an era of competition to an era of cooperation (though some companies, countries and political organizations are slower to realize this than others), which speaks to an environment of mutually supportive and integrated workplaces

The idea that we should transform educational institutions into businesses producing economic value by providing students with job-ready training in shorter and more flexible intervals is pernicious and destructive, and will cause a lot of harm before we reconfigure education into a diverse and multipart publicly funded support system driven by personal and professional needs and interests. The 'institution', as we know it, will no longer be there, or, more accurately, to the extent that it remains, will also be the extent of lingering (and destructive) economic competition and inequality in society.

What it means - beyond lower prices, which is a given - is that traditional *standards* and *expectations* of a university education will be waived. We've already seen this phenomenon in the executive MBA where you "earn a full MBA without taking time from your career." (Wharton, 2016) In the 'competitive international market' a similar sort of 'convenient' education will be the norm, such as Nottingham's 'Flexible MA' with a range of "module options to create a personally and professionally meaningful qualification" and "modes of delivery to take account of individual needs and professional." (University of Nottingham, 2016)

The same people offering these programs will resist the idea of the average (low-paying) student designing their own programmes. But these models will emerge. The Contact North writer even picks up on some of them: the need for programmes that lead to employment, and the need for shorter (micro) programmes.

Programs will look very different

1. More flexible program designs

As mentioned above, it doesn't seem reasonable to think of a thing called a 'programme' when it's different for everyone. The idea of a 'mix and match' program is at best an intermediary notion; it's like the idea of introducing menu selections at a restaurant instead of a fixed menu, when what would *really* offer choice is to do away with the restaurant altogether, and employ a buffet or a grocery store instead. A program model is ultimately rooted in *certification*, but as I've suggested elsewhere (Downes, 2014), certification will look very different in the future, and the idea of institutional structures such as PLAR and credit articulation will appear archaic. Indeed, even the outcomes-based model (Brandt, 1998) will be archaic - what is an outcome worth, if we

have actual performance data? Nobody cares about the 'outcomes' of spring training; what counts is the regular season.

The focus on 'outcomes' and 'competencies' (U.S. Department of Education, 2016) is in my view a transitory phenomenon. It's the last refuge of educational Taylorism, (Perruci, 2014) taking shelter in institutions of learning, where it could be decades before it can be dislodged.

2. More use of open educational resources

There is no denying the phenomenon of open online learning. “More people signed up for MOOCs in 2015 than they did in the first three years of the ‘modern’ MOOC movement.” (Shah, 2016) However the future of open educational resources, (UNESCO, 2002) properly so-called, is less clear. The idea of an open *educational* resource is that it is used in teaching, which presupposes, first of all, a teacher-student model of learning, and secondly, adherence to a certain educational structure (for example, the requirement that a learning resource contain some sort of assessment). The key to the definition, however, is that the resource be *used* to support learning, and this goes far beyond more traditionally 'educational' objects, to include free papers and videos, blog posts, online communities, and that much more.

As a consequence, the concept of the 'course' changes, and it is arguable that future MOOCs will resemble the Connectivist MOOC than the more traditional courses offered by, say Coursera (which have in fact ceased to be instances of 'open online learning' now that they charge tuition fees). As I said when we started the first cMOOC in 2008, the meaning of 'course' in my vocabulary resembles the concept of the traditional 'course of lectures', (Donnelly, 2014) where a professor will hold forth on some topic of interest, supplemented by a host of open online resources, and where it's up to the students to attend or not, or to conduct activities or not.

3. More creative assessment processes

The Contact North writer cites the common distinction between *formative* assessment (assessment used for learning) and *summative* assessment (assessment of learning). (Eberly Center, 2008) Most people are interested mostly in the former and almost not at all in the latter (unless, of course, they're assessing *other* people). We've discussed assessment above in a few places: first of all, in the quantified self movement, and second, in new social-net forms of assessment based on performance. But aside from producing personal feedback, it is arguable that assessment is over-rated. In the future, our assessment will be our work and our performance, which ultimately will be inseparable from our learning.

4. More micro-credit and nano-degrees

If we just called them 'points' would we be saying there are 'more points'? It reminds me of pinball machine inflation. In the early days of pinball machines, you played for hundreds or maybe thousands of points. By the time the electronic pinball machines rolled out, you were

playing for billions of points (and yet bumpers still scored 25 points). But more points did not mean more gameplay - indeed, games were typically a lot shorter on the new machines, and the play a lot less satisfying. Getting more 'degrees' doesn't mean you're getting more education, and there's no real purpose for it except to disguise the fact that you're getting less for your money.

5. More co-op and experiential components within programs, more international collaborative programs, more transfer and qualification recognition agreements for programs between nations, blurring of lines between college and university.

None of this matters. None of it is relevant. These predictions suppose that the existing system of educational institutions will remain largely intact, but as discussed above, the focus on institutions is misplaced in a rapidly changing and fluid society.

Teaching and learning will change

1. Learning will no longer be defined by time, place or institutional offerings.

If this is true, then almost none of what the Contact North author had to say about institutions is relevant. And, yes, this is true. And, indeed, even the paragraph that *follows* this statement is irrelevant.

Why, for example, would there be "admission to programs and courses will allow for multiple start dates?" And why would there be "a growing number of short courses (2-3 weeks in duration), which carry credit?" These remind me of modern arcades, where the games get shorter, the lights flashier, and you get less and less for your quarter. Ultimately, *there are no more arcades* and people play the Sunless Sea or some other game on their own computer.

2. Learners will create their own learning agendas, which reflect their own career, personal and lifelong learning goals

It is true that people will design their own online learning, but it will be far more likely to meet the needs of the moment than to satisfy long-term goals. That doesn't mean that there won't be long-term goals. But a person will work toward these goals in all facets of their lives (or not, as they wish - some people (quite legitimately) drift with the tide). Nobody will "set the agenda" - the idea that we can plan for a lifetime during a four year period in our late teens and early twenties does not respect the fact that we are entering a complex and rapidly changing environment. We learn as we need to; with some few exceptions, recognition is through performance, not certificates.

3. Learners will secure their learning outcomes through a combination of formal, informal, self-directed, instructor delivered, in class and online learning

The best that can be said of this point is that it doesn't include seances and divine intervention.

Again, though, the problem here is the employment of education-centered language - that learners "will secure their learning outcomes". One of the distinctions Jay Cross used to make was between formal and informal learning, and one of the markers of informal learning is that it is intended not to satisfy learning outcomes but rather to get something done. Credit recognition and the rest don't enter into it. (Cross, 2012)

4. Learners will expect personalized learning services and supports for their learning agenda

I think that in the chaotic and turbulent economy and environment of the future, nobody will *expect* anything. Why would they?

There will probably be a marketplace where "personal investments of time, money and energy in education increase expectations of service and quality." By the same token, the investments we can actually afford to make may well lower our expectations. We may all *want* more, but in learning as in everything else, we'll take what we can get (but it won't matter so much, because we'll be a lot more self-sufficient, and our entire futures won't depend on the quality of a particular education provider).

It is instructive to look outside the formal education market for good guidance about what to expect, to the fitness, sports and hobbyist communities, for example. Sure, you can get a full personalized fitness plan. But most of us will settle for something simple, inexpensive, and commonly available, like a bicycle. Why would anyone expect this to be different in learning? When the Canadian government decided fitness was important for the country, it launched a national program, distributed guides, and ran commercials. (Government of Canada, 2016) It did not set up a personal gym for everyone in the country.

5. New mechanisms for meeting personal learning agendas will appear in the market as the "unbundling" of learning continues.

The many roles in education were mentioned above. It remains to be noted that if 'unbundling' is a fact - and it is - that all of what was said above about institutions is moot.

6. Courses will be less important than mentoring, coaching, counselling, advising and assessment

None of these will be more important than the educational equivalent to the bicycle. And the assessment functions in a tool like this are the *least* important part. What matters is the network of support and encouragement the application can bring you.

7. Diverse and new forms of credentials will appear which reflect the varied needs of learners, employers, social agencies, innovation organizations and entrepreneurs

Another way of saying the same thing is that we are about to enter a credential bubble. Credentials will still be deemed to be valuable, but everybody will be able to create credentials.

It's hard to imagine that people will display reams of credentials on their resumés, but it could happen. This will be an intermediate stage, but an important one, because as the educational institution loses its monopoly on the credential, its marketplace advantage essentially vanishes. This will be a difficult time for institutions - their funding will disappear, their market will disappear, and yet they will have experienced and professional staff. Just like newspapers had.

Policy and Government

In this section the Contact North author purports to describe "what we can expect to change in terms of public policy." What we actually get are (bad) policy recommendations framed by a systemic misunderstanding of the environment. It is important to address these:

- Continued pressure on public finance as a result of demographic shifts, shifts in the energy economy and the new financial implications of international trade and related agreements;

The facts listed have nothing to do with the continued pressure on public finance. There are two major causes: first, the power to tax business and industry is at a nadir, and second, spending decisions lean toward business subsidy and military. Public finance is *reflective* of pervasive income inequality,

- The increasing complexity and competitiveness of higher education systems placing new demands on governments to re-think their roles as stewards and regulators – the demand being to reduce controls so as to enable institutions to make effective responses to market conditions, while at the same time protecting the public interest and the efficacy of their investments; and

What this point says, in so many words, is that the pressure is now on to privatize education. This is in no way a response to "increasing complexity and competition in education" - these are (as discussed above) artificial contrivances. The key question here is: *has deregulation worked* in other key economic sectors? The answer, almost uniformly, is no.

- Growing investment in education within the private sector and a growing number of public - private partnerships to deliver to educational outcomes.

There is no doubt that there are more public-private partnerships in education. The charter school phenomenon is an excellent case study. There's growing evidence that charter schools are failing. (Buchheit, 2015) Nearly 2500 were shut down over the last decade. (Persson, 2015) And educational outcomes are indifferent, at best. (Loveless, 2013) What would the *point* of such an initiative been except to continue to drive public money into private hands, increasing the fiscal inequity that is already paralyzing the economy.

Now let's look at the projections:

1. Significant Changes in the Way in Which Higher Education Is Funded

The author asserts that "the shift will be to funding social, economic and learning outcomes and away from funding processes and enrolment." I've seen no good evidence to support this (and the author provides none). The description is essentially that of the No Child Left Behind act (U.S. Department of Education, 2016) in the United States, but this program did not actually improve outcomes. (Weigel, 2011)

The author suggests that "a comprehensive re-think of the role of government is what will unfold," but what is meant is that such a rethink is required. But if the rethink is *still ahead* of us, then how is it that the redefinition of the funding process has *already happened*? No - this is a policy recommendation, and a bad one.

What is needed from government is not evaluation but support, not funding to companies and public-private-partnerships, but direct support to individuals. I think that we will see a shift in the funding model, but it will be one where institutions are consolidated and in which they achieve greater efficiency through free and open learning resources and support systems. It is costing us more to make education expensive than we would lose were we to make it free.

2. Strong Focus on Quality Assurance, with a New Understanding of Quality

This section appears to be written as though the entire and existing structure of higher education will be privatized, with these mechanisms in place to ensure it doesn't change.

If students really are able to manage their own education, why we would need a special program of quality assurance to ensure "programs which have meaning and value and engage them in authentic learning, faculty members defined by how engaged they are in supporting the learning needs of students and how creative they are in designing engaged and authentic learning?"

In what the Contact North author calls "a growingly complex market" (*sic*), a focus on quality assurance is a necessary precondition for privatization. This serves two functions. First, it is an offloading of some of the more significant costs of an educational system, accreditation. And second, it prevents private industry from delivering low-quality product to consumers, which it will do if unregulated.

3. A Commitment to Learner Mobility

For example., there is the European Bologna Process (European Union, 2016), which ensures that students will be able to transfer from one institution to another across the European Union. Given the complexity of the European process, it appears difficult to imagine how a global equivalent would work. We are told "Canada currently is lagging behind many other jurisdictions with respect to learner mobility," which is essentially the same as saying "Canada needs a Bologna Process". But all this presupposes a model in which credentials are very important. But this will not be the case.

We will need to interpret learner mobility a different way. The Contact North author has already suggested that education will be "unbundled", something that has been in the works for many years. When the credential monopoly is broken, the educational system will split into two major parts: a system that provides learning, and a system that evaluates learning. At this point, 'mobility' takes on a completely different form. And in retrospect, it will seem very backward to imagine that a student could or would attend only one institution; learning will be *everywhere* and the idea of monopoly providers will be forgotten.

4. More Public - Private Partnerships

Once again we are presented with the recommendation that the public education system be wholly or partially privatized. This is presented as a fact when it is in fact an opinion. It is very difficult to entice private enterprise to *contribute* to the public good, and it will be vital to remember that the objective of private enterprise is to make money. It's a model that has been touted for decades (Nelson, 2004) (Pusser & Doane, 2001), but has failed to fulfill its promise. Given the essential public purpose served by education, a different model - one in which private enterprise acts solely in the role of *service provider* - is preferred.

5. A Strong Focus on Outcome-Based Accountability and Public Assurance

Why would we pay "more attention... to measures of student engagement, learning outcomes, value added to the economy, and impact of the work of colleges and universities on communities, industrial sectors, innovation and health" when students are paying most of the cost of education?

In fact, in a more privatized system, we should expect a more consumer-oriented system of assessment, one in which public policy is secondary (if it is allowed to play a role at all (Choi, 2016)). Such a consumer-based system would fall under trade regulation, and (if the past is any indication) while outright negligence would be punished (to a degree) quality control would be a case of *caveat emptor*. There is no reason to believe that regulation in the educational sector would be any more effective than it was in the financial sector.

What Do Colleges and Universities Need to Do?

What we *should* do is far more a matter of policy preferences, priorities, values and principles than it is some sort of necessary response to a projected future.

I cannot believe that Canada is headed toward a privatization of higher education; this does not speak to the nature of the country, nor the shared assumptions Canadians have had about the role of public policy over the years. Having said that, let us consider the proposals:

1. Start engaging in strategic foresight as the basis of strategic planning

Strategic foresight is a good idea, but it cannot be based on an alternative reality or wish list. We cannot depend on the institution in its present form to be the source of employment and productivity, and we must think beyond stock responses to address the new economy. The current learning system is not preparing students for future success. It stresses increasing competition, privatization and a focus on jobs when we should be teaching students to adapt, to cooperate, and to solve problems together and as a community.

2. *See students as partners, not customers*

Students will be unlikely to see themselves as partners when they pay tens of thousands of dollars, when they are in a power-relationship with graders and assessors, and when they have a basic income one tenth that of their professors (though roughly equal to that of the people actually teaching the courses). And the goals and objectives of business value management and full or privatization are undermined if students are not seen as customers. The real goal here is to *make them think* they're partners, when *in fact* they're customers. I'd like to think they'll see through this.

3. *Re-think the Role of Faculty*

Once the predominate *ethos* was that “we the faculty *are* the university.” The reference in this recommendation to 'the faculty' in the third person is telling. The university is no longer an institution in which the faculty collectively performed a valuable social service. It is one in which the faculty are employees, under increasingly tenuous employment conditions, and in some cases (notably sessional and term lecturers) exploitative conditions. So the role of the faculty should indeed be rethought, though perhaps not in the manner intended.

The old constructivist model of faculty shifting "from instruction to coaching, guiding and mentoring" does not apply in this instance. If the university would like to hire coaches and mentors, it should hire coaches and mentors; faculty are quite by contrast legitimate and recognized experts in their fields, and the idea of their *not* sharing their insight is an affront. If we are to rethink the role of faculty as anything, it should be to move them *out* of the role of wage-labour instructional staff, and to move them back into the world of research and development, doing the things they actually studied ten years or more to do.

What of teaching, then? It *can* be managed more efficiently.

Colleges and universities will themselves be forced to rethink their role in society (it's fascinating that the Contact North document does not make this point at all). *Who do these institutions serve?* I think there are several choices here, and room for several models for the future:

- *the public mandate* - they serve the public through the development and dissemination of research for the public good, including full and open access to the means of production and distribution of that research, in return for sustainable financing from the public

- *the scientific mandate* - they serve the goals of science - original and pure enquiry, contemplation of the difficult questions, with no particular regard as to the present or future utility of the work, and are funded through the public, through foundations, and through the activities of scientific societies

- *the innovation mandate* - they serve as a research and development organization, operating as a self-funded research institution serving shorter-term needs of business and industry, which in turn underwrites the full cost of this work

All three models serve a teaching function, but not through the mechanism of classes. *As with all professions*, people interested in working in any of the relevant fields actually *work* with these institutions, being paid and gradually assuming greater responsibility as their capacities - as demonstrated by their work - increase.

4. *Re-think outcomes and impacts and re-imagine assessments and accountability*

Some institutions will transform away from research and teaching institutions entirely, with a desire to focus on certification and assessment. I wish them the best of luck.

5. *Build collaborations (local, provincial, national and international) and partnerships*

This is written as though it never happens. That is far from the case. There are numerous associations and organizations fostering inter-institutional and departmental cooperation (collaboration is a lot harder). There's nothing wrong with that, but it would be a stretch to imagine it would address the issues addressed in this report.

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Ottawa, Canada

March 4, 2016

Emergence / Recognition

Emergence

Alan Levine writes⁵⁶¹, *"I am looking for a metaphor or a real example of something maybe complex or just larger/valuable that does not arise solely from adding up many small components."*

The meaning of a sentence does not arise solely from the meanings of the words that make it up. For example: "Look out" is a warning, but neither "Look" nor "out" contain any element of a warning.

A journey is not composed merely of many small trips. The very same set of small trips can either mean "a pilgrimage to Mecca" or not, depending on the intentions of the traveler.

A school of fish (or a murmuration of starlings) is not made up solely of individual fish; they have to be swimming as one unit, not merely happening to be in the same place at the same time.

A holiday is not merely a sequence of days with no work (the same thing could describe unemployment).

A song is not merely a collection of noises; they have to be arranged in a particular way, and they have to be pleasing to a listener.

A fact is not merely a collection of perceptions or observations (not even if joined together with logic).

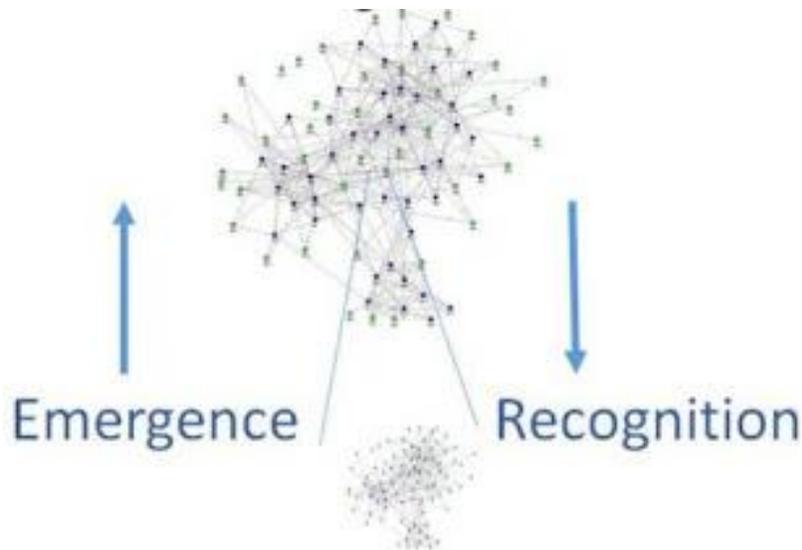
Etc.

In general, reduction can be defeated by the following principles:

- function, where the whole has a function one of the original parts can have
- coherence, where the whole forms a shape or structure none of the individuals can form
- purpose, where the whole forms an intent that cannot be ascribed to an individual
- meaning, where the whole can have a sense or reference none of the individuals can have
- emotion, where the whole can evoke a response none of the individual parts can evoke

(This is not an exhaustive list)

⁵⁶¹ <http://cogdogblog.com/2016/03/piles-of-things/>



Recognition

He also asks, *Would you have any spare time in the not urgent future to share some thoughts as to how certifications might be done that are not badges or just by exam*

I have thought about it, quite a bit.

All of the properties I allude to above (function, purpose, meaning, emotion, etc) are emergent properties. They depend in some way on the entities underlying them (this is known as ‘supervenience’) but they have properties none of the underlying entities have. This is exactly the case for knowledge, learning or achievement.

The mechanism for identifying emergent properties is recognition. For example, pattern recognition enables us to identify shapes out of a complex array of perceptions. Recognition is a result of the interaction between a perceiver and the entities being perceived.

Networks (specifically, neural networks, but arguably, networks generally) are recognition systems. We generally think of networks as pattern recognizers, but networks will recognize emergent properties generally. This is in fact how we evaluate achievement today (though we don’t always identify it as such):

- an aspiring doctor is observed by an expert doctor, who will assess the intern’s overall performance and recognize the intern as qualifying as a doctor
- a PhD candidate is given an oral exam by a committee, with the sole purpose of determining whether the committee members recognize the candidate as a peer
- an apprentice mechanic works under a supervisor, who will recognize the person’s expertise with cars

- the contests on Hell's Kitchen present their plates to a committee who will recognize whether the food is of the highest quality

But there's no reason why this needs to be restricted to individuals. A network can recognize expertise as well as an individual expert (and importantly, recognize different expertise). That's the principle behind democracy (though of course we've seen it interfered with a lot).

It's also the principle behind things like tagging, and behind the invisible hand of the marketplace, etc. It's not perfect (human perception is not perfect either) and needs to be subject to constraints and conditions in order to be reliable.

I talk about it here: <http://www.downes.ca/presentation/344>⁵⁶²

*Ottawa, Canada
March 26, 2016*

⁵⁶² <http://www.downes.ca/presentation/344>

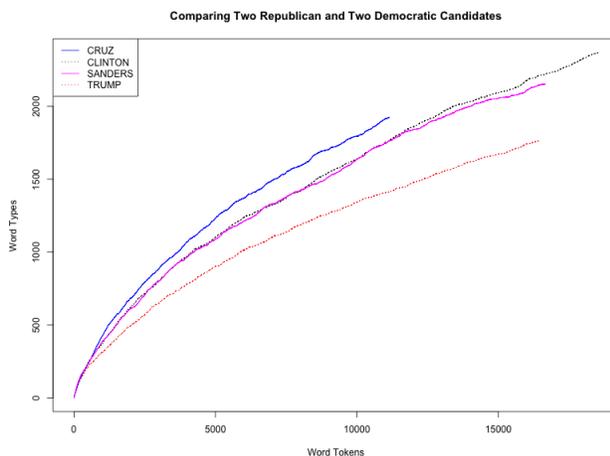
Types and Tokens

Look at this picture:



Did you see a cat? Or did you see my cat Alex? This is a question of some significance, since one of them exists and the other doesn't. And therein lie some important lessons in theory and theorizing.

This post was prompted by [a post on Language Log](#)⁵⁶³ describing the speaking styles of the current presidential candidates. It's a simple comparison, graphing the candidates' word use by tokens and types, as follows:



To count tokens, you simply add +1 to the count each time the candidate utters a word. To count types, you add +1 to the count each time the candidate utters a *new* word. So, for example, if Bernie Sanders says,

⁵⁶³ <http://languagelog.idc.upenn.edu/nll/?p=24904>

A sparrow has landed. This sparrow is a sign.

then Sanders has uttered nine (9) word tokens, but seven (7) word types (because the words 'sparrow' and 'a' are each repeated twice).

A token is an *instance* of a thing. A type is, well, a *type* of thing.

This is pretty important because almost all of our scientific reasoning in education (and just about everything else) is about *types*, not tokens. Scientific theories don't tell me about my can Alex, it tells me about *cats*. As in "cats will take possession of new objects in the house," and things like that.

The problem is, as I suggested above, *types don't exist*. There is nothing that exists in a type over and above the individual instances of that type. And if only statements about things that exist are true, then statements about types are literally not true.

These are not new issues; in fact they're very old. You've probably heard about [Ockham's Razor](#)⁵⁶⁴. The actual and original statement of Ockham's razor is:

Do not multiply entities beyond necessity.

In other words, if you have a bird in the house, you have only one entity, *this bird*, and not two entities, *this bird* and *a bird*.

What does this mean? Well, technically, it means that we have to treat a type as a set, so that the type 'bird' equals the set of {'this bird', 'this bird', 'this bird', etc...}, and the word type 'sparrow' = {sparrow, sparrow} and so on. A set is a mathematical entity, and doesn't have to exist in the world to be useful. And 'truth' can be redefined as "true over the set of 'sparrows'", or some such thing. So we're good.

But we have to be careful. Just what is a type? Sure, it's a mathematical entity. But when we say "*this* is a type," what do we mean by that? To make a long story short: a type is something we *make up*. We decide what counts as a type. Because types don't actually exist, so there's nothing in the word that defines a type or distinguishes one type from another.

(This view is called *nominalism*. The view that opposes this conclusion is called *essentialism*, and is the idea that things have inherent 'essential' natures. A lot of naturalism is based on essentialism. For example, if someone says "Man's essential nature is to be at war," they are

⁵⁶⁴ <http://plato.stanford.edu/entries/ockham/>

asserting that there is something in nature that is 'man' and that it is definable as 'has the nature of being at war'. [Saul Kripke](#)⁵⁶⁵ is a prominent proponent of essentialism).

Let me give you an example. Let's add another sentence to the speech by Bernie Sanders:

A sparrow has landed. This sparrow is a sign. Landing is a sign.

Now we have 13 tokens; no dispute about that. (Right?) But how many types do we have? At first blush, we want to say there are seven (7) word types in the sentence, that is, that Sanders used seven different words.

types = {a,sparrow,has,landed,this,is,landing}

But did he? Maybe 'landed' and 'landing' are actually the same word. After all, they describe the same event. They are merely different forms of the verb 'to land'. If I say "I land" and "Paul lands" we are not saying different things about I and Paul.

Sure, you could say that the actual sequence of letters is what matters, so that if I use different letters, then I am using different word types, and if I use the same letters, then I am using the same word type. But let's add another sentence to Barry Sanders's speech:

A sparrow has landed. This sparrow is a sign. Landing is a sign. And I will sign my support.

So now Sanders has used the word 'sign' twice. It's the same sequence of letters, but is it the same word? One is a noun, a 'sign', which is a thing that stands for something else. The other is a verb, a form of the verb 'to sign', which means to put one's mark on paper. Sure, they're related. But are they the same word? Arguably they are not; they just happen to be spelled the same way.

What counts as a 'cat'? What counts as the word 'landed'? What counts as a 'millennial'? As a 'learner'? As a 'student'? Our theories about language, learning, and the world in general are all based on types, but *a type is something we make up*. Indeed, even the *concept* of a type is something we made up.

Naming things, counting things, generalizing over things - these are really useful tools we have created for ourselves in language and in thought to make the world easier to navigate (and, sometimes, to rationalize after the fact why we navigated on one way rather than another).

This is where the 'construction' in constructivism comes from. The actual act of learning, in constructivism, is the act of counting, naming, and associating things into types. The reason there

⁵⁶⁵ https://en.wikipedia.org/wiki/Saul_Kripke

are dozens and dozens of different theories under the heading of 'constructivism' is that there are many ways to construct something.

And this is what is meant - literally - by 'making meaning'. When we learn to use a word like 'cat', what we are learning is the name and nature of the set of things 'cat' stands for. Creating this set and populating it with entities is, literally, making meaning. And it is over this set of entities that we will draw inferences, make conclusions, and determine truth and falsehood.

This is also why constructivism is so hard to criticize. There are many different ways to make meaning. If you show that one way of making meaning is inadequate, then the constructivist always has another one to show you. After all, the theory (mostly) isn't about some *specific* way of making meaning. It's about the idea that 'to learn' is 'to make meaning', and these can be made in different ways.

Caasselman, Canada
March 27, 2016

The People's Manifesto

Our society exists to provide the means and opportunity for each of us to fulfill our maximum potential and reach our highest aspirations, whatever we perceive them to be, while respecting the right and opportunity of others to do the same.

The land and the resources we have inherited from our forbearers belong to all of us equally, organized and protected in order to serve the purpose of society, and imposing on us a responsibility to protect and preserve them, so that we may pass them down to our descendants.

Our systems of laws and governance are created to enable and protect our individual and collective rights and opportunities, while at the same time ensuring we respect the responsibilities we have to each other and to future generations.

We are freely joined and assembled as one. We desire a peaceful society and a compassionate society, one which lives in harmony and cooperation with others, which welcomes our neighbours with open arms, and grants ourselves and others the right of free movement and settlement within and outside our borders.

To this end:

- no person should live in want, and it is the primary duty of government and society to see to the safety and security of each of its members, including full and proper provision for food, shelter, clothing, health care, education, transportation, communication, and the other necessities of life;
- to that end, and in recognition that all wealth is to a degree created by society as a whole, it is the responsibility of people of means to contribute to the support of society, progressive to the size of their wealth; and it is the duty of society to ensure that this responsibility is not shirked, and to ensure a rough equity in the distribution of wealth;
- beyond that, it is the right of people to live in quiet enjoyment of their lives, according to their own beliefs and values, without interference or control beyond what is needed for the reasonable conduct of society, such that each person may access the full rights and benefits of society, including civil society, without discrimination, fear or prejudice;
- and finally, as individuals and as society, we agree to work toward the preservation and betterment of the world, respecting and valuing the environment as a whole that we hold as stewards in trust on behalf of each other and of future generations.

*Ottawa, Canada
May 9, 2016*

The Audience Experience

There's a debate running around a few posts recently on the question of whether to reuse old presentations or offer new ones.

Martin Weller writes about it in [The New or Reused keynote Dilemma](#)⁵⁶⁶. There are advantages and disadvantages to both, he says.

This is in response to a James Clay post on [The Half Life of a Keynote](#)⁵⁶⁷. He writes,

I know of one individual who delivered forty eight virtually identical keynotes over a four year period across different events, I never even came close to that!

I think I might know who that is; I think I've seen some of them.

How do you decide whether or not to reuse a previous presentation? Clay writes,

Sometimes I feel that I have a back catalogue of keynotes and that though I may want to deliver the new album, people would rather hear the classic hits from the past!

This carries flavours of [Kathy Sierra's attitude](#)⁵⁶⁸, which Alan Levine cites in a comment on Weller's post:

this presentation is a user experience. And if it's a user experience, then what am I? Ah... now we're at the place where stage fright starts to dissolve. Because if the presentation is a user experience, than I am just a UI. That's it. I am a UI. Nothing more... I am not important. What is important is the experience they have. My job is to provide a context in which something happens for them.

OK, there's a point to that, but if I am indeed nothing more than a UI, then they could bring in just *anyone* to deliver the same content, or they could just play one of my videos. But I don't think that's what people want.

⁵⁶⁶ <http://blog.edtechie.net/conference/the-new-or-reused-keynote-dilemma/>

⁵⁶⁷ <http://elearningstuff.net/2016/05/05/the-half-life-of-a-keynote/>

⁵⁶⁸ <http://seriouspony.com/blog/2013/10/4/presentation-skills-considered-harmful>

I've done more than 350 presentations. As Jerry Seinfeld would say, "that's a lot". And as you can see from my [Presentation Page](#)⁵⁶⁹, I rarely if ever use the same presentation, and while I reuse slides, you can actually see them evolve over time.

In other words, I treat each presentation as a new creation, and strive as much as possible to give people a unique [experience](#)⁵⁷⁰. It's harder, I think - a lot harder.

As Martin Weller says, it takes time. Now it takes a lot less time for me than for him, but for me a presentation, even if it's only an hour, can be a full day event. But I consider it time well spent.

And also, I think, it's what people have come to expect and want from me. Because I'm *not* just delivering content. Let me explain.

I sometimes think in terms of the music metaphor the way James Clay does. But the *presentation* isn't the song or the album.

For me, my 'greatest hits' are my *ideas*. I've had a bunch of them over the years, some more popular than others. Like all greatest hits, they're derived from previous work done by others, but with a solid dose of my own creativity.

You're probably familiar with them (at least, I hope you are). Here's some of them:

- relevant similarity
- distributed online community
- hacking memes
- rules for good technology
- learning objects as tools for conversation
- knowing the future by reading the signs
- learning management as content syndication (gRSShopper)
- syndicated learning audio streams (Ed Radio)
- topic-based learning content feeds (Edu-RSS)
- resource profiles
- community-based sustainability for OERs
- distributed digital rights management
- syndication-based adaptive workflow (Synergic)
- learning networks qua networks that learn
- personal learning environments
- the semantic condition (autonomy, diversity, openness, interactivity)

⁵⁶⁹ <http://www.downes.ca/presentations.htm>

⁵⁷⁰ <http://theprinceexperience.com/>

- the Downes theory of learning
- personal professional development (relevance, usability, interactivity)
- the massive open online course (MOOC)
- content as a McGuffin
- the critical literacies
- learning as recognition
- personal learning

And there's a lot more; I'm not exactly [Prince](#)⁵⁷¹ but I have a pretty good catalogue. And together these ideas (along with a liberal borrowing of ideas from other people) form a comprehensive theory of learning which has come to be known under the heading of 'connectivism'.

But the think with ideas, as opposed to content, is that you're not just an interface. You don't just deliver them. You have to *use* them (and hopefully in a way that prompts the audience to use them as well).

Like Prince, what I feel is that I am delivering an *experience*. The content *per se* is irrelevant (I could literally talk for an hour on any topic, without notes; I've [learned how](#)⁵⁷²). My ideas are the tools I use to frame the talk, to give it a perspective.

Having said that, there are two major principles I use when giving a presentation; each of these constitute key reasons why each presentation must be unique, at least for me.

The first is the [Mike Bullard](#)⁵⁷³ approach to comedy:

- Find something you have in common with the audience
- Turn them around to make them see it from your perspective
- Make them laugh at themselves

Now I do like to make people laugh :) but my final point is:

- Make them learn something about themselves

And *that's* the basis of the experience. I come into a presentation not thinking that the audience is *lacking* something which I can provide, I come in thinking that the audience *already* has the essential skills or abilities, which I can help them realize.

⁵⁷¹ [https://en.wikipedia.org/wiki/Prince_\(musician\)](https://en.wikipedia.org/wiki/Prince_(musician))

⁵⁷² <https://www.amazon.ca/Keith-Spicer-Winging-Everybodys-Speeches/dp/B00IBOZAXO>

⁵⁷³ <http://www.imdb.com/name/nm0120028/bio>

This means every presentation is different, because every audience is different. Even the same group from the same place (as I discovered delivering [this talk](#)⁵⁷⁴ three times in two days to the same conference). Every place is different. Every context is different.

To use the jargon of the discipline, my talks are *localized*. But for me, localization is a bit different; it's a process where I fuse my own understanding of the locale (which you see through my photos I take, the references I make to other talks in the same conference, and the stories I tell about my local experience, plus a *je ne sais quoi*). You *can't* repeat that one talk to the text.

And, of course, my talks are interactive. They're not interactive in a typical sense (they're not, for example, 'question and answer' sessions). But like any experienced presenter, I read the audience. I adapt what I'm doing on the fly. I sometimes make use of backchannels (I built my own software to do this before Twitter became a thing).

The second principle, which is *essential* for removing the pre-presentation jitters (as Kathy Sierra says, they never disappear), is this:

- [Love your audience](#)⁵⁷⁵

This piece of wisdom is attributed to Luciano Pavarotti. As an opera singer he has a unique challenge: he is rendering interpretations of songs that aren't even his. *Anyone* could sing them. Yet the audience is in place to hear *Pavarotti* sing them. It isn't the content, it's the experience.

Loving your audience isn't just a one-way relationship. It's not simply about serving your audience or meeting their needs, as Kathy Sierra suggests. It's more. It's a *sharing* of the experience, where I bring what I have, and the audience brings what it has, and we see what we can create.

People want to be heard, they want to contribute (before, after and during the talk) and I want to let them, because each piece of audience engagement leads to the next idea (and my unique skill, if I have one, is to be able to *recognize* them, pull them out of the conversation like a diamond in the rough, polish them, and share them for all of us to see, as something *we* created).

Finally, there's one other reason why keep each presentation unique: since 2004, when James Morrison suggested it to me, I have recorded nearly every talk, and so now the slides, audio and video for each of my talks is presented as its own presentation page. As I said, there are more than 350 of them. And just as I could not post 350 identical essays, so also I can't post 350 identical presentations.

⁵⁷⁴ <http://www.downes.ca/presentation/18>

⁵⁷⁵ <http://chrisguillebeau.com/luciano-pavarottis-secret-for-online-success/>

p.643

Not everyone needs to do it this way. But this is what I do.

*Ottawa, Canada
May 12, 2016*

Assessing MOOC Quality in Terms of Provider and Participant Objectives

Summary

Our institution does not have a policy framework for MOOCs. In this position paper I seek to outline major aspects of the development and application of MOOCs, and to address them to the specific objectives of both MOOC providers and MOOC participants. The design of policy, environment, ethics or implementation needs to be measured against these objectives, and not some arbitrary third-party standard.

Introduction

MOOCs should be viewed as a means for government and institutions to promote public policy by increasing capacity and supporting the learning aspirations of the population. Rather than specifically addressing centrally or institutionally defined learning objectives, MOOCs should embrace the diverse objectives of the many people who participate.

Institutional Policy Frameworks

Our institution does not have a policy framework for MOOCs, and does not generally offer MOOCs (the exceptions are those offered through its e-learning research agenda, which developed the first MOOCs and continues to work in this domain).

From an institutional perspective, MOOCs may be offered in two ways: as an official institutional program, funded and supported by the institution, and possibly offering certification provided by the institution; and second, as an unofficial course offered by staff members of the institution, as part of ongoing research, collaboration with another institution, or individual outreach on the part of academic staff.

An institution should have a policy regarding the former program, stating clearly the institution's objectives in offering MOOCs, criteria for the assessment of these MOOCs with respect to these objectives, management and accountability, academic criteria, and program or certification affiliation. With respect to the latter type of MOOC, the institution should be permissive, should encourage academic outreach in the form of MOOCs, and recognize the role and impact of academic staff.

Corporate Academic mix

Our institution does not have a policy with respect to corporate-academic mix in academic offers. The institution does have a mandate to engage with both academic and corporate partners to meet a wide set of objectives related to innovation in Canada.

There is a long history of corporate involvement in online learning. This involvement may be characterized across the following dimensions:

- technology companies (Apple, Google, Microsoft, Adobe, and many others) engaging with academic staff at all levels to support and encourage the use of their technologies in academic environments
- learning support companies (Blackboard, Saba, Desire2Learn, MoodleRooms, Colleague, and many others) providing essential learning and support infrastructure to academic institutions (including in some nations provision of the schools themselves)
- content provision companies (Skillshare, Alison, O'Reilly, Lynda) providing off-the-shelf and custom content for both government and corporate clients

In the case of MOOCs, corporate engagement can be seen in all three areas, as the private sector seeks to encourage technology use, provide learning infrastructure, or deliver course content. We've seen both cooperation and conflict across all three dimensions. Clearly the claims of some entrants (for example, Sebastian Thrun) that the private sector will replace higher education institutions created friction. In fact, both sectors are required, and the focus needs to be on defining the conditions of engagement.

In my own view, private sector providers of the three types of services above should not be viewed as partners, but specifically as *service providers*. The objective and outcomes of technology deployment (including MOOC technology) ought to be defined by the government, higher education institution, or corporate learning department providing the service. Private sector service providers must be held *accountable* to the client agencies, in order to ensure proper and full provision of the services required.

The changing boundaries of the MOOC target

The initial mandate of the MOOC movement has been research and development. It is easy to overlook this in the wake of the accompanying publicity blitz, but even the courses created by commercial entities such as Coursea and Udacity, as well as non-commercial entities such as FutureLearn), has been experimental in nature. As a result (and not surprisingly) the average MOOC participant has mirrored the demographic of the research community in general: affluent, well educated, and based in the west.

The early commercial MOOC offerings have been recast as more traditional for-profit educational vendors, while meanwhile we are seeing a much wider educational sector engagement with MOOCs, including the aforementioned FutureLearn, EMMA, MOOCs for Development, etc. If we include open online learning generally, we could include such organizations as UNESCO, the Commonwealth of Learning (including OERu), and the Organisation internationale de la francophonie. Regional MOOC initiatives have developed in the Arab world (RAAQ) and east Asia.

As this change in focus has progressed, the target audience has shifted from one which will provide immediate financial return (the research demographic, traditional 18-24 year old students) to one which will increase access to higher education – non-traditional learners, adults, people in developing countries, people outside the Anglo-American tradition. This has created a need for things like greater engagement, cultural sensitivity, multi-lingual capacity, and a practical focus.

Care needs to be taken to ensure that MOOCs do not merely become the fast food of educational offerings. MOOCs developed to support wider access should not be designed as cheaper alternatives to residential academic programs, but should be designed as the *primary* educational delivery vehicle for society generally, with the infrastructure of the residential educational system repurposed to provide specific as-needed educational support.

Designing learning environments

The experience of traditional education from the past leads us to envision the development of a single ‘learning environment‘ designed to support the population as a whole. It is better to envision a range of individual learning services that can be accessed as needed through individual or personal learning environments.

This paper isn’t the place for a lengthy discussion, however it is important to recognize that digital environments in general are transitioning from an application and platformed-based model to a service-based and cloud-based model. Some of the key services that need to be supported include the following:

- authentication and certificate handling – this is already the norm in secure computing environments, where individuals present their credentials before accessing resources, and will be carried over into the personal environment; institutions should consider what certificates will be produced and accepted
- data persistence – people are already using cloud services (DropBox, OneDrive, Drive, AWS) to store data, and much of their online presence is hosted through social infrastructure (Facebook, Twitter, YouTube, Instagram, etc). Governments and institutions should be developing open data services and policies.

- resource libraries, analytics and artificial intelligence – people will be able to access, filter and enhance content with a variety of intelligent services; government services (from employment registries to licensing and certification) should be available as a service

- applications and scaffolds – people will be able to manipulate data and create new products in a variety of authoring and creativity environments (for example, Photoshop, Spreadsheets, Authoring Tools, Glyphy)

The challenge for individual learning environments is to support access to these services in an intuitive and usable manner. In addition, there is a requirement to provide open access to a range of alternative services and (with respect to content) perspectives and world views. It will be essential to provide mechanisms not just for consuming and creating content, but also for sharing it, commenting on it, evaluating and assessing it, and criticizing it.

In this environment I think that the ‘teacher‘ is not so much the presenter of content, instruction, scaffolds and services, but rather, a *model user* of these.

Bridging the academic divide

We tend to think of a MOOC as a body of content (for example, some notes and video and maybe some quizzes) but this is a carry-over from the initial days of the commercial MOOCs. These MOOCs were based on the design of sites like Khan Academy and sought to monetize private sector educational delivery by addressing the ‘core value proposition‘, which they saw as content, in a disruptive manner.

In fact, content is only a small part of the core value proposition of formal and higher education, and in the era of digital communications, one that has become increasingly commodified. In fact, a modern education provides for its participants the benefits of access to community (which includes access to resources and markets), mutual support and cooperation, and the capacity to create change.

A MOOC should best be viewed as a temporary academic community centred around a topic of interest, and considered to be successful to the extent it enables participants to attract, create or join longer-term national and international communities and to participate effectively in them to their own benefit and the benefit of others. The MOOC’s results are measured not in terms of completion or percent of knowledge acquired, but rather, the effect created.

To this, we return again to the institutional objective in offering MOOCs, and individual objectives in participating in MOOCs. Understanding what we are trying to accomplish is key to understanding the success of educational initiatives. Often, the acquisition of content or skills is only part of the objective, and sometimes not even a primary objective. Education comes in many forms.

Anacapri, Italy

June 24, 2016

The Importance of Faculty in the Higher Education Experience

Speaking notes for for Instituto Tecnológico y de Estudios Superiores de Monterrey National Faculty Meeting, Mexico City, July 4, 2016. [Presentation page](#)⁵⁷⁶.

1. New Forms of Learning

By now in educational institutions around the world we(*) have firmly entered into the technological era. There is no question any more of whether we should embrace new learning technologies; we have done it.

Today we employ tools such as learning management systems, digital learning resources and eBooks. We engage in online discussions, conferencing, and collaborative authoring. More, we have embraced online video, virtual reality, 3D printing, and much more.

We have also embraced 21st Century pedagogy. While there are pockets of resistance from traditionalists, we have generally recognized that teaching is not just about transmitting content. We employ active learning methodologies, project and problem-based learning.

We create challenges for our learners and where possible let them take control. Learning today involves building drone for competitions, launching companies, doing environmental research, creating art, and participating in the community.

2. The Changing Shape of Learning

All of that said, however, even as we cling to our old ways, the shape of learning is changing yet again.

For example. If we look at the organization of learning in our own community, we can see the continued focus courses, programs, and disciplines, like biology, engineering, literature, and the like. But this is changing. On the one hand, we're looking at microcredentials, tiny fragments of learning to small even for a course. And on the other hand, looking at overarching competencies like digital literacies such as critical thinking or collaborative decision-making.

Additionally, we have been looking at same standardized package for every student. We still see this in the push for curricular reform and standardized testing. But this, too, is changing. We're looking for ways to adapt learning to each individual need using technologies such as adaptive

⁵⁷⁶ <http://www.downes.ca/presentation/387>

learning and personalization. And if we look at the progressive school districts of today we see programs focused on art, sport, religion, science, and more.

It's true that the old institutional silos still remain. In Canada, for example, the process of 'articulation' remains a challenge; moving course credits from one institution to another is complex, and there are limits to what you can transfer. As most migrants can assert, credentials created in one country are not accepted in another country. But this too is changing. There are multinational initiatives like the Bologna process, though are complex and difficult.

And we have not advanced significantly in assessment. Tests and essays are not adequate, and while part of the community looks to PISA results, LSAT and SAT scores, others are looking for genuine learning, rejecting these traditional measures as inadequate or even irrelevant. And while issues around recognition of learning, initiatives to modernize prior learning assessment continue to make progress.

3. New Technologies Changing the Landscape

New technologies are being addressed directly at the problems described in the previous section and will drive the change into the next generation of learning.

One of the most discussed is machine learning and artificial intelligence. A lot of research is focused toward using artificial intelligence to support adaptive learning by being able to recognize individual learning needs and recommend resources and learning paths.

But artificial intelligence is not simply for adaptive learning. We talk about predictive analytics as though finishing a course is the problem. This way of thinking is to cling to the old model of courses and programs. The next generation of learning will be structured as an *environment* with continuous monitoring and adaptation. The real future is in the quantified self; using technology to solve immediate needs, in context.

Another major area of innovation is handheld and mobile computing. More than three billion people have mobile devices today, according to market-watchers like Mary Meeker. But the future of learning isn't the mobile phone; this is to depict learning as simply the consumption of content. The future is in the *integrated* performance support system, for example, in devices that help us learn.

A third set of technologies involve the creation of digital credentials. For example, there are the Mozilla Badges and Backpack initiatives. These allow people to display credentials in their own digital portfolio, and more importantly, allow anyone to *create* credentials. What happens when colleges and universities lose their monopoly on degrees?

Blockchain technologies could be used to support a microcredential system. This is a type of encryption that is used to secure digital currencies. The idea is to encrypt transactions into a

series of public ‘blocks’ that cannot be changed once created. While financial transactions can be secured, so can non-financial transactions, such as the awarding of badges and degrees.

A fourth type of technology is called the ‘Internet of Things’. The most immediate use is the deployment of sensor networks to monitor for fire, floods, storms, or anything else. Beyond this, the internet of things will allow devices to communicate with each other, as for example when self-driving cars negotiate with each other on the road.

But what happens when companies know the state of all your devices? For example, will your car insurance be increased if you drive on non-approved roads? The internet of things raises the question of personal privacy and the ownership of data. The mantra used to be that “information wants to be free” but what happens when the information in question is your bank account?

Fifth, we are seeing a widespread interest in games, simulations and virtual reality. This could occupy an entire discussion on its own. It’s worth drawing a distinction between using this in learning, and turning learning into an instance of this.

For example, with respect to games, there is on the one hand ‘Gamification’, in which game elements are added to learning. So for example students might compete for points, unlock levels or achievements, and compete against each other. On the other hand, there is the idea of ‘learning games’ or ‘Serious Games’, where a game is employed to facilitate learning. In the same way, simulations, virtual reality, or other visual and kinesthetic technologies can either be added to learning, or used to create instances of learning.

Finally, we should look at translation and cooperative technology. These are the tools that allow us to interact with each other and work together. Communication is already everywhere and we will continue to use text audio and video conferencing. Automated translation and improvements to usability will make electronic communications as easy as – indeed, easier than! – talking to someone in the same room.

But this does not mean we will suddenly start working in teams, sharing common goals, or even thinking in the same way. The future lies in cooperation, not collaboration. Each of us remains individual, unique, and rooted experience. Our perspectives are our own, and communications will help us work *independently*, rather than in groups. If in the past we trended toward single large taxi companies, in the future we trend toward Uber.

It should be noted that cooperation includes machines as well as people. The internet is the first large-scale example of cooperative computing. It is nothing more than a system that connects us – our commonalities lie in *protocols* and *syntax*, not (despite ‘the Digital Citizen’) shared goals or ideals.

Imagine, if we can, a world in which we can interoperate with and use tools, services and resources as we need them (Uber meets self-driving cars) rather than owning them.

4. *Learning in the Future*

If we take all of this together and ask where it leads, where does it leave us? It is arguable that many of the traditional roles of the educational faculty will no longer be relevant.

Take learning contents, for example. We are entering a world of open elearning resources. Entire school divisions, entire college and university systems are embracing not merely digital resources, but free and open resources. This means far more than eBooks and course packages; it means any resource you can imagine. The MOOC, which was created as a response to open learning resources, is only the first example of what will follow.

We might think that there is still a role for faculty to write learning materials and create other resources, but we shouldn't be too certain. A recent experiment at Stanford fooled students with an electronic tutor. Associated Press is using an artificial engine to write sports stories. The Atlantic reported on an initiative to use robots to teach classes. Computers are becoming skilled at *creating* content, including learning content.

Even if computers don't create learning materials, students will. The internet has already seen a proliferation of content generated by average users – social networks, photos, artwork, self-help videos, and more. As I have argued in the past, the most sustainable resources are those produced by the community for their own needs. Resources created by professional faculty may be considered unnecessary and expensive.

Today we think of these resources as fixed and immutable (hence there is a 'discovery' problem, or a 'reuse' problem). In the future these resources will be created as they are needed (the way you give advice to somebody over the telephone). They will be addressed to specific needs or competences. There won't be the need for a faculty member to know students personally. Computers will know far more than a professor ever could.

Our future learning environments will change as well. Here I am thinking not only of MOOCs, but of a single, complex, interactive learning environment that surrounds each person like a personal bubble. I've called this the 'personal learning environment' in the past. We will be linked to our friends and relevant resource people, linked to tools, and linked to a distributed network of services we access as we need them.

People when they think of personal learning in the future tend to think of it as operating a lot like Google search. But this again is to think of the problem of learning as a problem of content. Our learning environments of the future will be based on 21st century learning and scientific methodologies. They will consist as much of services and scaffolds as they do content and videos. They will help us work through simulations or scenarios, and will transfer seamlessly into real-world applications and problems.

The practice of teaching – even the practice of coaching and support – will be irrelevant. Already people get more support from their digital technologies than they do from their professors. That’s why they carry them to class.

Assessment and recognition will also shift dramatically. While it may involve microcredentials and a variety of recognition services, it will be based less and less on tests and exams and more and more based on actual evidence. Indeed, at a certain point it will be questioned why we need credentials at all (much less tests and marking and the like). Information about what we’ve actually done will feed directly into employment or project support tools, and instead of ‘grades’ you’ll get job offers.

This is already happening; we’re working on a ‘micromissions’ project at NRC to help Canadian public service people fill jobs on a temporary basis based on their online evidence base. Artificial intelligence can very easily match specific experience to existing problems, and does not risk losing information through the artificial mechanisms of credentials or even competencies.

5. *The New Role for Faculty*

We have traditionally thought of the role of faculty as having three parts: the teaching part, where they share their knowledge and expertise through classes, books and resources; the supportive part, where they coach and mentor individuals through the non-cognitive challenges they face; as the assessment part, where they observe student progress and make recommendations for recognition or remediation.

What happens when we no longer require faculty to fulfill these roles? Do they become irrelevant?

The challenges are significant. Students don’t need contents any more. Students don’t need experts any more. Indeed, we *want* them to figure things out, translate, try activities, work with others. They don’t need encouragement or motivation any more. Their learning will be engaging, immersive and wanted. They will *want* to be there, they will *believe* that they’re there, and they’ll believe that they are making a difference.

Think about your own learning. Think about what you do today, as a professional. For the most part, you no longer take courses. You receive learning and support from your environment. You select learning resources that are that is relevant, usable and interactive, be they friends, books, or even classes.

It’s all about context. It’s all about what you need when you need it. The airplane cockpit is no place for a two-week course. You need learning support you can use right away, and even more importantly, that directly helps you solve your current problem. Learning will be like water or electricity – or text. There when you need it. As infrastructure.

Think about your own learning, the type of learning that sticks over time, like learning a language or learning to fly. “To learn is to practise and reflect.” You need support, sometimes, but mostly you need examples and models. Then you try it. Think about learning a computer system. Learners today don’t wait for a course or even read the instruction manual – they try things and see what happens. They keep at it until they become skilled.

Think about your own learning, the way you share it with others outside the class. “To teach is to model and demonstrate.” You probably know by now that you can’t just *tell* people how to do things, you can’t *convince* them that this or that is important. You *show* them – you demonstrate the function, and you describe how you see it in your own mind, *explaining* using models and demonstrations.

As Alfie Kohn says, if we have to ask “how do we motivate people” then we’re taking the wrong approach.

The new role for faculty is to show how to be a practitioner in the field – *be* a carpenter, a physicist, etc. More, it is to show how you try, fail, learn, etc. To show the way you think about problems. To be open with your mistakes and your failings as well as your successes. To be a *part* of the learning community, the one who forges ahead, the one who discovers a new path.

From the institutional perspective, the shift must be from management to meaning. Pre-network work and learning was about giving directions and telling people what they need to do. In the network era, we don’t do things *to* people, do things *with* people, and even more importantly, we help people *do things*. The success in the future economy will not be the one who takes the most, it will be the one who gives the most.

The new model of work and learning – and ultimately, the *true* importance of faculty in the future, will be based around three principles:

- Sharing – by working openly, modeling and demonstrating one’s own practice, including the application of specific skills, but also how we think and how we see the works, by creating linked documents, data, and objects within a distributed network
- Contributing – by helping, supporting and being there when needed, supporting *their* learning or work objective, responding to their priorities and interests
- Co-Creation – by working *with* other people in social networks, facilitating and acting as a role model for group communication, group communication, by being a co-creator (rather than an aloof expert or a disengaged coach)

The traditional role of the faculty – even faculty currently working with learning technologies using 21st century pedagogies – is changing. Work that today seems essential will in the future be done by students themselves or by computers.

But the role of faculty becomes something even more important. It is no longer enough to tell students what they need to know and how to learn about it, faculty must be *part* of this active learning process. In a rapidly changing environment, both teacher and student work and learn at the same time, and the role of the teacher is to be the *role model* for our students.

This is not a role we have always excelled at. Certainly our politicians, business leaders, and other officials have not excelled as role models. We, the teachers, must hold ourselves to much higher standards in the hope that they, eventually, will learn.

(*) “we” = “the educational community as a whole, in general with exceptions noted, as interpreted by me”

*Mexico City, Mexico
July 4, 2016*

How the Internet May Evolve

The Pew Research Center is inviting a select group of people to participate in a survey that asks people to answer five questions about how internet may evolve – about the tone of social discourse online, education innovation for future skills, the opportunities and challenges of the Internet of Things and algorithm-based everything, and trust in online interaction. If you would like to share your knowledge, please access the survey here:

<https://www.surveymonkey.com/r/PD6772K>

Here are my responses:

In the next decade, will public discourse online become more or less shaped by bad actors, harassment, trolls, and an overall tone of griping, distrust, and disgust?

Online communication becomes LESS shaped by negative activities

Online communication becomes MORE shaped by negative activities

X I expect no major change in the tone of online interaction

I think it's important to understand that our perception of public discourse is shaped by two major sources: first, our own experience of online public discourse, and second, media reports (sometimes also online) concerning the nature of public discourse.

From both sources we have evidence that there is a lot of influence from bad actors, harassment, trolls, and an overall tone of griping, distrust, and disgust, as suggested in the question.

But a great deal of public online discourse consists of what we and others don't see. For example, you don't see the discussions I have on my Facebook feed or on Twitter with interesting and informed participants. Indeed, I am even sometimes inclined to think of it as private discourse, because of course it doesn't take place on some troll-magnet like YouTube, but it is nonetheless public discourse.

So a couple of things are happening. First, I'm biasing my own perception by taking a particular stance on the meaning of 'public' (as equivalent to 'mass'), and second, I'm receiving a confirmation bias because the main thing mass media says is that it is dominated by bad actors, harassment, trolls, and an overall tone of griping, distrust, and disgust.

I expect people, because of these biases, to project that there is more and more of this sort of behaviour, even though the rate remains steady. It's a lot like people's perception of crime rates when they are informed by mass media. And because media says (incorrectly) that this sort of behaviour is then norm, I expect a certain level of it to continue.

Hence I project no real change.

In the next ten years, do you think we will see the emergence of new educational and training programs that can successfully train large numbers of workers in the skills they will need to perform the jobs of the future?

X Yes

No

I think we will see educational and training programs that can successfully train large numbers of workers because for the most part mechanisms will be in place that enable them to train themselves. Within ten years, we should be beginning to see that the idea of 'providing' training education or training is misguided, because it's overly expensive and less effective than self-managed learning.

I find it interesting, even, that the question itself presumes that skills must be 'taught'. "Which of these skills can be taught effectively via online systems?" It's not that the skills are taught, per se, but rather that the skills are learned. A wide range of activities may enable skills to be learned - especially multidisciplinary skills, such as critical thinking or social interaction - without specifically teaching those skills.

There are very few skills that require specific and personal instruction from an expert to learn - frankly, I can't think of any - which means that within ten years we should at least be able to countenance the possibility that all, or nearly all, educational programs may be automated. Of course, they will continue to require the time and participation of the individual learner, and in many cases, social interaction with other learners, but the labour-intensive learning industry we have developed to this point will not be required.

I see two major objectives to this argument:

- first, it may be argued that personal interaction is required in order to get to know a student, and therefore anticipate what they need.

However, in ten years it will be arguable (and probably demonstrable) that your own computer networks will know you better than any individual instructor could, even an instructor who worked with you your entire life. Sure, there are disasters like the Facebook news stream, but people are already amazed at how much Google knows about them. And we know that with enough data analytics can outperform humans even in complex tasks..

- second, it may be argued that personal interaction is required in order to evaluate a student's level of achievement.

Most actual assessment (not to be confused with multiple-choice tests) in school or professional programs is based on expert recognition. The submitted behaviour (an essay, performance in surgery, piloting an aircraft in a simulation) is not assessed according to whether a set of indicators is achieved (this would possibly be a necessary, but never a sufficient, condition). The expert looks at the overall behaviour and assesses whether that competency has been met.

The expert is serving as a proxy for the community at large. With modern communications technology, this proxy is no longer required. Through the course of any given day, as a person goes through various activities, they interact with dozens of other people, either in person, or through online interaction. Each person responds to them in some way, not by testing them, but by (for example) engaging them in conversation, asking questions, following advice, etc. These responses, over time, form a comprehensive (and constantly changing) assessment of the person.

Will the net overall effect of algorithms be positive for individuals and society or negative for individuals and society?

X Positives outweigh negatives

Negatives outweigh positives

The overall impact will be about 50-50

The sort of discrimination, social engineering and other societal impacts we have today often have a negative impact because they are based on crude stereotypes and result in inappropriate measures. Their impacts are magnified when deployed by social systems causing harm to individuals based on these crude measures.

But new algorithms will have profoundly beneficial effects because they will:

- provide a person an accurate picture of themselves, and not a negative self-image reinforced by media messaging and stereotypes
- prevent other individuals from basing their assessments of us on unreliable intuition, incomplete or inaccurate data, or bias and prejudice

The negative expectations that exist - for example, fears of loss of employment, termination of health insurance, discrimination in housing opportunities, unfair denial of credit, media 'bubbles' and tunnel-vision, government surveillance and control, etc., are all reflective of *today's* reality. They are not properties inherent in the new technologies, they are things that are done to people every day today, and which new technologies will make less and less likely.

Some examples:

Banks - today banks provide loans based on very incomplete data; It is true that many people who today qualify for loans would not get them in the future. However many people - and

arguably many more people - will be able to obtain loans in the future, as banks turn away from using such factors as race, socio-economic background, postal code, and the like to assess fit. Moreover, with more data (and with a more interactive relationship between bank and client) banks can reduce their risk, thus providing more loans, while at the same time providing a range of services individually directed to actually help a person's financial state.

Health care providers - health care is a significant and growing expense not because people are becoming less healthy (in fact, society-wide, the opposite is true) but because of the significant overhead required to support increasingly complex systems, including prescriptions, insurance, facilities, and more. New technologies will enable health providers to sift a significant percentage of that load to the individual, who will (with the aid of personal support systems) manage their health better, coordinate and manage their own care, and create less of a burden on the system. As the overall cost of health care declines, it becomes increasingly feasible to provide single-payer health insurance for the entire population, which has known beneficial health outcomes and efficiencies.

Retailers - Alvin Toffler predicted an era of mass custom production, where a good is not manufactured until it is ordered. We are on the cusp of providing this today, from sourcing of raw materials on a real-time basis through production and deliver via automated vehicles or drones. Additionally, software provide efficiencies in many industrial systems, from energy production to storage, distribution and use, resulting in a more environmentally friendly economy.

Governments - a significant proportion of government is based on regulation and monitoring, which will no longer be required with the deployment of automated production and transportation systems, along with sensor networks. This includes many of the daily (and often unpleasant) interactions have with government today, from traffic offenses, manifestation of civil discontent, unfair treatment in commercial and legal processes, and the like. A simple example: one of the most persistent political problems in the United States is the gerrymandering of political boundaries to benefit incumbents. Electoral divisions created by an algorithm to a large degree eliminate gerrymandering (and when open and debatable, can be modified to improve on that result).

Will people's trust in their online interactions, their work, shopping, social connections, pursuit of knowledge and other activities, be strengthened or diminished over the next 10 years?

Trust will be DIMINISHED

X Trust will be STRENGTHENED

Trust will stay about the same

This is a very similar question to the first question. We experience many reasons to distrust our interactions, and traditional media are reporting numerous cases where they should be distrusted, so we think rising distrust is the norm, and yet on a personal basis, as time goes by, we are more and more trusting.

People who did not even know people in other countries, much less trust them, now travel half way around the world to participate in conferences, rent and live in their homes, meet on a date, participate in events, and more. Sure, things like catfishing are problems. But the exception is a problem only in the light of the trust that is the rule (Wittgenstein: a rule is shown by its exceptions)

People who did not trust online retail a decade ago now purchases games, music and media on a regular basis (they're still a bit wary of deliveries from China, but they're coming around to it).

People who did not trust online banking a decade ago now find it a much more convenient and inexpensive way to pay their bills. They also like the idea that their credit cards are now protected.

People who were sceptical of online learning a decade ago now like in an era when, in some programs, some online learning is required, and where there is no real distinction (and no way to distinguish) between an online or offline degree (and meanwhile, millions of people flood in to take MOOCs).

We can see where this trend is heading by looking at a few edge cases. For example: what would we say of a pilot that never trained in a simulator? What would we say of a lawyer who did not rely on data search, indexing and retrieval services? We trust them more in the future because they are taking advantage of advanced technology to support their work.

It seems like less trust, but it's more trust.

When we hear only one voice, we trust that voice. When we hear many voices, we trust that one voice less. As we should. And it feels like less trust, But we trust all of those voices, and the overall dolidity of our information, more. Feels like less, but is actually more.

As automobiles, medical devices, smart TVs, manufacturing equipment and other tools and infrastructure are networked, is it likely that attacks, hacks, or ransomware concerns in the next decade will cause significant numbers of people to decide to disconnect, or will the trend towards greater connectivity of objects and people continue unabated?

*X Most people will move more deeply into connected life
Significant numbers will disconnect*

It is true that attacks, hacks, or ransomware concerns impact our enjoyment of modern technology. But it's important to note that what they impact is almost exclusively our enjoyment of modern technology.

A person choosing to disconnect from modern technology suffers the same fate as the person who has been hacked. They lose the enjoyment of modern technology. So disconnecting from technology isn't a viable response to attacks, hacks and the rest.

People won't be looking to withdraw from modern technology, they will be looking for better and more secure modern technology (to a point; as people's choices of passwords such as '123456' show, they are willing to sacrifice a certain amount of security for a certain amount of convenience - indeed, if anything forces people off new technology, it will be the security measures, not the crimes).

Ottawa, Canada
July 12, 2016

Ascent from Social Media

The sad part is, most of you won't read this message.

Not because you don't want to. You probably do. You actually *followed* me just for that purpose. But because your social network is lying to you.

As of today my Facebook page [OLDaily](https://www.facebook.com/oldaily/)⁵⁷⁷ has 638 'likes'. This means 638 people think they are following the page. Yet when I post an article on that page, it reaches a small percentage of that audience. [This item](#)⁵⁷⁸, for example, which as of today has reached 33 people.

There are ways to increase the size of my audience on Facebook. I can advertise - specifically, I can 'sponsor' the post. If I spend \$4 I can increase its reach by an estimated 10-11 people. Surprisingly, people are paying to boost their posts on Facebook.

What they're trying to do is to insert themselves into my news feed. My news feed is where I read the messages my friends and family have posted. It has long been the target of unwanted attention, as spammers through out clickbait and exhort readers to 'like' and 'share' these empty posts.

These are annoying, but at least my friends actually recommended them (and there are ways of blocking these shares based on where they originate, so when Shirley sends me another meme from the radio station, I no longer see it, because I've blocked everything from the radio station - it takes a while to do this, but at least it can be done).

The sponsored posts weren't recommended by anyone - there's no hint of 'social' about them. They're just inserted into my feed. And while (in theory) I can block messages from a specific source, I can't keep them out of my feed altogether.

I *used* to be able to do this. For years I've browsed the web with ad-blocking software in my browser. It selects what I want to see, and eliminates the advertisements. It's able to spot the advertisements because reader views of advertising are tracked and reported, and the software can spot this.

Regular advertising - "Eat at Joe's" - slips right through, because it's just content. That's what all advertising used to be. But today's advertising spies on you, installs software on your computer,

⁵⁷⁷ <https://www.facebook.com/oldaily/>

⁵⁷⁸ <https://www.facebook.com/oldaily/posts/373699192753675>

adds extra seconds to page loads, and generally makes your life miserable. So I blocked it. But now, Facebook has [disabled my ad blocker](#).⁵⁷⁹

All this - the clickbait and spam and sponsored posts and advertising - is inserted into my feed instead of the observations and comments from my friends. And that's why my useful post that 638 people *want* to see is actually seen by only 33 people. Facebook wants me to *join* this cavalcade of sponsored posts. Not so much because of the money but because it legitimizes the whole thing.

And - frankly - what it legitimizes are the greasy bottom-dwellers of the internet. As I go through my feed today this is what I see: Search-Engine Optimization (SEO) services. Gambling houses. Skeezy political organizations. Sexist domain name registrars. 'Bank owned homes'. Health heart institute (with a fake Princeton URL). There are *reasons* why I avoid all these sites!

So not only is my personal information being bought and sold by Facebook applications, it is being sold to *these* guys. Ewww.... where can I wash?

What Facebook has done very deliberately is to *insert* itself between you and your friends. Nowhere is this more clear than with Facebook messenger, where Facebook no longer allows you to use a mobile browser to send messages to your Facebook friends - you are *required* to use their proprietary app. It won't let you read what they send you without the app either.

And it has inserted itself there not to serve any higher purpose (such as, you know, actually letting me communicate with my friends). It has inserted it there because it thinks it has me, because it thinks it has managed to eliminate all of your choice in the matter, because it thinks that Facebook is *better than nothing*.

After all, some other sites have been responding to my ad blockers as well. Sites like Wired and Forbes are preventing me from viewing their content, throwing up a big advertising window instead in which they require that I turn off my ad blocker if I wish to view their contents. But I can easily view other sites, and so I read (and link to) their competitors.

But without Facebook, what do I route around to? How, for example, do I find out about [this story](#)⁵⁸⁰ about Ulrike Reinhard (as of today, 52 reads on Facebook, 972 reads on my web site)? The value I get from Facebook is that, when my friends' messages finally get through, they're worth listening to.

⁵⁷⁹ <http://www.wsj.com/articles/facebook-will-force-advertising-on-ad-blocking-users-1470751204>

⁵⁸⁰ <http://www.downes.ca/post/65656>

Facebook has me going both ways. They make me pay money in order to allow people to read my content, and then they throw advertising at the people who are trying to read that content. And now they're tightening the screws.

And even as it clamps down on content, Facebook favours the wrong people, siding once again with the bottom-dwellers of the internet. It has no qualms about encouraging catfishers and other scammers to operate with impunity. Alec Couros [has been struggling](#)⁵⁸¹ with this for years as Facebook allows scammer after scammer to use his image to defraud innocent victims. [Breastfeeding](#)⁵⁸², however, bothers Facebook a lot. It has no problems with [hate speech](#)⁵⁸³, but generally [dislikes](#)⁵⁸⁴ plus sized women, cannabis advocates, sexual health organizations, indigenous people, reporters, and mentions of Facebook censorship.

Why do we tolerate this?

To a large degree, we don't. People have tried to build alternatives, like [Elgg](#)⁵⁸⁵ and [Diaspora](#)⁵⁸⁶ and [App.net](#)⁵⁸⁷ and [pump.io](#)⁵⁸⁸ and [GNU.social](#)⁵⁸⁹. Though they've all had some success and reached some level of usership, none has really caught on, and all are in various stages of abandonment. There are [enterprise](#)⁵⁹⁰ social networks like [Yammer](#)⁵⁹¹ which are [poorly used](#)⁵⁹².

It's like we don't *want* to replace Facebook. We've seen social networks and we don't need another one. Younger people are using things

⁵⁸¹ <http://educationaltechnology.ca/couros/information-for-romance-scam-victims>

⁵⁸² <https://www.breastfeedingbasics.com/laid-back-lactivist/facebooks-war-nipples>

⁵⁸³ <http://www.dw.com/en/german-justice-minister-tells-facebook-to-curb-hate-speech/a-19406616>

⁵⁸⁴ <http://qz.com/719905/a-complete-guide-to-all-the-things-facebook-censors-hate-most/>

⁵⁸⁵ <https://elgg.org/>

⁵⁸⁶ <https://joindiaspora.com/>

⁵⁸⁷ <https://alpha.app.net/>

⁵⁸⁸ <http://pump.io/>

⁵⁸⁹ <http://www.gnu.org/software/social/>

⁵⁹⁰ <http://mashable.com/2013/06/14/enterprise-social-networks/>

⁵⁹¹ <https://www.yammer.com/>

⁵⁹² <https://hbr.org/2015/04/why-no-one-uses-the-corporate-social-network>.

like [Tumblr](#)⁵⁹³ and [WeChat](#)⁵⁹⁴ and [YikYak](#)⁵⁹⁵ and [Tinder](#)⁵⁹⁶. And of course [Pokemon Go](#)⁵⁹⁷. And [Instagram and Snapchat](#)⁵⁹⁸. None of these is perfect, but also none of these seems to be so closely associated with the seamy side of the net the way Facebook is.

So, maybe just maybe, we can live without Facebook. And after all, if my stuff on Facebook is actually *not being read*, why continue to bother with it.

So I think it's time to move on from Facebook. Not to try to replace it, but to rather ascend from it, to get away from the bottom-feeders and think about new ways to connect with family and friends, new ways to cooperate with colleagues around the world.

Over the next few days I'm going to turn off the feeds and shutter the Facebook pages (I won't delete them, because then some SEO creep will pretend they're me). But first I'll make sure there are other ways to contact me.

And over the next few weeks I'm going to revisit what I do with my core offerings, my newsletter and my other work, and think about making my incoming content feeds work better for me, and my outgoing feeds work better for my readers. Thoughts and comments are welcome, as always.

*Ottawa, Canada
August 11, 2017*

⁵⁹³ <http://www.fastcompany.com/3004676/teens>

⁵⁹⁴ <https://web.wechat.com/>

⁵⁹⁵ <https://www.yikyak.com/>

⁵⁹⁶ <https://www.gotinder.com/>

⁵⁹⁷ <http://www.pokemongo.com/>

⁵⁹⁸ <http://www.brightspark-consulting.com/teens-use-social-media/>

In Defense of Ascent

I've actually spent quite a bit of time with Facebook, not just a user but also as a developer, working with the Facebook Graph. There's a lot that's really innovative about Facebook ([React](#), for example⁵⁹⁹). So I don't think I'm "old fashioned, out of touch and ill informed." But hey, I don't have grey hair for nothing.

That said, I can't say I agree with the content and even the tenor of the criticisms. Let's deal with the points raised, one by one ([comments by Pen Lister\('Webteach'\)](#) in *italics*⁶⁰⁰).

First rule of FB: Make your bed, to lie in the one you want.

Ah, if only. I doubt that anyone gets the FB they want out of Facebook. It's like squishing the come-on posts from clickbait sites - squash one, another one pops up. I could spend the rest of my life blocking feeds from Facebook. But humans cannot block at the speed algorithms can generate.

If you are a completely passive social media user then the majority of what you're describing is what happens. This is the bottom-line of non active algorithm, defaulting to basic content provision and ad placement (gee, just like free cable channels I guess). My feed is cool. My feed is intellectual. My feed is all round a winner.

Am I a completely passive social media user? Oh, hardly. I've spend a lot of time tweaking the settings and trying to configure Facebook to what I want. I've also tried various experiments (like trying different ways of using 'like' and 'share'). I've gone through campaigns of deleting users who share offensive content only to find it popping up again from the sponsored posts. So, no, I'm not passive. Indeed, I've put a lot more work into it that I should have to.

Why do you think Facebook is anything more than a huge (the biggest ever) TV cable company, syndicating content from any and every source, in this case, individuals, to you, another individual

If Facebook were just a neutral broker of syndicated content from "any and every source" I wouldn't have a problem with it. But Facebook *selects* from that content using its famous algorithm. Yes, the algorithm can be tweaked, but it can't be overridden, and it is designed to favour content partners and to cater to its very peculiar set of 'social standards'. So it's not just a

⁵⁹⁹ <https://facebook.github.io/react/>

⁶⁰⁰ <http://webteach.penworks.net/2016/08/16/response-to-ascent-from-social-media-by-stephen-downes-aug-11-2016/>

cable company. It doesn't just present the content, it presents the *filtered and commerce-friendly* content, which is the core of my objection.

Yep, fat cats from the algae of web life do have the most money to waste on blanket target sponsored ads. Get over it.

Why should I "get over it"? My *better* option is to work toward a medium of communication which is not owned and dominated by commercial interests attempting to manipulate my perceptions and mental states. I can use the *telephone* without being interrupted every few seconds by a commercial message, so why can't I use the internet that way?

You want to change this? Not only money is the answer – TIME is the answer. If you care, or had the time, you would facilitate your community and my guess is, more people would see your content organically, because it would be 'seen' as useful and engaging by the algorithm. Just like Google, in fact.

Nobody has spent more time working with other people on the internet than I have. I've been at it for more than two decades (hence the grey hair) and even today spend hours a day doing it. Now it *might* be the case that what I have to offer is inherently boring - it is pretty niche, after all - and I'm prepared to live with that. But seeing the scam artists with their fake weight loss pills and seamy meetup sites purchase their way to the head of the line reminds me that no amount of facilitation and curation is going to counter the effect of sleazy people with big bank accounts.

*Why do you think that FB will syndicate your content *forcably* into other people's feeds unless they really want it – i.e. have engaged actively with it fairly recently? (I note the last post by other people was in February this year and that none of your page posts get any activity at all... yes it's a vicious circle but you have the control to change that)*

I don't think Facebook will syndicate my stuff forcibly into other people's feeds. It only does that for people who pay them money - as Facebook itself reminds me repeatedly whenever I post content into the site. In fact, in order to get me to pay for placement, Facebook's algorithm makes my stuff harder to find.

Now you might say (as is suggested by your comment) that I should make my pages and sites multi-user in order to generate more traffic. Sure, if I had what might be called 'guest posts' then more people might come. But my objective is not to bring in other people's content for Facebook, it's to share my own content. I know I don't have a lot of comments, but when the 'reach' of a post is 11 people, it's not going to generate a lot of comments (thank you for your one comment on that post, by the way).

Semantic web controls web behaviour. I suspect you know this. The more clicks (activity) the higher the visibility in the 'rank'. Logic, really.

That's a nice fairy tale. It describes what may be version 0.1 of the Page rank. But the actual behaviour of the site is far different. In a nutshell (*again*) people can buy greater rank, which increases clicks, and Facebook depresses all sorts of content, which decreases clicks.

The challenge we have as the body of users is to teach the algorithm what we want, as individuals, as groups, as global communities. Smart data is not necessarily evil, unless we sit back and do nothing. Much like democracy then.

The snideness gets to me a bit.

If you examined democracy, you would find an algorithm that has been so badly gamed that people now find it impossible to elect governments that represent their interests. I won't go into this in depth because it's *really* obvious, and I'm surprised you used democracy as an example to make your point.

And similarly, it is not possible to 'train' the Facebook algorithm to respect my interests. Like so many politicians, it can be bought for a surprisingly small amount of money (adding up to surprisingly large amounts of money).

I agree that data are not necessarily evil, but it is hopelessly naive to think that we're looking only at data and evenly applied algorithms.

I liked your FB page. Because I'm interested in your great mind, I selected 'see first' from the follow options (directly beneath the like button). This way, I won't miss the action

I'm glad to hear that. Because if you want to continue following the action, you'll have to venture outside Facebook and into the wider internet. I'm planning my departure as we speak.

I am now off to write copious academic-nonspeak about your fab work in my thesis. Have a great social media day, guru of the e-learning glocality.

I'm sorry you have to write academic-nonspeak but I'm glad you like my work. I think it applies directly to the current Facebook discussion.

You know that I prefer open and distributed networks to closed and centralized ones. It disappoints me that social media has evolved into the latter. I want our social networks to become *better* and *smarter* but the best evidence right now is that they're becoming *worse* and *stupider*.

I blame this not in the individuals involved (though it's true that they are responsible for some reprehensible behaviour) but rather the structure of dysfunctional networks like Facebook and Twitter. I'm pointing to symptoms in the other paper, but let me point to some causes.

The very metrics cited above (clicks, rank, views) are mass metrics. Your interactivity with others is based on these. They are metrics that benefit from the first-mover effect (which is why some Facebook users and pages have large audiences despite not advertising) and are easily manipulated (which is why advertising works).

Facebook also limits scale on individuals (there's a 5,000 follower limit) but is scale free for larger accounts (especially those that pay). This results in the oft-cited long tail effect (which we also see on Twitter) and the corresponding 'big spike' populated mostly by commercial (and frequently slimy) interests.

The way to fix this is to change the metrics for connection with the intention of building *communities* rather than *markets*. But this means moving away from *mass* indicators and instead looking at *relevance* indicators, and most importantly, preventing commercial interests from gaming the system by buying access.

Facebook also privileges the *content* over individuals and relationships. There is no real organic community-building or clustering available in Facebook, only the pages and groups people form deliberately (which are either immediately overrun by spammers or must be private and hence invisible to genuinely interested people). Contrast that with [Snapchat](https://www.snapchat.com/)⁶⁰¹, which doesn't even keep the content, or [WeChat](https://web.wechat.com/)⁶⁰², which is simply a communications system.

Facebook also makes it very hard to work with community *outside* Facebook. Anyone working with the graph will understand this. Facebook likes users to bring other users and content in, but is very reluctant to let any of that *out*. Indeed, Facebook is so closed that some users actually think Facebook *is* the internet. I can build, and have built, a chat application that includes Twitter comments, but I can't build one that includes Facebook comments.

As I said in my previous post, Facebook's strategy is to *insert* itself between you and whomever you're talking to, and to ensure there's no alternative route. That's why it's so hard to leave Facebook - you're literally *cut off*. There's nothing in the response that refutes that, or offers a solution to that.

I've described an architecture (and maybe we're [seeing it built](http://www.downes.ca/post/65693)?⁶⁰³). Here's how Facebook stacks up:

⁶⁰¹ <https://www.snapchat.com/>

⁶⁰² <https://web.wechat.com/>

⁶⁰³ <http://www.downes.ca/post/65693>

- autonomy - no, Facebook will not let you use what platform or software you can use, and is aggressively (eg., Facebook Messenger) working to limit that choice.

- diversity - Facebook is based on principles of mass, which means that it encourages everyone to view the *same* resources, to the point of privileging some content providers over all others

- openness - the Facebook graph is not open; there are numerous types of content that cannot be exported from the graph. Facebook is the classic walled garden.

- interactivity - Facebook privileges content over relationships, and focuses on what is shared rather than on the network of interactions between people, and has no mechanism of comprehending the wisdom of the community rather than the popularity of the meme.

*Ottawa, Canada
August 16, 2016*

My Watershed Moments

I'm following in the footsteps of Dean Shareski, who originally [posted the challenge](#)⁶⁰⁴, and Chris Kennedy, who [posted a response](#)⁶⁰⁵ of his own.

The idea is to identify some key events in our own professional development, some 'watershed moments', if you will. Shareski writes, "Watershed moments are those occasions where there the lightbulb came on or something profound was shared or understood."

These are my own, and I'll use the same categories they do.



PD / Conference

I've had a number of key events in my professional life; most of the core ideas of my own approach to education and technology have been formed while on the road. On a trip through

⁶⁰⁴ <http://ideasandthoughts.org/2016/09/01/watershed-moments-of-learning/>

⁶⁰⁵ <https://cultureofyes.ca/2016/09/09/my-own-watershed-moments/>

Australia in 2004, for example, I was inspired by [Olegas Truchanas](#)⁶⁰⁶ in [Strahan](#)⁶⁰⁷, to think of teaching as stewardship and by the Aboriginal cave drawings in [Kakadu](#)⁶⁰⁸ to understand that we read the world. Or for example my visit to South Africa where I encountered the cattle boys of [Lesotho](#)⁶⁰⁹, or how I learned about [groups and networks](#)⁶¹⁰ in New Zealand. The list goes on.

But if I had to identify one conference that was an eye-opening moment for me, it would be my visit to [Bogota](#)⁶¹¹ in July, 2006. I gave [two talks](#)^{612,613}, both on the subject of learning objects and learning object repositories, at a conference titled Objetos de Aprendizaje (OA) y Redes de Alta Velocidad held at the Escuela Colombiana de Ingenieria.

It was my first time in Latin America and my first time outside the western world. I didn't learn so much about learning objects and such as I did people's attitudes towards learning and development outside my own culture. I saw a modern and technologically advanced school, met with staff and students who were knowledgeable and eager to build something better, and I saw a city and a culture ion what can only be described as a springtime for the country.

If affected me so deeply [I made a movie about it](#)⁶¹⁴, spending the next four weeks after the visit learning video editing and painstakingly piecing it bit by bit on a machine vastly underpowered for the job. It recounted not so much my experience at the conference - though it did cover that - as it did my experience in the streets, walking and talking with Diego Leal, talking about learning, seeing and feeling the powerful juxtaposition of people who have everything and people who have nothing, and how to bring them together.

"It all comes back to the children. What they see. What examples they follow. What they learn to value. What they see in life. Diego and I talked about this as we wandered through the Candelaria. That learning isn't saying the right thing or presenting the right content. It's doing the

⁶⁰⁶ <http://www.downes.ca/post/56624>

⁶⁰⁷ https://www.flickr.com/photos/stephen_downes/albums/72157594389789818

⁶⁰⁸ https://www.flickr.com/photos/stephen_downes/albums/72157594376469328

⁶⁰⁹ https://www.flickr.com/photos/stephen_downes/albums/72157594285719508

⁶¹⁰ <http://www.downes.ca/post/42521>

⁶¹¹ https://www.flickr.com/photos/stephen_downes/albums/72157594212015307

⁶¹² <http://www.downes.ca/presentation/124>

⁶¹³ <http://www.downes.ca/presentation/123>

⁶¹⁴ <https://www.youtube.com/watch?v=3HU-RkHNLOs>

right thing and living the right way. And that's the learning that I was seeing in the park in Bogota that day."

Presentation

As [I would write later](#)⁶¹⁵: "In 1989, the pieces came together. I watched the rise of '[people power](#)'⁶¹⁶ around the world. I had seen [Francisco Varela](#)⁶¹⁷ speak on AIDS and immunology at the University of Alberta hospital. I began to see how networks, whether of individuals or cells, could take shape, form patterns, act with purpose. And how this would reshape how we understood the world."

It's hard to explain why this talk in particular had such a profound effect on me. I'm not sure there is any extant record of it, except for what might be [in my own notes](#).⁶¹⁸ The technical part of the talk was an explanation of how the immune system and the nervous system had in common the property of being a network. He was explaining how the entities in these networks communicated. And he identified a 'sweet spot' - not too many connections, not too few - that would enable optimum functionality.

I knew about connectionism by then - that was why I was in the room - and I had been working on a network theory of knowledge. This talk emphasized to me that there were ways to understand networks themselves that would be of interest, and of use, to this understanding.

But there was more to Varela than that. It's when you look deeply at a person who is presenting and you see the resonance not just of superficial theory but of a way of seeing the world. That's also what I saw that day. A few weeks later I would write my entire dissertation in just a few days sitting on the top of a hill listening to folk music.

"If everybody would agree that their current reality is **A** reality, and that what we essentially share is our capacity for constructing a reality, then perhaps we could all agree on a meta-agreement for computing a reality that would mean survival and dignity for everyone on the planet, rather than each group being sold on a particular way of doing things." - Varela.

⁶¹⁵ <http://halfanhour.blogspot.ca/2009/03/tnp-20-years-on.html>

⁶¹⁶ <http://www.harvardir.org/index.php?page=article&id=1341>

⁶¹⁷ <http://www.enolagaia.com/Varela.html>

⁶¹⁸ <http://www.downes.ca/post/3622>

Book

I've had the privilege of reading a large number of powerful books in my lifetime. Some - like Patrick Watson's *The Struggle for Democracy*, Kenneth Clark's *Civilisation* or Carl Sagan's *Cosmos* - were born as TV shows. Others, though, were the classics of literature and philosophy - Tolstoy's *War and Peace*⁶¹⁹ is probably the greatest book I've read, while Gibbon's *Decline and Fall*⁶²⁰ much be the most vital nonfiction, followed by Shirer's *Rise and Fall of the Third Reich*.⁶²¹

But the watershed moment for me comes with the reading of John Stuart Mill's *On Liberty*.⁶²²

I read it in the Devonian Gardens in downtown Calgary around 1983 or 1984. The gardens are actually indoors, occupying the fourth and top floor of a downtown mall in TD Place. They were as large as a city block, fully tropical, and filled with nooks and crannies where someone could hide and read. Which is what I did. It was the beginning of a habit, for me, of reading great works of philosophy in malls and gardens.,

What Mill said to me was twofold: first, that every person has as much inherent dignity, worth and capacity as every other person, and that they are held back only by circumstances of poverty, poor education, or some other form of oppression; and second, the only defensible definition of society was one in which each person is free to pursue his or her own good, in their own way, so long as it doesn't interfere with others' rights to do the same.

Now of course the latter part of Mill's dictum has been taken on by neoliberals to justify some sort of libertarian non-society, but both parts of Mill's thesis are essential, and no view of society that treats its subjects simply as means (as Kant *would say*⁶²³) to someone else's ends is worth defending. There is a type of freedom that Mill envisioned which is essentially one of stepping lightly through the world, redressing wrongs, and working for the betterment of oneself and one's fellows.

Public gardens, I find, are the perfect place to read enlightened philosophy.

⁶¹⁹ <http://www.gutenberg.org/files/2600/2600-h/2600-h.htm>

⁶²⁰ <https://www.gutenberg.org/files/25717/25717-h/25717-h.htm>

⁶²¹ https://en.wikipedia.org/wiki/The_Rise_and_Fall_of_the_Third_Reich

⁶²² <http://www.gutenberg.org/files/34901/34901-h/34901-h.htm>

⁶²³ <http://faculty.philosophy.umd.edu/SKerstein/Kersteinmeremeans.pdf>

Tool

I am tempted to write 'the computer' or 'the internet' here. But I'll be more specific.

[NCSA's Mosaic](#)⁶²⁴ was the first graphical web browser. It transformed the web from a linear text-based environment to a non-linear link-and-graphics based environment. It's hard to describe the impact of that.

Before Mosaic, I actually had my feet firmly planted in both worlds. By the time it came out in 1993 I had had several years of internet experience, building bulletin boards systems, programming multi-user games, and traversing the depths of FTP, Usenet and email. And I also had a history in graphic design, working first with wax-and-paper based layout and design, and then tools like [Quark xPress](#)⁶²⁵, to create pages, posters and more. I had even authored a guide, *Practical Graphic Design*.

The resulting fusion of those technologies enabled my two greatest passions: to create, and to explore. I began building web sites almost immediately. And I began to navigate the world by hyperlink, spending thousands of hours exploring tens of thousands of websites, peering into minds and lives I never knew could possibly exist.

And I never stopped. My career today is an extension of these two passions, and if I would be said to have a research method, it is the same: to create, and to explore. Returning to a world bound by linear and physical limitations has never been an option.

Person

[Rik Hall](#)⁶²⁶. You may never have heard of him, but he was of fundamental importance to me.

Rik was moderator of the online [WWWDEV](#)⁶²⁷ mailing list (archives no longer extant, because who cares about history?) and chaired the NAWeb conference in Fredericton for ten years, 1995-2005. I attended seven or eight of them, often financially supported by the conference, as an unknown academic who could do workshops on interesting topics. I also managed the NAWeb Awards for a number of years, then gave it up so I could win some, and was the keynote speaker in the tenth and final year.

⁶²⁴ <http://web.archive.org/web/20090201015748/http://www.ncsa.edu/Projects/mosaic.html>

⁶²⁵ <https://en.wikipedia.org/wiki/QuarkXPress>

⁶²⁶ <http://rikhall.com/about-rik/>

⁶²⁷ <http://web.archive.org/web/19970710162854/http://www.unb.ca/wwwdev/>

I remember one time when Rik was introducing me to someone else him describing me as "one of the good ones." He didn't mean 'good' in the sense of capable, skilled or qualified, but rather, 'good' in the sense of working for the betterment of others and advancement of learning. You never saw these traits more clearly than in Rik, and it was high praise that made me glow inside but also engaged me with a sense of mission.

Through Rik I met people like Terry Anderson and Rory McGreal, who were also both important influences and role models for me. He also connected me with a network of developers and inventors. And NAWeb was leading edge - I connected to wireless internet for the first time at NAWeb. NAWeb connected me to AusWeb (where I did my first video editing in 2001) and with a number of great people from Down Under.

Rik is a sharer, a connector, and a demonstrator. He encouraged me when I explored with RSS and content syndication, he taught me to look for and appreciate the best in the many people around the world working in education, and he linked me to a community I had hitherto not even known existed. Like the best of them, he taught through example and not through lecture, and one of the many people he increased in life was me.

*Ottawa, Canada
September 9, 2017*

Diversity and Diversity Training

Donald Clark appears to be settling into the role of the voice of the closed society. His latest foray into this is his [recent column](#)⁶²⁸ arguing that diversity is "wrong-headed". Leaving aside the question of which monoculture we would settle upon were we to do away with diversity (I'm thinking Hopi, maybe, or perhaps Maori) his argument is based on a short-sighted and narrow interpretation of what diversity means.

Clark's point of departure is Goran Adamson's *The Trojan Horse*⁶²⁹. It is naturally not available as open content, so we have to rely on additional sources to look at the argument. An earlier report of his, *Immigrants and Political Participation*⁶³⁰, he argues "successful assimilation of immigrants mainly is achieved by downplaying the exotic implication of group-based difference." (p.40)

Terri Murray [summarizes](#)⁶³¹, "multicultural ideology makes a fetish, like the racial theories of yore, of ethnic diversity... the multicultural view of immigrants doesn't treat them as individuals who have a basic human need for self-determination; rather, 'the immigrant' is an abstract type, a species, a race." Worse, writes Murray, "When it comes to ethnic groups themselves, the rights of dissenting minorities within these groups are rarely defended. That's because the multicultural agenda treats ethnic subcultures as homogeneous groups."

Clark takes this one step further, addressing diversity training. He writes, "Major studies from Dobbin, Kalev and Kochan show that diversity training does not increase productivity and may, in fact, produce a backlash. Most don't know if it works as evaluations are as rare as unicorns"

Clark makes his case in ten points, and we'll address them in turn. The headings are Clark's, not mine.

1. Ideology of Diversity

The case in both Adamson and Clark is that the choice is being force upon us between individual freedom and the rights of a culture to assert itself. We'll revisit this theme many times. But to

⁶²⁸ <http://donaldclarkplanb.blogspot.ca/2016/10/10-reasons-that-show-diversity-as-wrong.html>

⁶²⁹ <https://www.amazon.co.uk/Trojan-horse-leftist-critique-multiculturalism/dp/918704353X>

⁶³⁰ https://fra.europa.eu/sites/default/files/fra_uploads/221-Immigrants_and_political_participation_2006.pdf

⁶³¹ http://www.spiked-online.com/newsite/article/the-principled-left-wing-case-against-multiculturalism/18703#.V_rPbySo7Ms

begin, the argument in favour of diversity is itself being presented as an ideology, against which no dissent is allowed.

"'Diversity' is a word that cannot be questioned," writes Clark. "The rhetoric that surrounds diversity in itself seems to censor debate, a diversity of views being the first victim."

The existence of Adamson's report and Clark's column are, of course, counter-examples to this proposition, and there is no shortage of writing against the concept of diversity available for anyone to read. A quick search reveals the article [Against Diversity](#)⁶³² published by the National Association of Scholars, a similar article [published](#)⁶³³ in the Economist, Walter Benn Michaels [against diversity](#)⁶³⁴ in New Left Review, and the list goes on and on.

Indeed, I wonder just what sort of opposition it is that they feel has been prohibited. Some of the more extreme expressions against diversity (of which, again, there have been many) speak of dress codes, language restrictions, and prohibitions against some religions. At a certain point the opposition to diversity tends to blend with outright racism. It is no surprise to see people react poorly to this (though one observes in the Trump and UKIP campaigns a suggestion that even this may be tolerable).

Clark seems to suggest that this 'ideology' in favour of diversity is what supports the phenomenon of diversity training, despite evidence speaking against it. "The vast amount of time and money spent on diversity training, when evaluated, is found wanting, mostly ineffective, even counter-productive," he writes. It's [an old argument](#)⁶³⁵, a favourite of the Harvard Business Review set, and not surprising to see it repeated here.

The same could be said (and, indeed, *has* been said) about training in general. Yet workplace training persists, not because whatever it promotes is held forth as some sort of ideology, but because workplace training officers don't know better, and because managers cling to traditional and outmoded views about training.

It's not surprising at all that forced diversity training can be ineffective; people respond poorly to coercion. But at the same time, "When attendance is voluntary, diversity training is followed by

⁶³² https://www.nas.org/articles/against_diversity

⁶³³ http://www.economist.com/blogs/schumpeter/2010/06/against_diversity

⁶³⁴ <https://newleftreview.org/11/52/walter-benn-michaels-against-diversity>

⁶³⁵ <https://hbr.org/2012/03/diversity-training-doesnt-work>

an increase in managerial diversity," [said](#) Alexandra Kalev⁶³⁶, a sociologist at the University of Arizona, (once of the researchers cited above).

The 'ideology of diversity' argument is a red herring. It is not based in fact. And it fails as an explanation of the failure of training.

2. Groupthink

Clark writes, "Companies, worldwide spend many hundreds of millions of dollars each year on diversity training. The tragic truth is that most of this is wasted. Groupthink seems to be at the heart of the matter."

'Groupthink' is [a term coined](#) by social psychologist Irving Janis⁶³⁷ to describe what occurs when a group makes faulty decisions because group pressures lead to a deterioration of "mental efficiency, reality testing, and moral judgment" (p. 9).

Is that what is happening here? Clark cites "groupthink among compliance training companies, who simply do what they do without supporting evidence and tout ineffective 'courses'. Groupthink in HR, who find it easier to just run 'courses' rather than tackle real business problem." This sounds like the problem of a monoculture, not one particular to proponents of diversity.

Indeed, diversity - a broader sense of diversity than the caricature being criticized by Clark here - is often offered as a response *against* groupthink. As [this article states](#)⁶³⁸, "Groupthink occurs when a highly homogeneous, cohesive group fails to critically analyse and evaluate alternative ideas for the sake of harmony and conformity. In such a group, disagreement with the consensus is discouraged, which eliminates independent thinking and creativity."

It is important to understand that diversity is *more* than the mere celebration of exotic cultures. There are many ways in which people can be diverse, and the promotion of diversity is centered around encouragement of distinct perspectives and points of view, not just the elimination of offensive behaviour.

This is called 'thought diversity'. "Thought diversity "goes beyond the affirmation of equality - simply recognizing differences and responding to them. Instead, the focus is on realizing the full potential of people, and in turn the organization, by acknowledging and appreciating the

⁶³⁶ <http://www.washingtonpost.com/wp-dyn/content/story/2008/01/19/ST2008011901990.html>

⁶³⁷ http://www.psyp.org/about/pubs_resources/groupthink%20overview.htm

⁶³⁸ <http://www.aperianglobal.com/leveraging-hidden-diversity-to-alleviate-groupthink/>

potential promise of each person's unique perspective and different way of thinking", summarizes [a 2013 study](#) by Deloitte Consulting.⁶³⁹

3. *Ill-defined*

It may be that Clark was thinking along similar lines as he wrote his piece, as his next argument focuses on the vagueness of the term 'diversity'.

"One could invoke the idea that individuals are unique, and this uniqueness is paramount. Unfortunately, it then focuses on race, ethnicity, gender, sexual orientation, age, physical abilities, religious beliefs, political beliefs, or other ideologies," he writes.

What Clark sees to be doing is drawing a distinction between what might be called *individual-based* diversity and *group-based* diversity. Individual-based diversity might include a person's unique point of view, perhaps their income level, and the like, while (he says) "But ethnicity, gender and so on are terms associated with the collective, not the individual."

I'm sure this would come as a surprise to people who happen to find themselves Chinese, women, or gay. I still remember seeing a documentary about race, where the speaker was objecting to the idea of people being 'colour blind'. "My blackness is *who I am*," said the man. "It is myself, it is my *identity*."

And that's the thing about race, culture, religion, gender, orientation, and the other terms associated, as Clark says, with the collective. *There is no 'black collective'*. Or, to put it another way, *all* forms of diversity apply equally well to the group and to the individual. It is a simple and fundamental point of logic, known since Aristotle, that *any property can be used to define a category*.

One of the fundamental elements of diversity training is the effort to show people are fundamentally *individuals* and that it is inappropriate to treat them as though they were all the same. Even in a close-knit community (the Mormons, say, or Cook Islanders) it is a category error to create and apply 'collective' properties (like, say, "all Mormons wear white shirts", or "all Cook Islanders love the ocean") to individuals.

We don't need to define diversity; only people consumed with group identity need to do that. The core idea behind diversity is that we encourage and respect differences between individuals. The principle is the same whether we are talking about their race or their taste in motorcycles.

⁶³⁹ <http://dupress.com/articles/diversitys-new-frontier/>

4. Lazy Cultural Relativism

As someone who has spent a lifetime as one who would be defined as a 'cultural relativist', I can say with assurance that there is nothing lazy about it. It is a constant effort to remind myself that other people may have different values, beliefs, and world-views than I do.

At the same time, I find that my own unique set of values, beliefs and world-views are substantially different from the majority, and I must struggle with this every day as well. For example, I believe that showing McDonalds advertising to children is morally wrong, I believe that people reason by means of similarity and metaphor, not logic and mathematics, and my world view does not include universals or laws of nature.

Clark writes, "a lazy cultural relativism descends, disallowing criticism of illiberal cultural norms. Freedom of speech is under attack from 'trigger theory', art is censored, honour crime not ruthlessly dealt with, FGM still prevalent. Any definition of diversity is glossed over and replaced with diversity plans."

This one-paragraph argument is itself lazy and poorly thought out. I understand that some people find the cultural practices of other cultures to be morally repugnant. I recognize they feel that way and may indeed even argue that way. Where we come into disagreement is when the other person represents their moral perspective as fact, and depicts their own culture as obviously superior to the other.

In the case of the four items listed by Clark, there are well-tolerated practices in my own culture, and his own culture, that are equally barbaric, and yet treated as normal. For example, one society that opposes 'honour killings' is fine with 'stand your ground' laws that permit legal homicide. Other societies that condemn female genital mutilation (FGM) as barbaric are fine with the routine practice of MGM (male genital mutilation).

For my own part, I believe that both murder and mutilation are both wrong, yet I have not found one culture on earth that believes these without reservation.

No, cultural relativism isn't lazy. Expressing a sanctimonious belief in your own world view is lazy. One-paragraph dismissals of difficult ethical philosophies are lazy.

5. Not an Intrinsic Good?

Clark argues that diversity is not an "intrinsic good", giving examples where sameness may be preferred to difference.

"Is polygamy better than monogamy? Will your coding team always benefit from having an even gender and ethnic mix or a ruthless focus on competence? Diversity rhetoric praises ethnic presence but could be a substitute for excellence and ideas?"

Clark slips into this short paragraph the old idea that support for diversity means sacrificing excellence. The suggestion is that by focusing on including (say) a person of colour on a team, we may be excluding a more qualified (or more competence, etc.) person who is not diverse.

This proposition depends on the idea that there is one set of properties - coding excellent, for example - that is relevant to team formation, and there are other sets of properties - cultural background, for example - that are not relevant. This presupposition depends in turn on the idea that the relevant set of properties could be identified and that differences in those properties could be measured in a statistically significant way.

And *even if we can address all that* it may well be that it is better overall to accept a less productive team in support of the principle that teams should be diverse. Because there is always more at stake than the performance of the individual team. If diversity is a value in society as a whole, this value may prevail whether or not it is a value in any particular case.

For example, consider airline pilots. It is arguable that we should ignore diversity in the cockpit because we want excellent pilots. But, first, it is arguable that even if women pilots aren't as good as men (a proposition which I doubt, by the way) it is demonstrably the case that they are *good enough*. And there is a need for girls to see examples of women pilots as [role models](#).⁶⁴⁰

This depends on the idea that diversity is a social good, of course. I believe it is - but again, this belief isn't a lazy belief, or even a popular belief. In most societies around the world, it is a minority belief. Which is what makes Clark's style in this article all the more astonishing.

6. Diversity as Conservatism

I don't *automatically* dismiss conservatism as wrong. But if it is, would it be an argument against diversity that it supports conservatism?

"Diversity is a deeply conservative idea masquerading as progressive," says Clark. "It replaces meritocracy with multiculturalism."

Let's stop right there for a moment. The concept of 'meritocracy' is deeply flawed and almost universally misapplied (this is the other part of the argument from the previous section). There are numerous arguments against the concept: it presupposes we can measure merit, it presupposes that merit reflects a person's worth, and it presupposes merit reflects an individual rather than their social or cultural background.

⁶⁴⁰ <http://www.cnn.com/2016/09/26/business/woman-26-easyjet-youngest-pilot-captain/>

As [Yong Zhao says](#)⁶⁴¹, "The ideal of meritocracy is built on four assumptions. First, a society/authority can correctly identify the merit. Second, there are ways to accurately measure the merit. Third the merit is only individuals' innate potential plus their efforts. In other words, it has nothing to do with their family background. Fourth, everyone has the same opportunity to develop the merit. None of these assumptions is true."

Moreover, meritocracy is *morally* wrong. As [David Freedman](#) writes⁶⁴², "Smart people should feel entitled to make the most of their gift. But they should not be permitted to reshape society so as to instate giftedness as a universal yardstick of human worth." Moreover, it is [the gifts one has received](#)⁶⁴³ in life that contribute to whatever qualities we call 'merit' - and luck does not convey any sort of moral primacy or quality of judgement. One only needs to observe the behaviour of the wealthy and gifted of British society to see that.

Where Clark *is* correct is that diversity brings with it difficult choices. As he observes, "From a feminist point of view, diversity may tolerate attitudes, cultural norms and behaviours that may prevent gender equality." Quite so. Nobody is *automatically* right in a diverse society. Every form of difference needs to, and has the right to, make a case. Ultimately it's about choice and deciding for oneself.

He also writes, " It prevents us from taking a secular view of the world, as we give in to relativism and acceptance." This is not true. I take a secular view of the world, as everyone knows. I also encourage those who wish to pursue a religious view of the world to do so. What 'diversity' means is that they can't force me to be religious, and I can't force them to be secular. Indeed, it's even a matter of bad taste to even try.

"The group trumps the individual," he writes. "It pits the poor against the poor. Ultimately, it is the dull traditionalism of conservatism." It does so only if we view these as struggles in which one or another type of diversity must ultimately prevail. But this is unreasonable. Nobody thinks that it is 'diversity' to hold that Sharia law ought to apply in all cases.

The people who *oppose* diversity are the ones pitting one group of people against another; they are, indeed, the ones who are representing them as groups in the first place.

⁶⁴¹ <http://nepc.colorado.edu/blog/from-deficiency>

⁶⁴² <http://www.theatlantic.com/magazine/archive/2016/07/the-war-on-stupid-people/485618/>

⁶⁴³ <https://www.ft.com/content/3b73bf58-079f-11e6-9b51-0fb5e65703ce>

7. Diversity does not lead to increased productivity

This was the major point raised by Adamson and others, and yet it begs the question: who said the objective of diversity was to increase productivity in the first place?

So we have Thomas Kochan saying, "There are no strong positive or negative effects of gender or racial diversity on business performance." But big deal. " According to the American Society for Training and Development's 2002 state of the [training industry report](#)⁶⁴⁴, only one in 10 companies attempts to create results-based evaluations of its training programs."

Companies engage in diversity training to avoid litigation and human rights cases. They also do it because women and ethnic minorities (among others) are larger and larger parts of their customer base. To work in a global environment pretty much requires understanding of, and acceptance of, other cultures.

The [five-year study](#)⁶⁴⁵ referenced by Clark earlier and in this section provides an unambiguous statement in support of diversity:

Diversity is a reality in labor markets and customer markets today. To be successful in working with and gaining value from this diversity requires a sustained, systemic approach and long-term commitment. Success is facilitated by a perspective that considers diversity to be an opportunity for everyone in an organization to learn from each other how better to accomplish their work and an occasion that requires a supportive and cooperative organizational culture as well as group leadership and process skills that can facilitate effective group functioning.

The same authors continue:

training programs must help managers to develop the leadership and group process skills needed to facilitate constructive conflict and effective communication... raining programs that improve the skills of managers and team members may be particularly useful, but training alone is not likely to be sufficient. Organizations must also implement management and human resource policies and practices that inculcate cultures of mutual learning and cooperation.

⁶⁴⁴ <http://www.braunconsulting.com/bcg/newsletters/winter2004/winter20042.html>

⁶⁴⁵ https://www.shrm.org/about/foundation/research/Documents/kochan_fulltext.pdf

It's always a good idea to read the articles you cite.

8. Diversity shows virtually no effect

No doubt Clark means to say here that diversity *training* shows virtually no effect. Then it would make sense to quote Frank Dobbin saying "Practices that target managerial bias through...diversity training, show virtually no effect."

Clark has cited [this study](#)⁶⁴⁶ numerous times through the years, though the [number of citations](#)⁶⁴⁷ it has received (969, according to Google Scholar) suggests that he protesteth too much when he says it was "ignored".

It is worth noting, first of all, that Dobbin et.al. are not opposed to diversity itself. Indeed, the paper reads as supportive of diversity, with the authors surveying companies to find out what workss. That's why we read not simply that diversity training has no effect, but rather, a range of programs that *do* have an effect:

The most effective practices are those that establish organizational responsibility: affirmative action plans, diversity staff, and diversity task forces. Attempts to reduce social isolation among women and African Americans through networking and mentoring programs are less promising. Least effective are programs for taming managerial bias through education and feedback.

Fair enough. But that's certainly not the perspective Clark would have us believe the authors represent.

9. More harm than good

Once again it is not clear whether Clark is talking about diversity in general or diversity training in particular (he appears to conflate the two throughout the article).

I think we can take it as a given that diversity programs, including training programs, can spark a backlash. There is ample empirical evidence of the backlash. The [mere presence](#)⁶⁴⁸, for example, of women with an opinion seems to be very threatening to a certain subset of society. It is not surprising to see this in response to training programs as well.

⁶⁴⁶ https://www.cfa.harvard.edu/cfawis/Dobbin_best_practices.pdf

⁶⁴⁷ <https://scholar.google.com/scholar?oe=utf-8&um=1&ie=UTF-8&lr&cites=18373662958137193840>

⁶⁴⁸ <http://gawker.com/what-is-gamergate-and-why-an-explainer-for-non-geeks-1642909080>

The anti-diversity backlash isn't unique to diversity training. Human resource writers have observed⁶⁴⁹ the backlash to all sorts of diversity programs, not just training. Even when the program is voluntary, it has triggered a backlash. It happens because the people who used to benefit from a monoculture no longer benefit. "The researchers reported that diversity efforts have led to increased numbers of women and minorities attaining managerial positions, but sometimes those efforts "can stimulate backlash among non-beneficiaries who may feel unfairly disadvantaged by these policies," the report states."

It is not at all clear that this backlash constitutes "more harm than good". There was significant backlash against the freeing of the slaves in the mid 1800s in the United States, but this backlash not mean that the freeing of the slaves caused "more harm than good". Any time an unfairly privileged class of people loses that privilege, there will be a backlash.

10. No evaluation

It is not true that there has been no evaluation of diversity training programs, because then it would be impossible to state - as Clark has done consistently through this article - that diversity training has had no effect. Obviously some evaluation has taken place.

Clark cites another of Kalev's studies, this one a 2008 review of 830 companies. According to this article⁶⁵⁰, the study found "the kind of diversity training exercises offered at most firms were followed by a 7.5 percent drop in the number of women in management. The number of black, female managers fell by 10 percent, and the number of black men in top positions fell by 12 percent."

But even this isn't the condemnation of diversity training Clark contends it is. The article continues:

The analysis did not find that all diversity training is useless. Rather, it showed that mandatory programs -- often undertaken mainly with an eye to avoiding liability in discrimination lawsuits -- were the problem. When diversity training is voluntary and undertaken to advance a company's business goals, it was associated with increased diversity in management.

So not only was there not no evaluation, the evaluation shows that in some cases diversity training let to positive outcomes.

⁶⁴⁹ <http://blogs.hrhero.com/diversity/2016/02/14/fairness-in-diversity-programs-know-how-to-avoid-a-backlash/>

⁶⁵⁰ <http://www.washingtonpost.com/wp-dyn/content/article/2008/01/19/AR2008011901899.html>

Overall

I get that Clark is trying to be cute, layering the objections to diversity into a series of objections to diversity training. Had he given his writing a bit more effort and thought this intent may have shone through. But it did not, and I am not convinced that he cared.

Many of the articles offered by Clark against diversity training are arguments against the concept of diversity itself. And if you don't support diversity in the first place, you're not going to support the idea of diversity training.

But the problem with diversity training isn't the fact that it is intended to promote diversity. It can be argued (and I have done so in this post) that diversity itself is substantially valuable (and whether or not it promotes business productivity is irrelevant). You cannot have a fair and just society of any type without diversity, much less one that expects to work and thrive in a global economy.

And the failures of mandatory training are, well, failures of mandatory training. Ascribing the failure to the desire to promote diversity is inaccurate and unsupported by the evidence. Indeed, it feels like the purpose of this approach is to *oppose* diversity.

Clark is free to oppose diversity. Goodness knows, a substantial portion of his own compatriots do, to the point that they want to expel immigrants from the country (they probably have bad things to say about curry too). If he wants to align with the likes of ~~Elizabeth~~ Theresa May and Nigel Farage, he should just say so. This little dance around diversity training is a sham not worthy of the little effort it took to write.

*Ottawa, Canada
October 9, 2016*

Institutions and Openness

Setting Up the Discussion

Let's be precise about what was claimed by Michael Caulfield in his paper *Putting Student-Produced OER at the Heart of the Institution*⁶⁵¹:

People make things possible. Institutions make them last.

His italics. His point is specifically that unless something is institutionalized, it does not last. He makes his position explicitly clear:

I had worked my heart out for this thing, evangelized widely, written up the prototypes and the stubs, explained it to the college. But I hadn't institutionalized it. And so it was bound to die the minute I left.

He is also pretty clear about what that means:

While we like to scoff at all the mucky-muck bureaucracy around training, budgets, policy and messaging, it's precisely that stuff that prevents your dream initiative of today morphing into rotting infrastructure of tomorrow.

It's because I respect the work that all of us do in the open — faculty, students, staff — and want to see that work plugged as deeply into the university as the textbook industry used to be.

I take pains to reproduce exactly what he says because of his response to my criticism (and also Jim Groom's criticism⁶⁵²).

My criticism⁶⁵³ is this:

You can't depend on institutions. And in a sense, you don't need them. Institutions aren't what make tests and exams happen year after year. Institutions aren't what guarantee there will be course outlines and reading lists. What makes this last - the only thing that makes this last - is culture.

⁶⁵¹ <https://hagood.us/2016/09/07/putting-student-produced-oer-at-the-heart-of-the-institution/>

⁶⁵² <http://bavatuessdays.com/the-overselling-of-open/>

⁶⁵³ <http://www.downes.ca/post/65788>

Caulfield says⁶⁵⁴ we have misunderstood what he meant by "institutionalize". What he means is:

To institutionalize is to set up policy and technical architecture that favors activities you want to promote.

I said⁶⁵⁵, "Pretty sure I've not misunderstood. Where do you set up policy? Where does staff turnover happen? In institutions. To be open, it has to be supported by more than just an institution. They're fickle. As I said, it must be part of culture."

The point here is that to institutionalize is to set up policy and technical architecture inside an institution. There's no other place these things can really happen. And my response is, contra Caulfield, doing this does not ensure persistence. Indeed, quite the opposite: if your innovation depends on an institution to survive, it won't.

Institutionalized

Caulfield responded to this exchange today with a longish paper called Institutionalized⁶⁵⁶ that deserves to be considered in full.

He first responds to my contention that culture, not institutions, preserve the good things we want to preserve:

Institutions are one of the mechanisms we use as a society to perpetuate, change, or disseminate culture. There are other means, but seeing culture as an alternative to institutions is a bit like seeing travelers as an alternative to cars. I understand the relationship of culture and institutions can get a bit chicken and egg. But they aren't alternatives to one another.

First, and technically, this is not a category error⁶⁵⁷. Institutions and culture have the same ontological status: they are human constructs, they cause changes of state in each other, and they can both be found empirically to be necessary (or not) and sufficient (or not) to preserve openness. We can disagree about the role each plays, but not about the existence or causal efficacy of one or the other.

⁶⁵⁴ <https://twitter.com/holden/status/776102193476751360>

⁶⁵⁵ <https://twitter.com/Downes/status/776183327804035072>

⁶⁵⁶ <https://hapgood.us/2016/09/14/institutionalized/>

⁶⁵⁷ https://en.wikipedia.org/wiki/Category_mistake

Second, and much more substantially, he offers an example of 'institutionalizing' a practice through Hostile Architecture⁶⁵⁸ "that purposely limits certain uses; here the addition of a middle bar to the bench. People don't lie down on the bench because the bench prevents it." The best authority I know on this is Dan Lockton⁶⁵⁹, who I've followed for years on the subject of architectures of control⁶⁶⁰.

Caulfield's point, and I take it as given, is that institutions perpetuate and control things. Sometimes they exercise negative control, as when they keep the homeless off park benches, keep black people from voting, or keep poor and coloured people off city beaches. Sometimes they exert a productive influence, such as voter turnout through registration, clean cities through the fixing of broken windows, and the like.

Where we disagree is when we say that the institution is necessary in order to produce and preserve these things. Caulfield offers an example and it's worth quoting in full:

You can say, well — you just need a culture of acceptance, or people just need to be less racist, or whatever. But that's incorrect. When you put a sign on the bathroom that says "Men" you institutionalize one thing. When you take it off, you institutionalize another. And when you put up a sign that says "All-Gender Bathroom" you institutionalize a third thing. (And no, not having any sign on it is not "de-institutionalizing access". You're all smarter than that, right?)

Well - let's think about that. The vast majority of bathrooms do not have signs on the doors. I have two bathrooms in my own home and neither has a sign on the door. What happens? Do people pee on the floor? No - they find the bathroom and use that. In my office, if we removed the signs from the doors people would still use the bathrooms. Having a sign on the door is not necessary to promote the use of bathrooms in order to pee.

By contrast, we also have a room in our office dedicated to eating and drinking; it's called a lunch room. There is a sign on the door that indicates this. Now, observe, first, the sign is not sufficient to induce people to eat there; many people eat in their offices, or at local restaurants. Second, imagine we created two separate lunch rooms, one for men and one for women. Would people obey these signs? Probably not - the institutionalization of segregated lunch rooms would (in this culture) be laughed at.

⁶⁵⁸ <http://rainystreets.wikity.cc/hostile-architecture/?path=&t=Hostile%20Architecture>

⁶⁵⁹ <http://architectures.danlockton.co.uk/>

⁶⁶⁰ <http://architectures.danlockton.co.uk/what-are-architectures-of-control/>

Institutionalization by means of signs is neither necessary nor sufficient to preserve social behaviours. Culture does. Culture says we pee separately, and not in our offices, but eat together, or sometimes in our offices.

Sure you can build things, like low-level bridges, to attempt to enforce policy through objects. Sometimes these objects last longer than the institutions that created them.

Learning Technology

Part of Caulfield's argument revolves around the choices institutions make.

They impact everything. And again, the point of all those ranting blog posts I wrote when I was a younger person was that the LMS institutionalizes a pedagogy that we don't really want. And I think the point of those early rants was if you want real change you're going to have to dismantle — or at least change — the LMS. The LMS chooses what counts. And that effects what gets done. It's the CompStat of education.

Speaking of category errors, we see one here. An LMS doesn't choose what counts. It is a piece of software, and software does not choose - that is a function reserved for sentience. People choose what counts. Sometimes they choose it directly, and sometimes they choose it (sometimes inadvertently) through their choice of software.

And sometimes - as in the case of institutions - other people make the choice for you, and then enforce it (or, at least, promote it) through policy or technology. That's what Caulfield is reacting to. Witness:

If you want real change, styrofoam padding isn't going to cut it. Eventually you have to remove the damn bars from the bench. That's what institutional change is. You make it so people don't have to be your level of superhero to get it done.

Yes. If you want institutions to change, you have to create institutional change. QED. But do we need - or want - institutions to change in order to support open access, open source, or open educational resources? Or could we get the desired result if (to take the extreme position) the institutions simply went away?

Why would I ask this? Because, from where I sit, institutions are typically the bodies preventing things like open access (and often in the same ways, and sometimes for the same reasons, they prevent the homeless from sleeping on benches or black people from going to the beach). And to take the point even further, what I've observed over the last two decades or so is a substantial struggle between culture - which wants these these things to be free - and institutions - which are trying to prevent that.

Caulfield lists half a dozen or more ways the institution reinforces the textbook and the banking model of education⁶⁶¹, and yes, this is one of the harmful effects of some of the choices institutions have made for us. I agree with him that these pose a "structural barrier to open pedagogy." But again we may ask whether we need an institution to support open pedagogy, or whether we would get the result we want were we simply to get the institution to cease and desist.

What's happening here, I think, is that Caulfield is imagining that the institution must be implicated in pedagogical choice, one way or another. So if we want something that is a non-banking model of pedagogy, the only way to get that is to change the institution:

We have made it simple to send hundreds of millions of dollars to textbook companies and difficult to use student dollars to build curriculum in-house for students.

Doesn't it seem from this that he is saying these are the only real options we have?

Look at how he expresses the way culture is changed:

Or imagine another world where there was just a "college store" instead of a bookstore, and where professors had to coordinate directly with publishers to get their books shipped.... What would happen? Suddenly "culture" would change, wouldn't it? People would walk around and say, wow, you have such a culture of OER on this campus, the same way people walked around the park benches and noticed there was no culture of visible homelessness.

Culture would change, he says. On. this. campus. Because there's no imagining in Caulfield's scenario that the change could happen outside the institution, or without the institution.

Pirate Libertarianism

The alternative to institutionalism is not libertarianism, Caulfield's argument to the contrary notwithstanding. Institutions can easily be used support libertarian (and neo-liberal) structures (indeed, that's what many of them are used for). And libertarianism is often used as an excuse (by institutions) to ignore culture.

Let's take the case of web archiving. It's a fact that institutions failed us with Geocities and with much more besides (we would also have lost all of UseNet, and we have lost countless websites). There are two ways to address this:

1. Set up institutions to archive the web.

⁶⁶¹ https://en.wikipedia.org/wiki/Banking_education

2. Let anyone who wants to archive the web.

Caulfield wants to do the first. Indeed, he suggests that doing the second amounts to nothing more than putting out fires or catching babies on an ad hoc basis. The problem of archiving should have been address structurally, institutionally:

A big part of it is the fact that a notion of archiving is not built into the model of the Web. If you want to fix that you're going to have to get people on some committee meetings, a lot of them. You're going to have to influence the W3C. You're also going to have to engage with use of Terms of Service, and the regulation of orphaned content. You're likely going to do that not as a private citizen, but through your institutions: colleges, policy boards, government.

Suppose we had done this. Would we even have the web? What made the web possible at all is that all this overhead wasn't built into it. All of this overhead costs money and resources. This sort of overhead was what made services like Compuserv and Prodigy so expensive.

This - indeed - is the sort of overhead that weighs down our educational system today. Committee meetings. Governing boards. Terms of service. Regulations. It is not clear - and the case has not been made - that this is necessary in a digital society to support learning.

But even more to the point: it is harmful.

If we look at the second option - "let anyone who wants to archive the web" - we can see that, in fact, this is what has largely happened. We have the people who saved Geocities, the people who saved UseNet, Brewster Kahle who created Internet Archive, Google images and Google cache, we have Napster that created MP3s of everything, even Sci-Hub to ensure that academic papers and publications do not (like so many books before them) simply disappear from sight.

The institutional response has been to do whatever it takes to stop this. The institutional response have been to create terms of service, to create regulations and laws, and to put people in jail for what they call piracy. Yes, even though the content would otherwise disappear. Indeed, the net effect of the institutional response has essentially been to enshrine it into law that only institutions can ensure open access. Not because we can't depend the public in general. But because we can.

It's ironic. On the CBC last night I listened to the announcer implore the public to look for a recording of the first ever episode of 'The World at Six', which was broadcast only 50 years ago. Less than my lifetime, and the recordings were lost. But maybe - just maybe - some individuals saved the recordings. It would have been illegal, of course. But maybe they did it anyways.

I don't trust institutions because they have proven time again that they can't be trusted. And I've found just as often than not when I go upstream that it's the institution lighting fires and throwing babies into the river.

Making it Work

I'm not saying people shouldn't work together. I'm not saying we should never build things. What I am saying is that we cannot count on institutions - organized economic and political units - to ensure the lasting value of these things is preserved.

And I am saying, therefore, that policies that make things like open access or non-banking education dependent on the good-will of institutions are misplaced and misconstrued. Because sooner or later someone is going to object (or forget, or simply retire), and the good work goes down the drain.

People do not value education not because we have educational institutions. Rather, we have educational institutions because people value education. And educational institutions are only one of many ways people support their own education, because what people value is the education, not the institution. The people inside educational institutions often miss that point.

We need policies that support education (or, more broadly construed, knowledge and learning). Because these are the things that are valued. And because people value education (and knowledge and learning), I believe they will value open access - indeed, that they have shown this to be the case - even though educational institutions do not.

Institutional change, in this context, is about saving the institution. But if the institutions don't change, culture will find another way. It always has.

*Ottawa, Canada
September 15, 2017*

Open Practices

This post is a response to a request for my thoughts on the value of open practices and methodologies for putting them into practice.



1. Do you have any insight into working with educators to help them see the value in open practice, to help share their learning more openly, and how we might scaffold the entire process? It is in building the compelling case for change that I am having some challenges. I work to craft messages for specific audiences but I am missing the mark in helping education leaders see the VALUE in open practice.

My first thought on this is that you are not alone in this experience. Proponents of open practice (open anything, actually) have experienced difficulties in translating the idea into practice. People like Stevan Harnad and Peter Suber have talked about the same phenomenon with respect to open publishing, for example. I've had pushback in my own organization when promoting openness. And I've had numerous people tell me about the same thing when I've presented on this. The objections break down into two major categories:

- first, there is a reluctance to share based on a fear of consequences. Some fear their own work isn't worth sharing. There's a fear of embarrassing oneself and looking foolish in public. Others (quite reasonably) are concerned about violating privacy and confidentiality (aka FOIPP). Others argue that people can speak more freely in private spaces. There is concern about practices (such as sharing of copyright materials) that might have to be discontinued if done openly. And there are concerns about the consequences, such as being fired, if people dislike what they see being shared.

These are legitimate concerns and cannot be dismissed lightly, or at all. People need private spaces. Any discussion of working openly has to include a discussion of when it's possible and appropriate to work privately. At the same time, there's a 'flipping of the switch' that needs to happen. Currently, the default is to do everything privately, and make an exception for sharing. The challenge is to make the default to work openly, and make an exception for keeping things private. This is the trend behind initiatives such as 'open data' and 'open science'.

The key here is that flipping the switch has to be seen as safe. Nobody wants to open up if it's going to blow up on them. There needs to be a space for confidentiality, and there needs to be a sense of security about the implications of being open.

- second, many people simply don't care. This is especially the case among academics, and has been well documented. All else being equal, people will not change their practices. They see no compelling reason to work openly. In addition to exposing them to risk, as noted above, it creates overhead and paperwork. Institutions say they want staff to share openly but in practice are nervous about what staff will share (this is especially strong in government, I can attest) and so they put in policies and procedures (for example, I've see all of these in action: requirement for legal review, requirement for IP screening, requirement for conformity to ADA, requirement for bilingual versions, requirement for institutional wordmark and branding).

Commercial publishers have taken advantage of this and though they also create overhead they have removed much of the work and risk involved in publishing, and they offer reward in terms of promotion criteria and sometimes financial incentives. This only exists for certain categories, however; we don't really see the equivalent for classroom teachers (though things like Discovery Education Network have made some inroads here). And of course they often limit access to those who can pay for it (and create a rights and payment overhead in the process).

To date, at the institutional level, only one strategy has countered this: an openness mandate. We see examples in freedom of information legislation, open data policies, funder requirements for open access publication, and institutional archiving mandates. These requirements create a lot of pushback but create much more openness than we see in the same environment without a mandate. Obviously a mandate is not an ideal strategy. It's hard to argue for the value of something while at the same time being in a position of having to force people to do it.

So, what then?

My best results have come when I ask people to stop thinking of themselves as teachers and start thinking of themselves as learners. By changing the role I am changing how they perceive they might benefit from open practice. That said, it's not one big giant step; it isn't the idea of openness as a default that attracts people, it's the idea of a bit of sharing producing a bit of benefit. So I find that the value is seen in open practices, rather than the concept of openness itself.

For example: when we were developing MuniMall (an online learning, resources and knowledge community for the municipal sector in Alberta) we asked town managers how they got answers to problems that would happen from day to day (where to send a grader for repair, new guidelines for sewer inspection, examples of planning law litigation, etc). The run-away winner was: pick up the phone and call someone they know. There is no questioning the benefit of direct person-to-person sharing. They don't even think of it as 'open practice' (though of course, it is).

It's a small jump from this to seeing the benefit electronic media. A lot of discussion boards operate like this, with a question-answer format (you see this in communities of practice, for example) but they're cumbersome and people don't use them if the community is too small. We can draw out three examples that do work, providing enough people get involved: direct person-to-person text messaging; text messaging in an open environment such as Twitter; and question-answer sites like Stack Exchange. None of these by itself is sufficient, but the set of them work quite well together, and are often more convenient than making a phone call (especially for people who have a lot of client-facing work and can't stop to answer a call).

In a lot of environments, though, these media are used as broadcast media by the administration. There is a tendency to 'clamp down' on official channels (for example, I've seen cases where administrators terminated a mailing list because it was being used too much). Once people see the benefits of these simple forms of working openly they can be encouraged to take control of them as a means of managing their own learning and development. The technologies that seem to work the best, to my observation, are those which preserve the following values:

- relevance - the communications are directly relevant, when and where needed. They offer means to focus on exactly what you need (that's why we see a progression from text messaging to question-answer sites) in a format that is directly usable (a short web page as compared to a two week class).
- usability - they don't require any extra work to learn how to use. There isn't 'navigation'. The interfaces are intuitive and predictable.
- interactive - they support dialogue, and not just broadcast. Questions can be refined, particular circumstances addressed. They provide a means for the same people asking the questions to also answer the questions. More here: <http://www.downes.ca/presentation/138>

Over time, this evolves into open practice. This is a desirable result. But it isn't the goal. The goal is to help people with learning tasks in their day-to-day lives, and to help them reflect on that. As they begin to see what is working for them, they begin to see that it works for others.

2. How does open practice impact knowledge mobilization? Are we able to show that open practice can impact student learning much faster than traditional forms of professional learning for teachers?

This question has a half dozen separate questions built into it. These make it difficult to offer a single response. Here's a quick reprise of some of the questions:

- how are we defining open practice? As suggested above, it's really a suite of tools and methodologies that leads to an overall default of openness.
- is knowledge mobilization a desirable outcome? It has overtones (as does knowledge translation) of the idea of diffusing knowledge from central sources.
- is the objective to learn faster? To learn better? Or to learn better things?
- how would we characterize more traditional forms of professional learning for teachers? None? PD day? Staff room gossip? Board retreats?
- what does it mean to show open learning has had an impact?

My comments will address each of these in turn.

- open practice

As I've suggested above, there are gradations of open practice. It's not something we simply turn on and off. Moreover, it's not clear that 'open practice' as a goal in and of itself is desirable. It is an outcome of various tools and methodologies, but the objective is always to provide learning and performance support. Environments vary, so this discussion has to begin with the question, what would provide learning and performance support? What are we trying to accomplish here?

I've been doing workshops on personal learning with educators in various countries. The hardest thing to do is to shift them from thinking of teaching strategies to thinking of learning strategies. I use a type of format used for software design, working back from objectives to tools to a definition of a minimal viable product (MVP). I find participants focus on access to information they need to do their jobs - calendars, forms, resources. So it leads me to think that, before asking them to work openly, to consider whether they are working in an open environment. It seems to me that they are less likely to share if they're not working in a sharing environment.

This works both ways. A large organization I know embarked on a program "Dialogue on the future of X". They're assembling panels and tiger teams. There's a video and web page and brochure to promote the initiative. But in this entire environment, there is no place for

individuals to contribute their comments or take part in the dialogue. I think it would be difficult to promote any sort of open practice after such a process. But maybe this degree of openness isn't desired. There can be many reasons to moderate or control an open discussion; we've seen discussions get really out of control on the internet.

I think understanding the need for openness is the first step, where openness is defined as much as possible in terms of specific types of information and resources, different types of tools and methodologies, and different degrees of openness. Simply being behind a password barrier doesn't necessarily mean something is closed, but if everything is behind a password we need to question what objective the password protection is intended to achieve.

- knowledge mobilization

The origin of 'knowledge mobilization' I would say is in the concept of 'knowledge translation', which is essentially the idea researchers and theorists (or consultants and executives, in a dystopian version) create knowledge, which is then 'translated' into practical tools and processes. By using the term 'mobilization' we are agreeing explicitly that knowledge originates not only in the back room, but also in the everyday practices and experiences of practitioners, so that there needs to be a two-way flow of information and communication.

Given such a characterization, the argument to the value of openness is very short: without this communication, which by definition requires a degree of openness, there is no knowledge mobilization, and therefore, no improvement of practices. But even here there is nuance. Some practices require the shared development of expertise (the best way to move a patient, the best use of a Smart Board to collaborate in a class) while in others there is a more regulatory or policy-driven flavour (safety hazard recognition and protocols, gender and diversity issues awareness, terms of employment and contracts).

But moreover, in some cases there simply isn't knowledge, and the deployment of knowledge mobilization might be inappropriate. I think for example of a lot of the 'advice' I received before teaching in First Nations communities. Though there are some culturally-driven tendencies, the generalizations about working on First Nations reserves turned out uniformly to have exceptions. The 'knowledge' of 'teaching in First Nations communities' doesn't exist; at best what we have are shared stories, experiences and histories. So there could and probably should be sharing, sure, but it's something different here.

- objectives

The objective of learning technology and practices (such as 'openness') is very frequently stated to be "faster" learning. It would not take a lot of effort to compile a list of vendors with products and theorists with theories about how to learn a subject faster. It's probably second only to the promises to increase test scores and to help people learn the subject better. These form the basis for an 'outcomes oriented' philosophy of education.

What you may have noticed in the section on 'open practice' above that I did not talk about outcomes; I talked about the need for different types of resources, tools, and degrees of openness. I find a definition of outcomes to be a lot less useful in practice than it might appear to be. The groups of educators I have worked with may have commonalities, but each has a different set of outcomes they require from learning and support resources and technology. The same is true, I would say, of the students in their classroom.

Part of the reason I ask educators to focus on their own training and development needs is that it forces them to recognize this.

Key, I think, to seeing the value of openness is seeing how it contributes to one's own outcomes, rather than to policy or institutionally mandated outcomes. Learning and development is personal in a way that other aspects of employment are not. There's an old naval slogan, "One hand for the ship, one hand for yourself." Learning and development is most often thought of as being the one hand for oneself. It not only prepares a person for their current position, it prepares them for their next position.

- traditional forms of learning

All the data and surveys I see about corporate and professional learning suggest that in-person classes remain the dominant form of learning. The nature and structure of these classes has changed a lot over the last few decades, from lecture and demonstration to a lot more collaborative activities and hands-on work (think of the 3-day f2f session/retreat you just completed).

But as I mentioned above, when a person is on the job (that is, the 95% of the time they are not in a class or at a retreat) the predominant form of learning is simply to 'ask someone'. As people like Jay Cross and Harold Jarche have emphasized, informal learning constitutes the bulk of workplace learning. This is no doubt as true for teachers as it is for board members. It's even true to a large degree for students themselves (through the percentages are different).

I think the process of introducing open practices in a traditional environment is one where the SAMR (Substitution Augmentation Modification Redefinition) model applies. We don't begin by thinking about how we are replacing traditional practices. Instead, we look at these practices and ask where tools, resources and openness can be applied in such a way as to make the traditional practice more effective or more efficient. Only once we have moved to the new environment will other affordances become visible, and at that point we can think of augmenting and ultimately redefining a practice as 'open'.

In a sense we're turning the question of how openness 'can impact student learning much faster than traditional forms of professional learning' on its head. The new practice (whether it's a type of openness or, more likely, a type of technology that will ultimately lead to more openness)

would not be implemented unless it 'can impact student learning much faster than traditional forms of professional learning' (or some similar statement of objectives and values).

- impact

Let me quote you: "The second structure we are trying to interrupt is this the 'flow' of learning from Superintendent to Principal to Teacher. The concept that we need to 'feed' teachers in this way is outdated in a world where teachers can access learning anytime and anywhere. I argue that a higher yield strategy is to encourage teachers to become self-directed learners and to teach them where to find what they need, how to build a PLN, and how to be savvy in accessing learning online."

I agree with this. It follows, though, that an assessment of the impact is not going to be found in demonstrations of better learning by means of tests or evaluations against a body of content. Nor will it be found in demonstrations of better learning by means of tests or evaluations of their students against a body of content. We're looking for an outcome where teachers become self-directed learners, and the only measure of that is whether teachers direct their own learning (here defined for the sake of argument as knowing "where to find what they need, how to build a PLN, and how to be savvy in accessing learning online", though again this will vary for each of them).

The fundamental question, I think, is whether that (teachers becoming self-directed learners) is valued by administrators and supervisors, and if not currently, then what would lead them to value it.

The answer to this, I would suggest, is created with a two part structure consisting of a value proposition and a logic model.

The value proposition is a statement of what administrators and supervisors actually do value, and how it is measured. The value needs to be stated as outcomes, as concrete and tangible benefits the program produces. We need to be careful not to overgeneralize about this; the 'knowledge' of 'satisfying the needs of administrators and supervisors' doesn't exist. Each will be different: some will be looking for financial efficiencies, some will be looking for improved test scores, some will be looking for better community relations, and some will have very specific learning outcomes they need to see. What's important is that there needs to be a value proposition, something you know the administrators will support.

The logic model is a description of how the effort that will be undertaken leads to a satisfaction of the value proposition. The logic model is necessary because there isn't (and never will be) a strict measurement of cause and effect. You can't measure 'x' in the program and see it correlate to 'y' in the value proposition. What the logic model does is to show how implementation of the program as a whole will implement the value proposition as a whole. It's a way to connect the idea of enabling employees to meet their objectives with the idea of enabling boards and supervisors to meet their objectives.

In my own work I've tried to hit several value propositions over the years with different logic models: self-directed learning (SDL) reduces recruitment costs by enabling a pool of applicants to quality themselves; SDL reduces retention costs by enabling career advancement and personal development; SDL reduces administrative overhead by enabling peer-to-peer knowledge sharing (thus reducing the need for courses); SDL creates motivation by enabling a teacher to be a member of a professional community, motivation results in greater enthusiasm in the classroom, which results in increased motivation on the part of students, and hence better grades. Etc.

In sum...

Open practice isn't a specific thing: it's a set of practices, tools, and policies the combination of which results in what we might call 'openness by default', but which has a specific objective the ability of people to support their own learning and development more easily and effectively than before.

Boards and supervisors might not directly value people being able to support their own learning and development themselves, but they can be shown how this leads to benefits that they do value, such as lower costs and more effective teaching.

All of this needs to be developed and implemented iteratively; there are no general principles. Different learning objectives are supported by different technologies, leading to more or less great degrees of openness, and these will lead to varying board and supervisor objectives in different ways.

Ottawa, Canada

October 21, 2016

Photo from the Metcalfe Fair

On Teaching Critical Thinking

As someone who was teaching critical thinking for a living well before anyone thought to call it a '21st century skill' it bothers me to no end to read [articles like this](#)⁶⁶² arguing that we should not be teaching critical thinking in schools.

It feels to me that the critics of critical thinking do not understand what critical thinking is, nor why we would teach it. Thus Carl Hendrick describes the critical thinking as follows:

the aim is to equip students with a set of general problem-solving approaches that can be applied to any given domain; these are lauded by business leaders as an essential set of dispositions for the 21st century.

Well.... no. That's not what critical thinking is. Critical thinking is neither "a set of general problem-solving approaches" nor is it a "disposition". Critical thinking *does* apply to any given domain, for reasons I'll explain below. And it's irrelevant whether they are lauded by business leaders.

The most common argument against critical thinking ([favoured](#)⁶⁶³ also by Daniel Willingham) is this:

to be good in a specific domain you need to know a lot about it: It's not easy to translate those skills to other areas.

and

This non-translatability of cognitive skill is well-established in psychological research and has been replicated many times.

Moreover, they argue that critical thinking does not contribute to improved learning outcomes. Citing a study of 'brain training' games, Hendrick quotes:

We know of no evidence for broad-based improvement in cognition, academic achievement, professional performance, and/or social competencies that derives from decontextualized practice of cognitive skills devoid of domain-specific content.

Fair enough. Let's take all this as a given.

⁶⁶² <http://theweek.com/articles/665551/why-schools-shouldnt-teach-critical-thinking>

⁶⁶³ <http://www.tandfonline.com/doi/abs/10.3200/AEPR.109.4.21-32>

Critical thinking, however, is *not* the translation of specialized skills from one domain to another. Nor is it even intended to support the learning of a specialized domain - you need a lot of practice and hands-on experience to do that. Nor are the 'brain training' games an example of critical thinking.

So what *is* critical thinking good for? Hendricks *almost* had it when he said this:

we all know people who are "clever" in their professional lives yet who often seem to make stupid decisions in their personal lives.

Yes! Exactly! Critical thinking is designed to *prevent* this!

So how can critical thinking accomplish anything useful? After all, it is true that you *do* need to know things in order to reason critically about them. Happily, first, we almost never have *no* knowledge of a subject. And second, critical thinking is one of those things we need to know.

Let me offer an analogy: mathematics. This is a type of very general knowledge that is applied in a wide range of domains. There are some useful things to note about mathematics:

- it applies everywhere, regardless of context. There are no domains in which $2+2$ does not equal 4.
- nobody pretends that it is the whole of any other discipline. Of *course* you have to have some knowledge about physics to use mathematics in physics. And the knowledge of physics doesn't transfer to other domains (but the mathematics does).
- knowledge of mathematics will help you a lot in everyday life, and help you spot (or prevent) glaring errors of reasoning even in domains you know little about.

For example, I know nothing about aviation. But I can demonstrate that 100 kilograms of fuel is different from 100 pounds of fuel, which tells me that if the pilot uses 'kilograms' and the ground crew uses 'pounds', someone is in for [a rude surprise](#).⁶⁶⁴ Or if the range of the aircraft is 1600 kilometers, and the flight plan is 1605 kilometers, there's a risk the flight might [end tragically](#).⁶⁶⁵

This might seem pretty basic. But so are the principles of reasoning that characterize critical thinking (and as someone who taught it, watching people get it wrong feels the same as watching someone say $2+2=5$... *and getting away with it*).

⁶⁶⁴ https://en.wikipedia.org/wiki/Gimli_Glider

⁶⁶⁵ <http://www.bbc.com/news/world-latin-america-38165757>

So if critical thinking isn't a problem-solving set of dispositions (nor empty advice to 'consider all perspectives' and other [de Bono truisms](#)⁶⁶⁶) then what is it?

In the first place, critical thinking is the application of the basic principles of logic, usually beginning with the propositional calculus and categorical syllogisms (if you took my course you'd know what those terms mean). Here's an example of each:

Propositional calculus:

If A then B
A
Therefore B

Categorical syllogism

All A are B
All B are C
Therefore, All A are C

The point of both of these principles is that you can replace A, B and C with anything, and it still works. It doesn't matter what domain you are working in. Just as $2+2$ always yields 4, If A then B, and A always yields B. There are many more such principles, and indeed whole other branches of logic that form the basic of our comprehension of any domain: inductive reasoning, quantification, modalities, probabilities, and more.

Now there is a skill involved in applying these. There are, for example, many ways to say "If A then B". A lot of the time, in practical life, people skip that statement entirely, and it has to be assumed. Being able to read text, and identify these patterns, is an essential skill (even more essential than the 'word problems' that are their counterpart in mathematics). And these skills apply *independently* of the domains. The words may vary, but the principles remain the same.

This leads us to consider a second example of a generic skill that applies in a wide range of domains. Mathematics was the first. And the second? *Grammar*.

In all disciplines, a sentence needs to have a subject and a predicate in order to have a fixed or specific meaning. Pronouns need to agree with nouns, or at least be employed in a context where some sort of agreement can be assumed. The role of propositions is the same in geography as it is in avionics, and they appear in the same places in sentences.

⁶⁶⁶ https://en.wikipedia.org/wiki/Lateral_thinking

Grammar, and language generally, are not a part of physics (or of any specialized discipline), but physics cannot operate without them.

There is a close relationship between critical thinking and grammar. The formal "If A then B, A, therefore B" maps to the linguistic structure of a language, and we express the condition in the subjunctive sense ("*if wishes were horses...*"). Knowing how to form a sentence is part and parcel of knowing how to reason. For this reason, a great deal of critical thinking revolves around reading comprehension.

Another, broader, part of critical thinking involves the comprehension and criticism of larger cognitive structures. here are generally thought to be four major types of structures (and favious lesser structures, such as interrogation):

- Argumentation - the offering of reasons that lead to a conclusion
- Explanation - the identification of causes or reasons that something is the case (and ultimately the basis for the scientific method)
- Definition - the fixing of meanings of terms through reference, representation, ostension or other means
- Description - the presentation of events and states of affairs, including attributions of properties, categorizations, relations, and connections

Each of these operates in any given discipline (indeed, the absence of any of these four major types of structures in a discipline is *prima facie* evidence that it is a pseudo-discipline).

Most critical thinking courses focus on argumentation, since the giving of reasons to believe a conclusion is fundamental to pretty much any discipline (argumentation, for example, is always offered in response to a question like 'what *should* I do?'). And the principles for evaluating arguments do not vary from discipline to discipline.

That's not to say that every discipline is the same as every other. There are key differences between disciplines. Some of the major differences include:

- what makes a question worth asking (and what questions are really worth asking).
- what facts are relevant to the resolution of problems and states of affairs
- what counts as evidence, and what makes a statement true or false

These are pretty big differences. Cavernous. These are what make the arguments offered by Hendricks and Willingham seem so intuitive. Any time you need to know *whether or not something is true*, you've gone outside the bounds of critical thinking, and entered into one or another specific discipline.

And that takes us to the third major area of critical thinking: identifying errors or fallacies of reasoning. And as you may suspect, you don't need to be an expert in a discipline to be able to tell that an error of reasoning has been committed. These have been drawn up in various guides, [including one of my own](#) ⁶⁶⁷, to the logical fallacies.

And here's the kicker: there are no disciplines in which any of these fallacies count as good reasoning. The whole point of a fallacy is that it is not an error of fact or of evidence (again, *these* are the things that are domain-specific). A fallacy is a common form of error (just like [failing to carry](#) ⁶⁶⁸ is a common error in mathematics).

It takes skill to identify and correct logical fallacies. If you have domain knowledge you will be better at it in a specific domain, but even if you have no domain knowledge, you can avoid the consequences of some of the more egregious errors. Invalid syllogisms, misrepresentation of information, distortion of data - all these are errors in all disciplines, and can be spotted by amateurs and experts alike.

The teaching of critical thinking equips students with essential core skills that are needed in any discipline, based on principles that are as fundamental as mathematics and language (indeed, for the purists, you can read an argument shoring that they are all in fact [the same things](#) ⁶⁶⁹).

Like the teaching of any discipline, it requires not so much the presentation of facts and principles as it does the application of these principles in varied and authentic environments. And like mathematics, the teaching of critical thinking can be adapted to a student's existing knowledge, developing skills and abilities that will be useful - and transferable - to much more complex disciplines in later life.

Ottawa, Canada

December 14, 2016

⁶⁶⁷ <http://www.fallacies.ca/>

⁶⁶⁸ [https://en.wikipedia.org/wiki/Carry_\(arithmetic\)](https://en.wikipedia.org/wiki/Carry_(arithmetic))

⁶⁶⁹ <https://plato.stanford.edu/entries/principia-mathematica/>

Wiley's Misguided Advocacy

David Wiley once again launches⁶⁷⁰ into advocacy for the CC-by license. We've been through this many times, so I'll keep it relatively brief. His text is italicized.

> *There is a growing consensus among those who work in open education that the Creative Commons Attribution (BY) License⁶⁷¹ is our preferred license.*

No there isn't. The list of organizations hasn't grown over the years, and the number people from this list remains stable.

> *Since the first release of the Creative Commons licenses, newcomers to the field have been attracted to licenses containing the non-commercial (NC) condition.*

There's a whole paragraph devoted to depicting advocates of the Non-Commercial license (NC) as "newcomers". As if I am a newcomer. As if MIT's OpenCourseWare is a newcomer.

> *The BY license best reflects our values of eliminating friction, maximizing interoperability, and promoting unanticipated and innovative uses of OER.*

> *No one knows what the NC license condition means, including Creative Commons. The license language is so vague that the only way to determine definitively whether a use is commercial or not is to go to court and have a judge decide.*

This vagueness is cited by proponents of CC-by but hasn't actually been a problem. There are some good rules-of-thumb which can guide you:

- if you have to ask whether your use is a commercial use, it probably is

- if someone has to pay to access your resource, it probably is

> *Example – I want to use some NC-licensed content in my course, but students can only attend my course if they pay tuition. Is that a commercial use?*

It's a commercial use if the only way people can access the resource is to pay you tuition. But if the resource is free to access for everyone, it doesn't matter whether your students use it also.

⁶⁷⁰ <http://opencontent.org/blog/archives/4818>

⁶⁷¹ <http://creativecommons.org/licenses/by/4.0/>

> For would-be authors of NC-licensed content, the only way to resolve the confusion arising from someone using your content in a way that you think is commercial but they think is non-commercial is to lawyer up and send a cease and desist letter.

This isn't unique to the NC condition. It applies to all CC-licensed content. In practice, I find that there has been more of a problem enforcing the *attribution* condition. But nobody has suggested removing it on these grounds.

> The primary thing you gain by choosing a license that includes the NC condition ...

The primary benefit is that you prevent people from turning it into a commercial product and selling it. There are numerous reasons why you may want to do this.

> Why would someone go to all the cost and effort involved in selling copies of your CC BY licensed material (e.g., paying for ads to drive traffic to the site where they're selling it) when every copy will include instructions on where people can get the same material for free instead?

Because this access is often theoretical. Should the original ever disappear (or in the case of OpenStax, should the URL ever change) there is no resource; the user must pay for the resource.

Saying things like "there would be very little incentive..." creates a nice hypothetical, but we have no way of knowing that there won't be an incentive. We've seen that large businesses can be created out of very marginal returns, so our "very little incentive" is someone else's business plan.

> The CC BY language gives you practical protection from newcomers' concern that some interloper is going to make a million dollars from their work (even if it does not offer protection against all theoretical possibilities).... This is why you don't see Pearson, McGraw, or other major publishers reselling copies of CC BY textbooks.

If we limit the example to textbooks, the statement is possibly true. However, publishers have made millions selling out-of-copyright works, such as the classics of literature. Walt Disney made a fortune by appropriating folklore and fairy stories and marketing them as Disney property.

> The only counterexample I can offer to this line of argument, and it's not a direct one, is the [CC BY simulations created by PhET](http://phet.colorado.edu/)⁶⁷². As I understand it, at least one major publisher includes PhET simulations in their offerings. The publisher doesn't sell the simulations as a product – I don't think they could sell the simulations this way for the reasons I've described above. But they do include the simulations as a "free extra" to make their textbooks or courseware more attractive than those offered by other publishers.

⁶⁷² <http://phet.colorado.edu/>

This sounds like exactly the sort of situation I would like to avoid.

And it's not nearly as rare as described here. Consider, for example, companies like ResearchGate, which have slurped up all the open access publications they can find, and then require that readers log in to read them, thus creating data they sell to advertisers and publishers.

> On the one hand, the faculty member you speak to may feel like this possibility represents a lost opportunity to make some money.

I don't actually think this is what motivates supporters of NC. Mostly, people don't want their work to become part of a commercial product that people would have to pay money to access.

> Personally, for the OER that I create, I want every learner in the world to use them – regardless of which major resource (commercial or open textbook) their faculty have decided to adopt. If publishers decide to throw my OER in as free extras with their textbooks or courseware, that just decreases the amount of search engine optimization and other work I have to do to make sure people know about the OER I've created. It's free advertising for my OER.

It's the existence of commercial content that makes SEO and advertising a requirement. This alone should be a reason to discourage CC-by. It shouldn't be necessary for us to have to advertise open access content. It's a requirement only because commercial publishers want to *make sure* readers cannot find the free content.

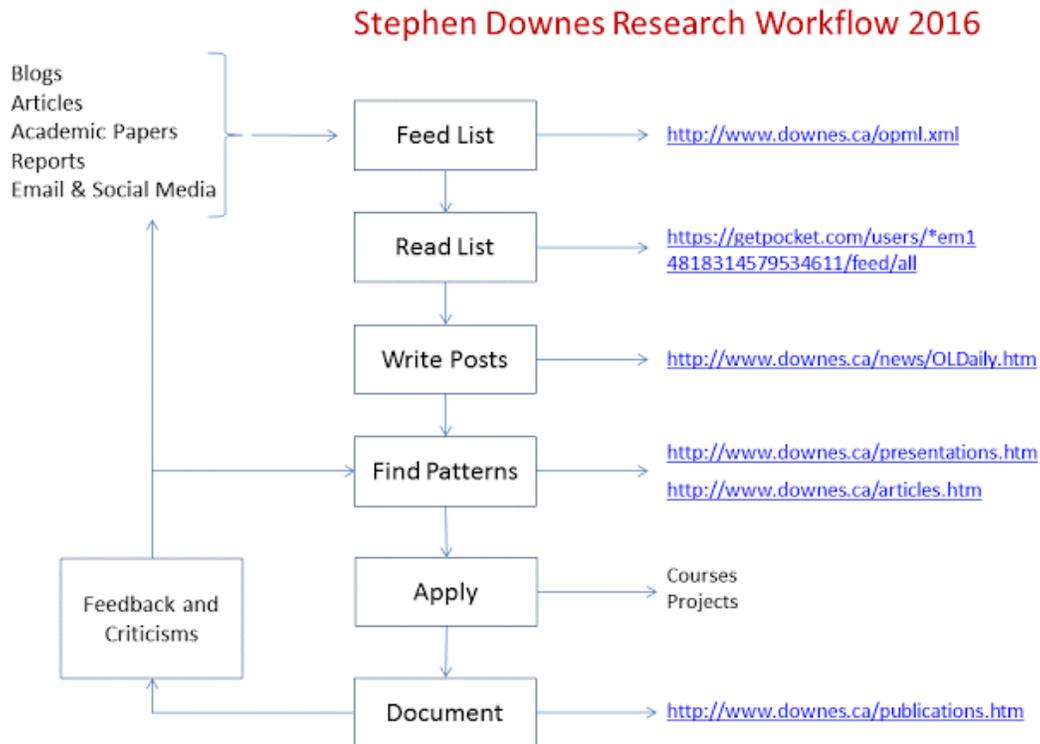
Most of us do not want to become entrepreneurs or publishers or whatever. We simply want to share the work we've created. It's the commercial publishing system that makes that hard.

As always, I argue that people should adopt whatever license best suits their interests. I continue to fail to understand why David Wiley doesn't respect that choice.

*Ottawa, Canada
December 18, 2017*

My Workflow

I was thinking about working openly recently and decided to document my workflow, such as it is. As you can see I need to devise a way to make my projects and courses more transparent.



There's also a [PowerPoint version](#)⁶⁷³ of the image with working links. No HTML version, sorry.

Ottawa, Canada

December 19, 2017

⁶⁷³ <http://www.downes.ca/files/workflow.pptx>

Detecting Fake News

After the spate of fake news in circulation over the last year or so numerous guides have been published to help you spot fake news. Unfortunately, few of them are effective.

The reason for this - which you can spot for yourself as you look at them - is that they tend to focus on whether or not the source is authoritative. But to spot fake news, you need to focus on whether the news is authoritative.

The reason for this - and again, you can verify this for yourself - is that the authorities lie. Whether they're an old school newspaper, or just an old school, these days they all have a vested interest. They want you to believe them.

So how do you cope? That's what this article is about.

First rule: Trust no one.

Start with this. Don't believe anything just because someone says so. It doesn't matter who they are. Don't even trust me. Read this article sceptically.

It's not that there's nobody to trust. The problem is, you don't know who they are, and you don't know how far to trust them. Trust is something that has to be earned.

You can't trust someone simply because they have a degree or a collar or a title. You can't trust them simply because they own a newspaper or a corporation.

It's not that they're all untrustworthy. Many people - maybe even most people - are upstanding citizens and will tell the truth most of the time. But some won't. And the problem is, you don't know which is which. Not at first.

Second rule: Look for the evidence.

Much of what you are presented can be discounted based on this one rule alone. If the author or the teller does not present you with a reason to believe, you shouldn't believe it.

What counts as a reason to believe? Quite a few things, happily. There isn't a simple list. Different things will carry different weight. Here are some examples:

- verification. This means you can see your yourself that something is the case. If I say the house burned down last night, you can verify this by going to the house and looking for yourself. In the first three paragraphs of this article you can see to examples - I'm inviting you to verify something for yourself.

- replication. A lot of things can't be directly verified, or can only be verified after it's too late. But they're the sort of things that can be tested, and the test comes out the same way. Science

works on this principle. If someone says they have produced cold fusion, they should be able to produce cold fusion again.

- confirmation. If something is true, then something else should be true. If it rains, the sidewalk gets wet. That's how you know rain is made of water. You can confirm this by looking out the window and predicting that the sidewalk will be wet. Successful predictions count as confirmation, and give you a reason to believe 'rain is made of water' is true.

- falsification. What makes confirmation work is that the predictions must be falsifiable. If the sidewalk bubbled and melted when it rained, then you would know it wasn't made of water. Acid, maybe. So something is confirmed only if it can be falsified. If there is no way a prediction could be wrong, then the prediction proves nothing.

These are all forms of direct evidence. The advantage is that they're solid. Do them right, and you have good reasons to believe. But the disadvantage is that they require personal involvement. You can't go to Syria to check things out for yourself. Prediction and falsification give you some reach, but they still depend on direct evidence at some point.

Plus, these four principles are hard to get right. There are numerous ways to get them wrong. Thus, you need to add another rule.

Third rule: Avoid error.

Avoiding error is partially a matter of knowledge and skill, and partially a matter of ordinary prudence and caution. There are numerous errors you can make - I list many of them in my Guide to the Logical Fallacies - but you don't have to be an expert to avoid common sense errors.

Here are some of the major sources of error:

- prediction. We make predictions using logic and mathematics. Logic and mathematics are skills that can be learned (and verified directly for accuracy). You can't fake this; you have to do the work. Deduction, induction, calculation, probability - get them right and you've eliminated a huge percentage of the errors other people make.

- precision. Being precise is a virtue. If you are predicting something, then measuring the result, you need to be sure you're measuring the same thing you are predicting. Vague terms (like 'knowledge', 'value', etc) are difficult to evaluate. Non-standard units of measurement ('serving', 'car length') cannot be measured. If there are sources, are the sources named?

- relevance. It's easy to become distracted from the subject at hand. It's important to focus on the message, not the messenger. It's important to focus on whether something is true or false, not why or why not you want it to be true.

- perspective. We are fooled by our senses. We think we see the whole truth when we only see part of it. We live within a world view that shapes our perceptions and affects our judgement.

Did we see a tiger in the bush, or just black and orange stripes? It's easy to jump to conclusions through bias and prejudice.

Take your time. Don't jump to conclusions; evaluate the evidence. Even if you are not an expert in reasoning or perspective, be aware that these are sources of error. Practice making your own inferences and predictions.

Fourth rule: Take names.

You are finally in a position where you can begin to trust others. After all, the proposition that someone is trustworthy is just another fact about the world you can learn for yourself.

Use the four mechanisms above to assess the trustworthiness of people:

- trust. How do they reach their beliefs? Do they carefully observe and weigh the evidence, or do they tend to believe rumours and innuendo? Are they swayed by certain people or do they make up their own mind?

- evidence. Do they provide you with reasons to believe? Do they describe what they've seen for themselves clearly? Have you caught them lying or misrepresenting the truth? Is it the sort of thing you could have seen, had you been there? Do they have a track record of making good predictions (that could have been wrong)?

- errors. Do they avoid errors? To the best of your ability, can you determine whether they reason correctly, whether they use language clearly and directly, whether they stay on topic and talk about ideas, not people? Can they separate their own interests from the facts, and keep perspective?

- trust. Do they themselves have a network of people they can trust? Are they trusted by other people you can trust?

Final rule: Diversify.

No matter how careful you are, you can still be misled. It happens all the time - people make honest mistakes, they overlook factors they should have considered, or something may be hidden from view.

Never depend on just one source - not even your own eyes. The first thing you should do is to ask someone else, "do you see this too?"

This is what good newspapers do. They get the same information from multiple sources, and don't publish it unless they have multiple sources. When the reporter says an interview said something to them, they have an editor call the person back and confirm that they actually did say this. At least - they used to do these things.

p.717

In a conflict, learn from both sides. That doesn't mean both sides are equally trustworthy - but without learning from both sides, you'd never be in a position to evaluate this. Get multiple points of view, if you can.

Remember - the truth isn't "in the middle". Don't treat all sides equally if they're not all trustworthy.

That's it! Yes, we could explore each of these subjects in more depth, and as someone serious about detecting fake news, you should. There are no shortcuts - you need to study and practice.

Casselman, Canada

December 29, 2016

Open Learning in the Future

Published as *Open Learning in the Future* in FutuOER November 2, 2016.

This morning Dan Colman updated his master list of free and open courses from top universities, a list that now includes 1200 courses and roughly 40,000 hours of audio and video instruction. (Colman, 2016) This is actually only a small percentage of the tens of thousands of learning resources available freely and openly on the internet.

To get a sense of the depth and breadth of free and open online learning resources, look at YouTube coverage of the Stirling Engine (also known as the external combustion engine). As of today, I count 154,000 results. (YouTube) These are not advertisements or spam – they are individual contributions ranging from ‘Jim Tangeman's wood fired Stirling engine powered tractor’ to ‘Homemade Stirling Watts Beam Engine, Hot Air Engine’ (“this is something I’ve been working on for five months,” says the author). (Knight, 2014)

The question we face is no longer *whether* we will live in a world of free and open learning resources, but rather, one of what that world will look like. We will produce these resources, what will they look like, how will we sustain their production, how will people find resources and how will they use them? None of these questions has a simple answer, and each offers several possibilities for a future of open learning.

Who Will Produce?

As suggested by the Dan Colman article, we might suspect that open learning resources will be produced by educational institutions. That’s part of the thinking behind the initial roll-out of MOOC companies like Coursera and Udacity, and part of the plan behind things like lecture capture software.

But educational institutions will find their traditional role challenged. Non-educational institutions are entering the learning resources market and offering courses and programs of their own, many of them free and open. Today, “The World Bank, PwC, and Fundação Lemann offer MOOCs on Coursera. Microsoft, the Association of Chartered Certified Accountants, and the Inter-American Development Bank all offer MOOCs on edX.” (Lequerica, 2016) These courses exist not to make money but to serve other business interests: to sell advertising, to promote a product, or to enhance recruitment.

Finally, individuals and communities are producing innumerable resources. This may be the largest area of growth in the future as the technology for creating compelling video and multimedia becomes increasingly affordable and usable. A person living in Ottawa who wants to

learn beekeeping, for example, can find resources from the Ontario Beekeepers' Association, the Toronto Beekeepers' Collective, and Gees Bees Honey Company. (YouTube, 2016)

What Will Resources Look Like?

The traditional approach suggests that open online learning will consist of courses. While courses may well persist (there are occasions where a linear, focused and deep study into a subject continues to be a good idea) they are occupying a smaller and smaller space in open online learning.

As the connectivist MOOCs started in 2008 demonstrated, even the structure of courses may change. As opposed to the traditional format of a series of lectures offered by a leading academic, contemporary online courses are clusters of short and focused learning resources, often videos, linked together with a web of narrative, interaction, activities and assessments. Where these elements are not provided by the course provider they are created by the course-taking community.

Indeed, a lot of open online courses resources will be non-digital. When we offered open online courses participants used Meetup to create local in-person groups. Although organized digitally, community-based groups meet in person. We are seeing a proliferation of such groups, whether or not affiliated with courses. A person living in Ottawa, for example, could find any number of free and local learning activities. (Meetup, 2016)

Online discussion groups, mailing lists, and other forms of community have continued to thrive and prosper. While many of these occupy sites like Facebook and Google Groups, many others have created their own web presence. Low-cost web hosting is widely available and free and open source software, such as Drupal and WordPress, makes this accessible to the wider community.

How Will They Be Sustained?

Proponents of free and open learning resources are constantly challenged to produce a 'business model' for MOOCs or some other technology, for example, by Alex Usher. (Usher, 2016) This may be needed for resources that cost thousands of dollars to create. "The problem is there's no revenue model here... 35 million users, with a 3% conversion rate, at \$50 per user, and you've got a grand total of \$52.5 million in total revenue. Over five years."

Such a scenario presumes that the costs of open online learning would (and should) be borne entirely by the learner. But as the scenarios above suggest, other agencies will have legitimate reasons to pay for open online learning, especially in the form of inexpensive resources (as opposed to expensive formal courses). Numerous examples already exist.

Future open learning resources and opportunities will be offered by government agencies to promote positive role models, to encourage compliance with legislation, to inform citizens of rights and obligations, and to support services such as voting and registration. Companies will offer training to their own employees and potential recruits, support products with free learning and promote literacy and other programs. Community groups will offer events, seminars, meetings and resources related to their areas of interest.

Formal learning will be less and less focused on resources – which will be available to everyone – and much more focused on *activities*. Tuition will pay for materials, environmental support and equipment, and professional assistance (often on an as-needed basis).

How Will People Find Resources?

In a world with an abundance of resources they won't be difficult to find *per se* but selecting the appropriate resource for the task may pose a considerable challenge. One of the primary learning skills will be the selection and evaluation of resources.

Learners today face a similar challenge selecting college and university programs. Of course financial constraints prevail – most people *can't* choose Harvard, for example – in traditional university choice. Otherwise, studies seem to show that *distance* (as opposed to say academic rank) plays the most important role. (Drewes & Michael, 2006)

As finding learning resources becomes more and more difficult on Google (partially because of the number of resources, and partially because of the proliferation of sponsored listings and search-engine optimization) a similar factor will prevail online. The 'distance' of a resource from a potential recipient can be considered a function of the relation between that person and one of their friends of friends who has used (and would recommend) the resource.

The purpose of connectivist open online courses is that it reduces that distance in a manageable way. The purpose of the course isn't to create a thread of instruction, but rather to help people interested in a topic discover and recommend resources to each other, creating a local and temporary network linking events, groups and communities, and videos and activities.

How Will Resources Be Used

Traditional education is centered around the amassing of knowledge in a particular discipline in a series of courses that cumulates in the awarding of a degree or certificate. Many of the structures and discussions of open online learning (for example, OERu) base based on this model; see, for example, the Taylor 'logic model'. (Taylor, 2007) Thus we may see people predict open credentials, open assessment and open course articulation (for transfer of credit) focused on *qualifications and competencies*.

It is likely that in the short term at least an economy of sorts based on these credentials will be developed and possibly backed by a cryptographical framework such as blockchain. But over time, I think, this will be overtaken by a mechanism of personal *reputation* that is backed by evidence of *achievements* instead of credentials, where by ‘achievements’ we mean artifacts and accomplishments that can be inspected directly rather than through the proxy of an educational institution.

To support their employment and other objectives, people will create open learning resources. These resources are direct evidence of their own learning. Often these resources will be produced cooperatively. An excellent example of such a model is *open source software*. We also people become leading figures in their own communities by providing help and assistance. A person’s *standing* in their professional community will be their educational credential.

The resources will be used, therefore, as much by the people who create them as by the people who follow in their footsteps. These resources will continue to be of use on an occasional and informal basis by browsers, but the major educational activity supported by an open educational resource may have taken place during its creation. What remains has a stigmergic effect, creating a path for others to follow.

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*Ottawa, Canada
September 29, 2016*

Is Technology Making Us Smarter? Yes!

This Column published as *Is Technology Making Us Smarter? Yes* in The Costco Connection Volume 30, Number 4 15 Jul 03, 2017.

To understand the ways technology is making us smarter in 2017, let's examine the ways we are told technology is making us less intelligent.

- One study says "Using digital platforms such as tablets and laptops for reading may make you more inclined to focus on concrete details rather than interpreting information more abstractly."⁶⁷⁴

This is because when we use digital technology to communicate with people around the world, we realize that few generalizations are actually true, and we're less inclined to leap to them.

- Another study says we tend to scan digital media rather than reading articles from beginning to end.⁶⁷⁵

This means we are reading more efficiently. Instead of simply consuming content, we are making judgements as we read. Because reading takes so much less effort, we can look at many things and focus in on the ones we want.

- Digital media encourages multitasking, which a UCLA study tells us makes it more difficult to learn and remember.⁶⁷⁶

Becoming better at multitasking makes us more able to adapt and thrive in a complex environment. Learning isn't simply about consuming content remembering it; it's developing the skill to keep one's eyes and ears open and to recognize and react instantly, even if we're doing something else.

⁶⁷⁴ Digital media may be changing how you think. Science Daily.

<https://www.sciencedaily.com/releases/2016/05/160508151944.htm>

⁶⁷⁵ How Little Do Users Read? Jakob Nielson. <https://www.nngroup.com/articles/how-little-do-users-read/>

⁶⁷⁶ Don't Talk to a Friend While Reading This. UCLA. <http://newsroom.ucla.edu/releases/Don-t-Talk-to-a-Friend-While-Reading-7212>

- Our use of technology is changing our brain so that we become less deep and contemplative when we use digital media, says another report.⁶⁷⁷

This is called ‘plasticity’ and is one of the key advantages humans have over animals, which must rely on instinct. Instead of simply learning by remembering, we learn to *learn* quickly and efficiently.

Yes, we think and learn differently when we use technology. But we become less set in our ways, more able to adapt to changing information, and more able to make judgements. These are all ways of being smarter, not less able.

*Ottawa, Canada
January 29, 2017*

⁶⁷⁷ The Internet May Be Changing Your Brain In Ways You’ve Never Imagined. Carolyn Gregoire, Huffington Post. http://www.huffingtonpost.com/entry/internet-changing-brain-nicholas-carr_us_5614037de4b0368a1a613e96

We Are Not Agreed

A few days ago University Ventures authored a piece ⁶⁷⁸in response to a post from the New America Foundation comparing ⁶⁷⁹Republicans who defend for-profit colleges to climate change deniers. The unattributed University Ventures article argues "this piece re-fights yesterday's war... the many challenges and opportunities facing higher education lend themselves to bipartisan consensus – perhaps more than any other area of public policy."

Bipartisanship is of course a U.S. phenomenon. But it is worth noting that there are many things U.S. lawmakers agree upon that are opposed in corners around the world. I find myself frequently occupying those corners, and today is no exception. So, setting aside the for-profit colleges debate for another day, I'd like to take the time to point to the points where I disagree with what is taken to be the emerging consensus.

The text in italics is their contention; what follows is my response.

1. Completion is the most powerful lever

The author makes the very reasonable point that "drop rates approaching 50% at many four-year institutions and 80% at many two-year colleges" represents a failure of traditional post-secondary institution, and responds that "there's no 'free college' silver bullet to the complex completion challenge."

But completion is not the powerful lever that drives everything else; it is the pointless anchor that weighs everything down. It is becoming increasingly untenable to stop everything in your life to complete four or eight years of studies, especially when the mechanisms for delivering that education are increasingly inefficient and expensive.

Indeed, completion would be irrelevant as a lever were it not for the mechanism of granting recognition only at the end of the four or eight year program. To be sure, students value those degrees and diplomas. They have no choice; there's no other way to earn recognition for their learning.

As recognition becomes more distributed, however, we will see other more fundamental levers emerge: the requirement that learning be relevant, that it help us solve problems, that it support networking and collaboration, and that respect our personal interests and abilities.

⁶⁷⁸ <http://universityventures.com/publications.php?title=inaugural-edition>

⁶⁷⁹ <https://www.newamerica.org/education-policy/edcentral/gop/>

2. Bachelor's degree "addiction" is hurting students

The author argues that "it takes a Candide-like idealist to continue to insist that a bachelor's degree is the optimal or only path to establishing the core cognitive and non-cognitive executive function skills that lead to successful white collar careers."

The disagreement here is not whether we're questioning the relevance of the Bachelor's degree. It is actually rather more subtle than that.

First, this second point can be seen as code for "we need to restrict the number of people admitted into Bachelor's programs," with the idea that alternative schools - trade schools, business skills schools, etc. - would emerge to pick up the slack. We see this in the allusion to "successful white collar careers", which already assumes the separation between advanced education and trades. The idea here is that white collar workers are the new tradespeople. But returning universities to their original position of offering education to the elite is not what I would consider a progressive step forward.

Second, this second point continues to carry the presumption that the point of education is to lead you step by step toward a future career. We see this in phrasing like "optimal or only path". The presumption that education amounts to preparation should be challenged. This may be one function of education, but it is not the only one, nor even the most important one. There's no end to the stories about students being 'prepared' for a future that no longer exists. Education should be addressed toward capability, not preparation.

3. Colleges need to do much more to help graduates get great jobs.

The author's point here is that colleges and universities "must ensure students are equipped with the technical skills employers increasingly require for entry-level positions." The idea of colleges and universities being preparation for the employment, whether for one's first job or eventual career, is anathema to many. From my perspective it's not a matter of faith but of common sense: chasing after "what employers want" is a mugs' game you can never win, and is increasingly irrelevant in a world where you make your own employment.

First of all, if employers want certain outcomes from our education system, then why don't they pay for that themselves, rather than requiring governments and students to pay for it?

Second, if employers want certain outcomes from the system, why don't they hire on that basis, rather than on (among other things) college pedigree, connections and friends, biases and stereotypes, proximity, and willingness to work for lower wages?

Third, employers lobby for certain outcomes from the education system - computing science grads, nursing students, engineers, etc. - in order to drive down labour costs. Why should any of us support a mechanism that actually reduces our negotiating position in the marketplace?

What about that [New America survey](#) ⁶⁸⁰ showing that the reason students enroll is "to improve employment opportunities (91%); to make more money (90%); and to get a good job (89%)"? When you read the survey, you find it is "an online survey of 1,011 U.S. residents ages 16-40, who were largely prospective college students." So this reflects the *sales pitch*, but does it reflect the reality?

Colleges and universities - indeed, all of education - should help students become *self-sufficient*. That's what the elite programs do. That's what they should all do.

4. Employers bear much of the blame

We can certainly agree with the author that "Opaque Applicant Tracking Systems and imprecise job descriptions have turned getting in front of a human hiring manager into a 'rigged' game. And "campus-based recruitment at a select number of schools" merely reinforces this perception. Employers (and banks, and venture capitalists) aren't looking for qualifications in new employees; they know that the right person can always adapt to the needs of the position, especially entry-level positions. They are looking for the right pedigree.

That's why the proposed 'agreed upon' solution won't work, and indeed distracts from the core issues. Here's what the author suggests: "utilizing new People Analytics technologies to identify competencies that are predictive of success, incorporating these skills into job descriptions, and proactively searching among passive job seekers and current students will become a competitive advantage for farsighted employers." Nonsense.

If it accomplishes anything at all, identifying competencies will fit only short-term positions for specific tasks. As a mechanism for long term employment and career-readiness, competencies will prove to be an unmitigated failure. Employers will care about a few very general core competencies (can they speak and write reasonably well (and without an accent), do they know the jargon of the field, can they work with other people (and especially our team), do they dress well and bathe themselves, have they done this kind of thing before, are they connected?).

Should it be this way? Of course not. I too would like to see "a shift from degree- and pedigree-based hiring to competency-based hiring... while also increasing workforce diversity." But changing the way we educate people won't accomplish this result. Much broader social changes are needed, not just in the U.S. (where they are engaged in a political struggle over this point) but also around the world.

5. Accountability shouldn't start and end with for-profit colleges

⁶⁸⁰ <https://www.newamerica.org/education-policy/edcentral/collegedecisions/>

The author argues that "if we can agree on desired and measurable outcomes... while for-profit schools may need to be held to a higher standard given the potential for abuse, there's zero logic in letting traditional colleges off the hook entirely." This is based on the dubious premise that traditional colleges ever were "off the hook", which is demonstrably false. In the U.S., there are numerous federal, regional and occupational [accreditation bodies](#).⁶⁸¹ In Canada, colleges and universities are accredited by provincial governments. Other countries have similar requirements.

What the author's argument glosses over is that the existing set of regulatory bodies *hasn't been nearly enough* to accommodate corruption in the private sector. The profit motive in education (as in health, as in justice, as in government...) creates incentive for dishonesty that doesn't exist in an environment where dishonesty doesn't provide financial rewards.

Nor is accountability itself any guarantee of appropriate behaviour. The U.S. is one of the most regulated economies in the world, yet conflicts-of-interest converts much of that regulation into tools to protect existing markets and to cater to specific lobbies and entrenched interests. I just referenced an article the other day showing how pizza has been [classified as a vegetable](#)⁶⁸² in U.S. school lunches.

Education is better viewed as a profession with core ethics - akin to medicine, law, accounting, ect. - than an industry depending on legislation and accountability to constrain fraudulent behaviour. That means that the *core objective* of education has to be something *other* than the pursuit of profit, otherwise the only ethic is (as it is in the financial service industry) the bottom line.

6. Outcomes should be about "distance traveled"

This is the author's "pizza is a vegetable" moment. "When we measure outcomes, we need to ensure we're not focusing on metrics that correlate entirely with inputs, but rather on 'value added' by the institution to students."

On the surface the intuition is sound: "providing extra points to institutions with a demonstrated track record of enrolling low SES students and producing strong education and employment results."

On the one hand, this simply replaces one form of institutional cheating with another one. Instead of denying admission to low SES students, the focus turns to 'force marching' them along predefined paths (think: 'special education for poor people'). And because the only measure is

⁶⁸¹ <https://ope.ed.gov/accreditation/agencies.aspx>

⁶⁸² <http://highline.huffingtonpost.com/articles/en/school-lunch/>

'distance traveled', it remains acceptable to produce graduates who are unqualified in terms of competencies and skills, and in addition bereft of self-management or self-sufficiency skills.

On the other hand, the representation of education as a 'path' is itself fundamentally misguided. I've talked about the [weakness of the path metaphor](#)⁶⁸³ in the past. And I've talked about the key requirement that educators prepare people not to be followers, but to be explorers.

7. *Technology is key to improving learning*

The gist of the author's argument here is that technology can make the delivery of instruction more efficient. There is a nod to the idea of better outcomes, but the emphasis is on more productive delivery of existing outcomes (and of reducing or limiting educational faculty salaries).

We see this in the reference to [the Baumol effect](#),⁶⁸⁴ "a rise of salaries in jobs that have experienced no increase of labor productivity," which is part of the jargon of the productivity movement. As Wikipedia (correctly) explains it, "Baumol's cost disease is often used to describe consequences of the lack of growth in productivity in the quaternary sector of the economy and public services, such as public hospitals and state colleges. Since many public administration activities are heavily labor-intensive, there is little growth in productivity over time because productivity gains come essentially from a better capital technology."

So the point that is 'agreed upon' here is that, in education, human labour can (finally!) be replaced with technology to improve productivity and achieve outcomes more efficiently (where, as we've seen above, outcomes will be measured in 'distance traveled' toward 'competencies' which result in 'employment outcomes').

This may be how education is viewed from the outside, from a corporate, financial and perhaps political perspective, but few people actually employed in education view it this way. Oh sure, we'd like to see our graduates get jobs and succeed economically. But we like to see this as the result of the *student's* efforts, not as something we merely provided for them. We see it as the capability, growth and self-sufficiency we've provided, rather than as the terminus of our own efforts in the field.

So technology plays a very different role *in* education than it plays for people talking *about* education. Technology increases the capacities *of educators* and helps them focus on the hands-on tasks (which they're never really had time for before) while automating the things that can be automated. Technology held address many of the *needless expenses* associated

⁶⁸³ <http://www.downes.ca/presentation/384>

⁶⁸⁴ https://en.wikipedia.org/wiki/Baumol's_cost_disease

with education - like content and content delivery, records management, unwanted and unneeded courses, etc) - and to focus on the real and present needs of students.

The objective here isn't 'efficiency', though it's easy to see why outsiders cast in in this light. It's *precision* - being able to target our work where it will do the most good for the greatest number of people. Precision isn't simply a matter of hitting a target more often than not (that's efficiency). It's hitting the right target, at the right time, in the right way.

8. Assessments are needed to save the liberal arts

The author's argument here is that students (especially poorer students) have been increasingly turning to "pre-professional degrees" like business, healthcare, education, and technology while turning away from the liberal arts, and that unless schools can actually document the outcomes of liberal arts programs, they "will be increasingly a plaything for rich kids (who'll use connections to get good first jobs, so it doesn't matter what they study)."

My own education qualified as liberal arts. I majored in philosophy but took strong concentrations in the sciences, history and geography, and religious studies. As I've often said, there was a sign on the wall in the University of Calgary Philosophy Department warning student not to expect employment as a consequence of a philosophy degree. Despite taking out the maximum in students loans (totaling \$25K in 1980s dollars) I didn't care.

Why not? The 1980s were recession years in Canada, and having spent time in industry *before* my university education I could see first-hand the fallacy of believing that a specific university program would get me a job. It didn't really matter *which* degree I had; they were looking only for the persistence and tenacity (and wealth and upbringing) that having *any* four-year degree demonstrated.

And also, I lived in Canada, and we don't starve in the streets just because we're unemployed. I knew that, and I knew that no matter what happened (as I often said at the time) "they can't take my education away from me". Not that they didn't try - the Universities withheld transcripts and collection agencies destroyed my credit. But they couldn't take the knowledge back out of my head - all they did is to create a healthy scepticism and distrust of institutions.

Societies that truly want to 'save the liberal arts' will derisk the pursuit of them. It's not a question of documenting outcomes - the benefits of studying grammar, logic, communications, mathematics, the arts and astronomy are actually pretty self-evident. No really successful person has succeeded without them (even Steve Jobs talks about how important the study of

calligraphy 685 was to him). When students take pre-professional degrees, they are saying, in effect, "maybe later, it's too risky now".

9. Follow the money

The author writes, "colleges and universities get paid no matter what." As with some of their previous premises, this is demonstrably false. Colleges close all the time - in the U.S. the [10 year average](#) ⁶⁸⁶ is five a year. Look at [the struggles](#) ⁶⁸⁷ faced by the University of Phoenix over the last year or so. Look at the decades of [declining state funding](#) ⁶⁸⁸ for institutions in the U.S. The story is told in other institutions in other countries. It is simply false that "colleges and universities get paid no matter what".

The author uses this premise to argue that 'we are agreed' that "the federal government has two choices: it can condition funding on outcomes (à la Gainful Employment) or require schools to put 'skin in the game'" in the form of "risk capital" for each and every student. Forcing institutions to bet on students' future financial prospects would certainly change institutional behaviour. But not for the better. It would convert 'education' into 'venture capitalism'.

I won't get into the problems with this approach in detail. It suffices for the purposes of this post to point out that there is scarcely unanimity behind the proposition that education is fundamentally an economic activity that should be financed the way we finance business and industry. But this sort of perspective should not be surprising coming from 'university ventures'. After all, there's money to be made in 'student IPOs'.

10. Colleges are worth saving (especially the one you attended!)

The author's point is exactly the opposite of the bullet point: "we don't have enough resources to save every college (or, for that matter, to discharge every student loan)." The point is essentially that not every college can be saved and not every student can be funded. We should "avoid the myopia" that sees our own college as something that "represents the apex of civilization."

⁶⁸⁵ <https://www.washingtonpost.com/news/arts-and-entertainment/wp/2016/03/08/the-trappist-monk-whose-calligraphy-inspired-steve-jobs-and-influenced-apples-designs/>

⁶⁸⁶ <https://www.insidehighered.com/news/2015/09/28/moodys-predicts-college-closures-triple-2017>

⁶⁸⁷ <https://www.insidehighered.com/news/2015/09/28/moodys-predicts-college-closures-triple-2017>

⁶⁸⁸ <http://www.chronicle.com/interactives/statesupport>

It's true. Colleges rise, colleges fall. Civilizations rise, civilizations fall. Even [Plato's Academy](#)⁶⁸⁹ shut down after a successful 300 year run (or 800 year run, depending on who you talk to).

But there's a difference between observing that colleges and civilizations fail and arguing that we should just stop supporting them. What we should be doing is to *preserve the good* that these institutions provide society rather than giving up on the enterprise wholesale. A company can be happy to sell its legacy to the highest bidder. A society should not. Yes, there are "natural limits" to almost everything, but this does not constitute an argument for being the agent that applies them.

It's not a question of whether or not colleges and universities are "worth saving". To view the question in such terms is to treat them merely as economic entities and assessing them against their financial value. But they are just vessels.

What we have, in societies around the world, is a millennia-old legacy of educational institutions as stewards and purveyors of our collective wisdom *not* as an engine of employment or economic development, but as *the reason employment and economic development exist*.

In a sense, the role played by the educational system in society is the same as the role played by an education in an individual. It may result in income and employment, but that is not the *purpose* behind it. It is to help us not only adapt to the winds of chance and fortune but to rise above them, to create our own place in the world as free and fully realized beings, to *flourish* in every sense of the word.

That's not something a venture capitalist will invest in. But it's something each one of us lives for, each and every day.

Ottawa, Canada

February 15, 2017

⁶⁸⁹ https://en.wikipedia.org/wiki/Platonic_Academy

How We Know

In my view, knowledge is a subjective feel, but there's a nice story behind it.

The subjective feel appears circular: I say that I know when I can't not know.

The story lies in the cause of this subjective feel: to know is to recognize.

Recognition is involuntary, hence the modality of 'can't not know'. It is also non-grounded. The subjective feel is the knowledge.

It's like recognizing a person. Your mother walks through the train station and you pick her out of the crowd. This recognition is not based on any particular rule or principle, not based on any essential features, not based on any inferential process.

Yes, you could be mistaken in the train station - an alien disguised as your mother may have appeared instead. But your knowledge is not at fault. You know what your mother looks like; that's where your certainty lies.

Recognition is a property of neural networks, and this is what explains why you recognize, why it's involuntary, and why it's not based on any rule or principle.

Your previous experiences seeing your mother have over time resulted in the growth of an associated pattern of connectivity in your neural network (ie., in your brain, ie., in you).

When a person with the appearance of your mother is presented to you this pattern is activated. It is automatic and involuntary. This pattern in turn activates associated patterns. Hence: mother!

The pattern is subsymbolic; the brain is not a physical symbol system. Hence, no rules or principles, nor either models or representations.

The neural network part of the story, note, is an **explanation** of how we know, and not the justification for it or evidence for that knowledge.

Ottawa, Canada

April 22, 2017

On Rights and Religious Liberty

Without commenting on the particular events in U.S. politics that give rise to these issues, I want to consider the argument that it is reasonable to allow religiously-based schools to discriminate.

Here is the argument advanced in a column from Michael J. Petrilli⁶⁹⁰, and it's a good argument:

Just as we wouldn't expect a Montessori school to hire teachers who aren't trained in, or committed to, the Montessori method, we wouldn't expect a Christian school to hire teachers who are not committed to the Christian faith. The same holds true for Jewish schools, Muslim schools, and those of other faiths.

This is a premise that can be accepted. I'm not saying that I would endorse it personally, but the premise is certainly defensible, and I can imagine a reasonable person holding this view.

As I've documented before⁶⁹¹, there was a case in my own history when I was asked to please not return to Vacation Bible School because it was pretty clear I didn't have faith. I understood that request, and we amicably parted ways.

So why wouldn't this work for the school system? Why, in particular, wouldn't it work in a school voucher system, as suggested in this article? Petrilli suggests this line of reasoning:

There is great value to all Americans in preserving and promoting a pluralistic school system that allows schools to come in all shapes, sizes, and moral codes, and that empowers families to find schools that match their own values and educational priorities.

I've written about this as well.⁶⁹² Diversity is a strength. School boards should enable students with different wants and needs to attend different types of schools. I am comfortable with schooling that is based in religion. It's not for me, of course, but neither is hockey school.

So, abstracting from the hot-button issue of religion in schools, what can we make of the argument in its more general form to the effect that different types of schools can and should focus on different types of needs and methods, and that this necessarily means excluding some teachers and some students from them?

⁶⁹⁰ <http://educationnext.org/school-vouchers-lgbtq-rights-religious-liberty/>

⁶⁹¹ <http://halfanhour.blogspot.ca/2006/10/that-group-feeling.html>

⁶⁹² <http://www.downes.ca/post/44259>

This is on the face of it pretty reasonable. You wouldn't enroll a non-dancer into dance school, and yet we have schools for young dancers in Canada. It would be absurd to close them.

So where does the Petrilli argument break down? It's in the difference between the public system and a system funded by vouchers.

In a voucher system, where schooling is offered by private providers, when a person (whether non-religious, or gay or lesbian, or whatever) is excluded, then the education of that person becomes someone else's problem.

It's not simply that the voucher school provides specialized learning, it's that it takes no responsibility for those outside the special group of students it serves (and teachers it hires).

When a publicly funded school system, by contrast, offers specialized schooling - be it sports-focused, religious-focused or Montessori-focused - it automatically assumes the responsibility to offer an education to those students not thusly specialized.

Education is a social responsibility.

That's why people without children (like me!) pay taxes to support education. We pay not just to support our own children, but to support all children in our society. The need for this is clear: if the only people who paid for education were people who had children in school, then few people could pay for education.

Too often the proponents of voucher systems turn their back on that responsibility. What do we do about a person who has a voucher but no school? How have we addressed this person's need? A proponent of a voucher school for one type of person has by that fact a responsibility to provide a school for the other type of person.

And this brings us back to discrimination.

It is reasonable to support a school based on certain values and principles. But it is not reasonable to deny the same degree of support for people without those values and principles. Not just equivalent services: but equivalent community, and sociality, and acceptance.

You don't get to exclude people from society. You don't get to exclude those people who are not like you or your children from all the comforts and benefits of society. Especially children: excluding children is a cruel form of abuse.

The more you wish to exclude a certain sort of person from a school, the more you have a responsibility to welcome them in your home.

Casselman, Canada

June 6, 2017

Open Learning, Open Networks

Publication forthcoming in Distance Education in China.

Abstract

Open online learning entered the mainstream with the growth and popularity of MOOCs, but while interest in open online courses has never been greater MOOCs represent only the first step in a broader open learning infrastructure. Adapted from a talk given March 9, 2017, at the State University of New York in Syracuse, this essay describes several key innovations shaping the future of open learning: distributed social networks, cloud infrastructures and virtualization, immersive reality, and personal learning environments. It outlines the challenges this evolving model will pose to learning providers and educational institutions and recommend policies and processes to meet them.

Keywords

MOOC, Personal Learning, Social Networks, Cloud Infrastructure, Virtual Reality, Artificial Intelligence

Preliminaries: Openness



Downtown Syracuse. Photo: Stephen Downes

In the centre of the city of Syracuse, New York, there is a scene that represents openness for me, musical instruments that anybody can play. You've got the mallets there. I can just imagine, when it's warmer, people coming to the center of the city just jamming on those things and making all kinds of noise. I would love to see it.

I have three examples of openness from this talk:

First, from an earlier presentation that I saw, everything was up on Google Docs, and anyone could edit it. I decided to copy that; it's at <http://bit.ly/2n3bptm>. I have the different slides and all the links, etc., from this talk on this page. It's open for any of you to edit. Please do. Enjoy. Add links, add commentary, whatever you want.

Second, this is the presentation page: <http://www.downes.ca/presentation/468>. This is where you can get your slides and, later on, audio and video. This will be up there as long as I have my website.

Third, I know there's a Twitter chat. I like to give alternatives to people who do not like to sign up to social media, because I know you're out there, and I feel for you. I don't use Facebook anymore and I sometimes feel like an outcast now, so I get it. This is the live chat on my website, http://downes.ca/cji-bin/cchat.cji?chat_thread=753. If you use the #cotesummit hashtag, your Tweet will also show up on this page. From time to time, I will go back to this page and randomly look at a Tweet, because I can.

My Current Work

I'm going to begin by pointing out probably the obvious. We're living in a time of challenges, aren't we? We've got the usual four -- famine, war, pestilence, and, of course, death -- and we've got a lot more going on besides. We've got climate change; here I refer to the NASA climate change, which as of this writing is still there,⁶⁹³ though I thought about using the Wayback Machine archive reference, just in case it's deleted by the new U.S. government.

We've got the problem of "fake news" and "fake, fake news," which isn't real news.⁶⁹⁴ Double negative does not apply online. We have the problems of poverty, inequality, inequity, injustice,⁶⁹⁵ and social media itself.⁶⁹⁶ These are challenges that we're all facing today. We face

⁶⁹³ NASA. 2017. Climate Change Website. <https://climate.nasa.gov/>.

⁶⁹⁴ 2017. The Shattered Mirror. <https://shatteredmirror.ca/>

⁶⁹⁵ OECD. <http://www.oecd.org/social/inequality-and-poverty.htm>

⁶⁹⁶ NPR. 2016. Did Social Media Ruin the Election? <http://www.npr.org/2016/11/08/500686320/did-social-media-ruin-election-2016>

not exactly the same, but similar challenges in Canada. We face them in Europe. We face them in Asia and Australia.

It's a difficult time. That's life these days, and we figure we understand it. We just saw a presentation, a good presentation, which had the theme, "OK, we've finally figured this out. Here's what you do. Here are your 10 steps. Here are your 20 ideas," and everything's changing again. That's what's going to happen and that's a big part of my message for this talk.

I've been reviewing and making recommendations for the Canada School of Public Service.⁶⁹⁷ We have 250,000 federal civil service employees in Canada. The School of Public Service manages all of their training and performance support. I've been working with them, getting into the details of their system. They use a big Saba learning management system. They've got a Skillsoft system, and SAP.

⁶⁹⁷ Canada School of Public Service. <http://www.csps-efpc.gc.ca/index-eng.aspx>

In the last few years, they've adopted social and informal learning. They've hooked it all together with a Drupal content management system, with Moodle, with Kaltura. They're beginning to understand the new technology, and I was studying this, evaluating it, and working on a development plan for the next three years, the next six years.

I've also been studying the Advanced Distributed Learning (ADL) initiative's Competencies and Skills Systems (CASS) program.⁶⁹⁸ I'm not directly related to the ADL project, but for the National Research Council, I'm keeping tabs on that. I'm making sure I know what's going on. I've been following the meetings of the IEEE Learning Technologies subcommittee.⁶⁹⁹ There is a lot happening behind the scenes there, which we address below.

I am still working on Massive Open Online Courses (MOOC).⁷⁰⁰ People say MOOCs are dead. In, what was it, 2015, more people took a MOOC than in all previous years combined. In 2016, they took double the number of MOOCs as 2015.⁷⁰¹ MOOCs are not dead. MOOCs are here and, believe it or not, MOOCs are here to stay. But as with everything else, the environment is continually changing.

For example, both Udacity and Coursera are changing business models and finding revenue streams. Open edX, which is gone, though edX itself remains. FutureLearn from Britain is charging money for certificates and credentials. And I've been carrying on with my little, free MOOCs, the way I've always been doing it for nine years. I've been working on a thing we just call the MOOC Aggregation Engine. It's going to be hosted at mooc.ca.⁷⁰² I've been running that site for a little while, but I'm in the middle of making changes to that.

I continue to work on personal learning environments. Even though I'm no longer leading that program, I think personal learning environments are important. We talk about them below. In particular I am working on something called gRSShopper in a Box. Grasshopper⁷⁰³ is the system that I've built over the years to manage my website. It's the system that I built to create the world's first MOOC and I still use it for many things. It's not commercial software; it's my online

⁶⁹⁸ Advanced Distributed Learning (ADL). 2017. Competencies and Skills Systems (CASS). <https://www.adlnet.gov/introducing-the-next-big-thing-cass/>

⁶⁹⁹ IEEE. 2017. Learning Technologies Subcommittee.

⁷⁰⁰ Stephen Downes. 2017. Connectivism and Learning. Federica.eu. http://www.federica.eu/c/connectivism_and_learning <http://candl.mooc.ca>

⁷⁰¹ Reference to Class Central

⁷⁰² MOOC Aggregation Engine – <http://www.mooc.ca>

⁷⁰³ Stephen Downes. 2017. gRSShopper. <http://grasshopper.downes.ca>

research lab. But I've been setting it up so that now you can get it in a box, and you just install a virtual server, run a single command, and you've got Grasshopper in a Box..

And finally, I continue to work on Connectivism, the idea that 'to know' is to be or to instantiate a network of connections in the brain, in society, or wherever you can find a network. To learn is to create, to grow, to weaken, to traverse those connections. There's a lot of importance behind that understanding of learning. With deep learning and artificial intelligence today, people are beginning to see, in a way they didn't see even 10 years ago, the validity of this approach to learning, the validity of this approach to knowledge.

The artificial intelligence software that everybody's talking about is using the same kind of neural net technology that George Siemens and I have been talking about all along. We're not saying we invented AI. That was done back in the 1980s, but the approach that we copied from the 1980s is the approach that artificial intelligence researchers are using to this day.

New Developments

MOOCs

Let me talk for a few minutes about MOOCs (not long, because people have heard the story). The "true history of the MOOC"⁷⁰⁴ (I sometimes have to talk about it that way) is that George Siemens and I decided that we would mount an online course to talk about connectivism. We had released the theory in 2005, three years before the first MOOC, George first with his introductory paper "Connectivism" and my work before and since on learning networks, which is what I preferred to call it. Connectivism, as a term, stuck. Learning networks did not, because I'm terrible with titles.

Our experience was nobody knew what we were talking about and couldn't get the concept. What we decided to do is to host a course, which we called "Connectivism and Connective Knowledge."⁷⁰⁵ We would make this course a connectivist course. In other words, we would design this course as a learning network, and that's what we did.

'Connectivism and connective knowledge' is a niche subject, and by that I mean it was not widely known or popular. We expected no more than 25 people. In fact, 25 people actually signed up for the certificate version of the course. But George and I advocate open learning, and the course was structured as an open network, so we opened it up to everyone and were surprised with 2,200 people. At the time that was a big deal. Now with 2,200 people your course is considered a failure. But at the time, that was a big deal. The reason why it was worked, the

⁷⁰⁴ Stephen Downes. 2010. The MOOC Guide. Google Sites. <https://sites.google.com/site/themoocguide/home>

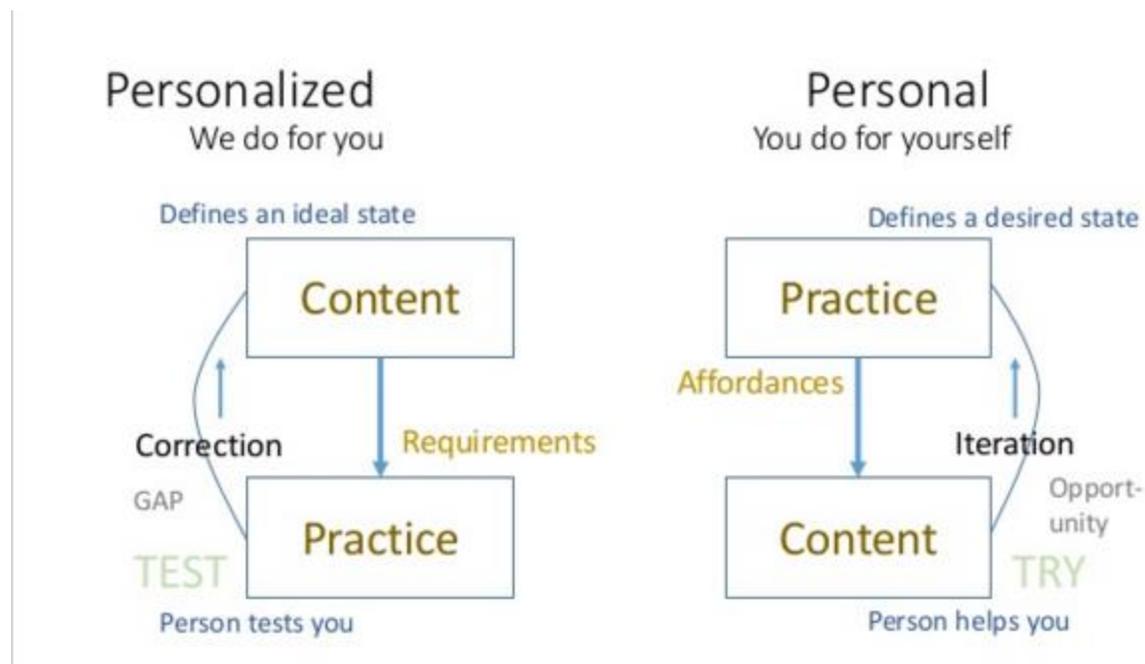
⁷⁰⁵ CCK08

reason why we didn't get swamped marking papers, moderating discussions, etc., is that we designed it as a network.

That was the first MOOC. Since then other people have developed what have come to be called the xMOOCs, for example, on Udacity and Coursera.⁷⁰⁶ From my perspective, they represent a step back. We heard a little bit in the previous talk about, "Oh, yeah. They had the things where you could vote up the comments and all of that." That's a technique that's been used over the years. Stack Overflow uses it. Reddit use it.

One commenter on Twitter said at the time, quite accurately, voting up doesn't always work. If you look at Reddit and sites like 4chan, etc., you find that simply counting votes doesn't work. Network epistemology is different from mass epistemology. Network construction is different from voting, and network knowledge is different from accumulated knowledge. That's an important thing to understand. They built mass. We built connection. They built a big pile of knowledge, videos, and all of that. We built an interconnected web of ideas, concepts, people, technologies, etc., and that's what made the difference.

Personal Learning



⁷⁰⁶ Tony Bates. 2014. Comparing xMOOCs and cMOOCs: Theory and Practice.

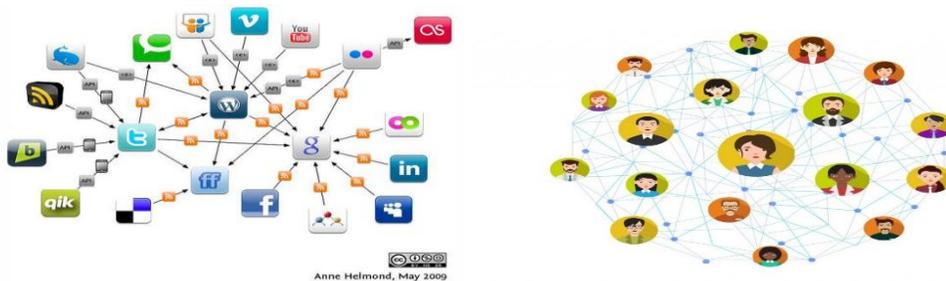
<http://www.tonybates.ca/2014/10/13/comparing-xmoocs-and-cmoocs-philosophy-and-practice/>

Personal and Personalized Learning. Graphic by Stephen Downes.

That's what leads me, ultimately, to distinguishing between what they call "personalized learning" and what I call "personal learning."⁷⁰⁷ I've got the diagram there. The main idea is personalized learning is that pre-packaged learning is altered to suit the individual. It's 'personalized' but you are managing doing the learning for the student. It's like (in English) 'chocolatizing' the flavor for them – it's made to appear like chocolate, but it's not real chocolate

Personal learning, by contrast, is where students manage learning themselves. It's like your own personal professional development; nobody is managing for you, you're doing it for yourself. For example, you're choosing to come to this conference, you choose to attend this talk, and you can leave the room if you want. You choose what subjects are important. You choose what materials you're going to read. That's the difference. Connectivism is a theory that supports personal learning as opposed to personalized learning. I think that's a really important distinction, and this is going to underlie many of the changes and many of the challenges that I'm talking about today.

Distributed Social Networks



Images: left, Anne Helmond, 2009⁷⁰⁸; right, Savoir-Faire Linux, 2016.⁷⁰⁹

Let me address distributed social networks. When we discuss learning as social networks people think of Twitter, Facebook, 4chan, Yelp, LinkedIn, Yammer, and the other services in the diagram on the left, above. But those social networks are centralized social networks. They're centralized social networks because users sign in on a central go to their site and you might have a presence on that site. They have a Facebook account or Twitter account or whatever but the company owns the site, not the user. The companies own the news, they own the newsfeed. They

⁷⁰⁷ Stephen Downes. 2016/ Personal and Personalized Learning. <http://www.downes.ca/presentation/380>

⁷⁰⁸ Anne Hellmond. 2009. Social media dataflows. Flickr.
<https://www.flickr.com/photos/silvertje/3582297307/in/photostream/>

⁷⁰⁹ Savoir-Fair Linux. 2016. Blockchain, a revolutionary tool for Ring. Distributed Network.
<https://blog.savoirfairelinux.com/en-ca/s/distributed-network/>

present advertising to you. They tell you whether you're allowed to be on the network or not, etc. When Twitter goes down or fails, the entire Twitter network goes down.

Distributed social networks, by contrast, are networks that you own. That's why I created an *alternative* chat for this presentation, so you don't have to use Twitter. You use your own computer and communicate directly with me, as in the image to the right, above. I'm using my site to host the back channel not Twitter. Yeah, sure I tap into Twitter because it's there, I'm using my site. That's what these distributed social networks are about.

Distributed social networks have had a difficult history. I'll be very blunt and very honest about that. They are not in widespread use yet. I admit it's a possibility that they might never come to fruition. I think they will, I think they should, but the idea of the personal server isn't an idea whose time is here yet, but I think it's coming.

Companies have tried.

- *Opera Unite*, for example, eight years ago,⁷¹⁰ was a web browser with a server in it. They discontinued it three years later because nobody was using it. The Mozilla operating system also had a server.⁷¹¹ It was a web-based operating system for mobile, but it had a server built into it as well so that users weren't just consuming, they could also share content.

- *Diaspora*⁷¹² was a crowd funded project, which was released and was widely criticized because it was insecure, it was buggy. Diaspora exists but now we begin to look at the future.

- *Solid* (which is a terrible name if you're searching for it) short for "social linked data."⁷¹³ Tim Berners-Lee is working on it with a bunch of people at MIT on this and basically, it's a distributed social network where you each have your own presence.

- *Keybase*⁷¹⁴ is a mechanism whereby if I have Keybase on my machine, I can do file sharing and direct linking with other people, no intermediary required.

- *The interplanetary file system* (I love the name) is the idea that instead of depending on the server to give us web pages, everybody's server also becomes a host for web pages as well.⁷¹⁵ It's

⁷¹⁰ 2009. Mashable. Opera Unite - <http://mashable.com/2009/06/15/opera-unite/>

⁷¹¹ 2017. Mozilla OS - <https://www.npmjs.com/package/fxos-web-server>

⁷¹² 2017. Diaspora - <https://www.joindiaspora.com/>

⁷¹³ Tim Berners-Lee. 2017. Solid - social linked data. <https://solid.mit.edu/>

⁷¹⁴ Keybase - <https://keybase.io/>

⁷¹⁵ InterPlanetary File System (IPFS) - <https://ipfs.io/>

modeled after BitTorrent. If I access the SUNY web page, I bring the SUNY web page to my computer. Now, because I've got it on my computer, I make it available to other people, so the resources don't disappear from the web.

People say that anything you do on the web is permanent. But this is not true. So much of the stuff that I've done online is gone. Some of it is on the Wayback Machine, but the Wayback Machine itself only started in 1997, so some of the early stuff is gone. For example, the first online ad-supported website with fictional characters was called The Spot. You can't find it, it's gone. Or for example, for many years I ran a site for many years called News Trolls. It's gone. Hundreds of pages are gone because when you take the site down, it disappears. The distributed social network and the interplanetary filing system would prevent that.

Cloud Infrastructures

Systems like that are coming. The question we need to ask is, what happens when instead of handing in a paper or a document, your student gives you a URL, says, "Here, it's here." It's a different way of looking at communication in general. People are still using email. Why? Because nothing better has come along. Not Twitter, not Facebook, not instant messaging. But when we have our own web presence, then something better will have come along and we'll use that, but it's going to take some change.

Right now, we've got good download speeds. But we have terrible upload speeds. The communications environment that we live in right now is dedicated to making us consumers and not producers, and that's not an accident. That's one of the problems, one of the pestilences we have to face.

The answer to the asymmetry dilemma will be found in cloud infrastructures and virtualization. This is not new technology; people who manage information technology (IT) for corporations and institutions have been using it for many years. Now, virtualization⁷¹⁶ is becoming mainstream and products such as VMWare, Virtual Box, or Parallels are appearing on more and more personal computers.

With these, with one command, you can have a Linux box running on your system, and in that box, a Linux supported website. A whole infrastructure has developed to support this sort of technology. For example, tools like Vagrant manage and configure virtual boxes. Tools like Docker organize boxes into 'containers' so they can be scaled as needed to meet increased server load. Applications like Chef and Puppet automate virtual server configuration.

⁷¹⁶ Kevin Patel. 2017. Key Trends to Watch in the Field of Virtualization. V&C. <http://www.vcloudnews.com/key-trends-to-watch-in-the-field-of-virtualization-kevin-patel/>

In the last few years, internet service providers have made it easy and affordable to run virtual servers in the cloud. So instead of carrying around your ‘web server in a box’ around on your computer, you can save it in Amazon Web Services (or IBM cloud, or Microsoft cloud) and access it from where you are. And now your personal server no longer faces the asymmetry dilemma.

The cloud infrastructure created the xMOOC. The novelty of Coursera wasn't that it had videos, it wasn't that it had voting up or voting down, or even that it had automated quiz marking. It was that it had server virtualization in the backend (on Docker, specifically⁷¹⁷) so that the course could expand as it needed to.

A person (you, me, anyone else) can have server virtualization on the backend now. I run a Docker cloud on Amazon Web Services. It's cheap, not super cheap but it's cheap. It's definitely affordable. I'm just renting it because I want to experiment on it, so I can run these major infrastructures for just a couple of dollars a day.

- Environments: [VMWare Fusion](#), [VirtualBox](#)
- Provisioners: [Docker](#), [Vagrant](#)
- Configuration: Chef, Puppet
- Providers: [AWS](#), [MS Server](#)
- Services: [MS Cognitive](#), [Wolfram Alpha](#), [Segment](#)
- Serverless CMS - <http://www.downes.ca/post/66459>

People are now talking about things like ‘the serverless content management system’ (CMS)⁷¹⁸. The idea is that through the use of cloud data storage and lightweight cloud servers-in-a-box, you can share a database with your friends without hosting your own server at all. You use Dropbox or other cloud technologies to store data and you provide access to it using JavaScript that is written for the client environment for your browser and that's it. You have your own web server without a server. That begins to address some of these bandwidth problems.

It used to be that only Google and Microsoft could have these web-based services. But now anyone can. It changes the game.

Immersive Reality

⁷¹⁷ Brennan Saeta. 2016. Rust & Docker in production @ Coursera. Coursera. <https://building.coursera.org/blog/2016/07/07/rust-docker-in-production-coursera/>

⁷¹⁸ Anibal. 2017. Awesome Serverless. GitHub. <https://github.com/anaibol/awesome-serverless>

People talk a lot about immersive reality.⁷¹⁹ What's going on here? To understand immersive reality and open learning we need to back up and look at the early days of the internet and the division between producer and consumer, and how this relationship changed over time.

I can remember a time, believe it or not, before there was a World Wide Web. Not before there was an Internet, but I was around at the time when the Internet had serious competition. It had competition from Prodigy, from CompuServe.⁷²⁰ From America Online, remember them? These were destination services that you logged on to from your home telephone, and you accessed the discussion board, articles, data services, and all that.

At the same time there are people around that time messing around with things like FreeBSD and other free and open source software. Those people eventually won. Those people eventually created this free and open system that we call the Internet, where we can have home pages, create our own bulletin boards, play in open online games, and develop their own applications and software.

You paid a lot of money to use these services; CompuServe, for example, cost \$6 per hour (in 1980 dollars) to access⁷²¹, but the internet was essentially free, and that's what attracted people to it. But in the last 10 years or so there has been a retrenchment and a return to the model of CompuServes, and the AOLs, and Prodigys. We're in that mold now, except our destination services are Facebook, Twitter, YouTube, and Instagram, and we pay for these services (for now) with our information rather than our dollars (though we can look at services like Netflix or LinkedIn Pro to see the model for the future).

There are still people messing around today, people like Tim Berners-Lee, with things like Keybase and Solid, which will, I think, eventually win again.

Immersive reality is a good case in point. When I talk about immersion of reality, what do you think of? You think of Oculus Rift, Google Cardboard, Samsung Gear, the new display technology, high-tech wearable screens, and 3D virtual reality.. There's a whole bunch of them, now. (I can see it now "Man charged for driving while wearing an Oculus Rift." He says, "Ah! I

⁷¹⁹ Daniel Newman. 2017. CES 2017: How Immersive Virtual Reality Points To The Future Of Product And Experience Design. Forbes. <https://www.forbes.com/sites/danielnewman/2017/01/08/ces-2017-how-immersive-virtual-reality-points-to-the-future-of-product-and-experience-design/#b16856c655a1>

⁷²⁰ Ken Gagne and Matt Lake. 2009. CompuServe, Prodigy et al.: What Web 2.0 can learn from Online 1.0. Computerworld. <http://www.computerworld.com/article/2526547/networking/compuserve--prodigy-et-al---what-web-2-0-can-learn-from-online-1-0.html>

⁷²¹ Peter H. Lewis. 1987. Peripherals; Communication's Cost. New York Times. <http://www.nytimes.com/1987/06/16/science/peripherals-communication-s-cost.html>

thought I could do it.") These are interesting technologies. But these are not the future of immersive reality or immersive learning, because they are not what is core to being immersive.

Immersion isn't the technology, it's the state of mind. You're only immersed if you believe you're immersed (It's like George Costanza from Seinfeld: it's not lying if you believe it⁷²²). It's not reality if you don't believe it, but if you do believe it, it is reality.

It was mentioned during the introduction, I messed around with MUDs. I did. Multi-User Dungeons. We adapted them for academic use (we called them Multi-User Domains, because nobody would support a Multi-User Dungeon in a college; all the wrong connotations). These were *text-based* multi-user virtual environments. But they were immersive because people *believed* in them.

I still play video games a lot. I was one of the people who paid for [No Man's Sky](#), which was an immersive virtual world, but the thing with that kind of game (and maybe you know this feeling, maybe you don't) is that you're in your exosuit, and you're traveling, you're bouncing along a planet that you've never visited, and you encounter some creature, and this *chill* goes down your spine.

That's a unique feeling. At that moment, that world is real, as real as it needs to be. At that moment, you're engaged. That is the core of immersive reality. Whether or not you're using a video screen, whether or not you're inside a VR helmet or whatever, that's not what makes something immersive.

What makes something *immersive* is working on something that matters, with real people at the other end, with real consequences to your actions, with hopefully multi-modal interaction (but this not strictly necessary). As long as it matters to you, it's immersive.

People talk about virtual reality. They talk about games and gamifications. I'm thinking more about producers and consumers. When they talk about learning from a game they say "we will provide the game. We will provide the learning. You just go in there and have a good time, and, 'Hey! Now I know French!'" I don't think it works like that.

Not even with learning to fly an airplane. Yes, you need the simulation to learn to fly an airplane (I wouldn't want to fly in an airplane with a pilot that had never used a simulation) but at the same time, you need to know something about how an airplane works and why it stays up in the sky. When you're in an airplane, actually piloting the airplane, a simulation is not going to help you. A game is not going to help you. You are going to need support right then and there

Personal Learning Environments

⁷²² Seinfeld. 1996. The Beard. Via Internet Movie Database quotes. <http://www.imdb.com/title/tt0697654/quotes>

In another talk we heard of the “in-the-moment” phenomenon. The fact is, we all live our lives in the moment. It's the only way we can live them. What that means is that most of the time what we need is not a simulation, is not a game, is not a course or a class, but we need something that supports or helps us *in the moment*.⁷²³

Why? Because the stuff that we did in the past to prepare ourselves increasingly no longer prepares us for what's coming. Who could have prepared themselves for today's environment, today's social environment, today's political environment? Who found themselves prepared for that? We need mechanisms and tools to adapt, rather than to prepare.

That takes me to personal learning environments, because the personal learning environment to me is the opposite of a course.

The personal learning environment, to me, is this immersive form of learning based on distributive social networks, based on virtual clouds and things like that, that give us the day-to-day learning support that we need. So that, among other things, we don't have to take eight years of our lives, or whatever, and go off to school and prepare, but rather we're able to live our lives right away.

Now, you might dismiss this as the talk of somebody saying, "Oh, everything's going to be disruptive. That didn't happen in the 1980s, so, it won't happen now."

A lot of things didn't happen in the 1980s that are still happening now. Newspapers, you might remember them. I remember not too long ago people saying, "You know what? People just like the feel of a newspaper." You can take the newspaper anywhere. Today, newspapers are struggling, not only for subscribers, but for actual relevance. Not to mention credibility.

Newspapers were important, now they're not.⁷²⁴ People still say, "Radio didn't stop newspapers, television didn't stop them, CD-ROMs didn't stop them. The Internet won't stop them." But it's the end of the era of the newspaper, and we get our news online, now. Especially young people, but all people get their news online. How many of you read a newspaper this morning? Two? Three? Maybe four, five, out of a room of what? 100, 100 and whatever?

Sometimes the thing that never changed in the past changes now. Maybe they will look a bit different, maybe they will be invented by Sebastian Thrun or by MIT, but they will change. There will be a personal learning environment and it will have these elements.

⁷²³ Conrad Gottfredson and Bob Mosher. 2012. Are You Meeting All Five Moments of Learning Need?. Learning Solutions Magazine. <https://www.learningsolutionsmag.com/articles/949/>

⁷²⁴ Robert Levine. 2012. How the internet has all but destroyed the market for films, music and newspapers. The Guardian. <https://www.theguardian.com/media/2011/aug/14/robert-levine-digital-free-ride>

It will have a resource repository network. This is also known as, "that part of the Internet you're interested in" set up in such a way that you don't have to go look for stuff. The stuff comes to you, and organizes itself, and puts itself in your server-less content management system all by itself, ready for you to use.

It will have the personal cloud. This is where you store that stuff, where you store stuff that you create, your blog posts maybe, your finances perhaps. That's where I store my finances, in the cloud. Am I crazy? Yeah, but where else am I going to store it?

It will have the personal learning record. This is a challenge. A personal learning record is a person's learning record, not an institution's learning record. At some point in time, whether it's on LinkedIn, whether it's on Monster, whether it's on something else, people will have their own personal learning records.

When I worked with the School of Public Service, it was a challenge. I checked my personal training record over 15 years with the government of Canada, and the School record said I had taken one course in all of that time, that this was the extent of my learning. I concluded at that time that they have issues with learning records. If any of your students has issues with learning records, you might think, "No, no, no. All of their records are in our records store." Yeah, except for the stuff that they didn't take at your institution. What will you do, then?

Robot Tutors

It will have a personal learning assistant. We get quite a bit of laughter at that. "Oh, yeah, yeah, sure, robot tutors." Then, there was the case of, I don't have the link here, but the professor who provided his class with a robot teaching assistant (TA) gave a section of his class a robot tutor, and nobody noticed.⁷²⁵ That's a sad, sad statement about tutors, good statement about robots.

This year, we've had Siri, and Alexa, and Cortana⁷²⁶, and various other personal assistants. These are really clumsy first attempts at being a personal assistant. They will get better. They're not going to get worse. They will get better. There will be artificial intelligences that help you learn, that help you navigate all that data from the personal repository, help you manage your finances, your taxes.

⁷²⁵ Jason Maderer. 2016. Artificial Intelligence Course Creates AI Teaching Assistant: Students didn't know their TA was a computer. Georgia Tech News Center. http://www.news.gatech.edu/2016/05/09/artificial-intelligence-course-creates-ai-teaching-assistant#more_photos

⁷²⁶ John Koetsier. 2017. Alexa, Google, Siri, Cortana: 24.5M Voice-first Devices Will Ship This Year. Forbes. <https://www.forbes.com/sites/johnkoetsier/2017/01/26/alexa-google-siri-cortana-24-5m-voice-first-devices-will-ship-this-year/#1be85a327237>

It will be based on distributed intelligence, using machine learning as a service. For example, there is an automated transcription system that we saw yesterday that's running off of the IBM cloud. The idea here is that, that site, you can upload a video in the supported format, which is OGG or WAV, but not MP3, or, you can record. Upload your audio and it will give you a transcript.

That's what I mean by machine learning as a service, because it's machine learning, these neural networks humming in the background of the big servers at IBM, that are providing this service. This is coming. This will be part of every website. This will be part of YouTube or IBM's video service. This will be part of your online classes, and not just an automated transcription but automated translation, grammar checking.

Any cognitive function you can think of will be available as a service⁷²⁷, and you'll simply plug in your server-less server, into that service. Now, all of your content that you've created, you can translate into Urdu simply by clicking a button.

Why you'd do this, I don't know. But, you could, that's the point. Or, you could encrypt it, or you could decrypt, or whatever. We have, at NRC, algorithms right now that take tweets on Twitter and evaluate them for sentiment.⁷²⁸ This one was hostile, this one was pleasant, this one was aggressive, whatever.

Things like that. I don't know how that will be useful, but it will be useful. All of this will be part of your personal learning environment. You'll have a more powerful tool at your disposal, in your browser, that doesn't actually exist anywhere, but is just JavaScript connections to a bunch of services. That'll be a lot more useful than the 39-hour class on introduction to critical theory in post-war Europe, guaranteed.

Challenges

Let's look at some of the challenges we face and individuals and institutions. They result from the dichotomies inherent in these new technologies. These are not, I think, false dichotomies, although you could probably plot a mental path through some of them. They're certainly not "both ands" (I know people like to say "both and" instead of "either or" but sometimes "both,

⁷²⁷ Thomas H. Davenport. 2016. Will AI Companies Make Any Money? Harvard Business Review. <https://hbr.org/2016/07/will-ai-companies-make-any-money>

⁷²⁸ Saif M. Mohammad, Xiaodan Zhu, Svetlana Kiritchenko and Joel Martin. 2015. Sentiment, emotion, purpose, and style in electoral tweets. *Information Processing & Management*. 51-4, pp 480–499. <http://www.sciencedirect.com/science/article/pii/S0306457314000880>

and" doesn't work - when you're in the voting booth, you can't go "both and", or when you're picking IBM or Apple). You're working with one of them or the other.

For learning providers: are you providing content knowledge or, are you providing literacies?

By 'learning providers' I mean you, I mean the instructors at your institution, the tutors at your institution, anyone who provides learning directly as a service. And by 'content knowledge' I mean teaching, as so many people say, mathematics, or classic literature, or other essentials.

I fall on the literacies side. That's a framework that I've been working with over the years, and I fall on the literacies side because the content knowledge changes a lot, a lot more than we think. Even math changes. We think of foundational math as addition, subtraction, multiplication, but at any moment foundational math could change to substitutivity, set theory, things like that, which actually are more foundational. Science changes. When I grew up, there were nine planets. There are still nine planets, we just don't know which one is the ninth anymore.

It's hard to deal with. Are you preparing people for employment, to get a job? Or, are you preparing them for the post-employment, post-job world that we are definitely entering into? All of our jobs are going to be replaced by machines. Why are you training people for a job? Are you preparing people with courses or with performance support? Are you preparing them ahead of time? Are you solving problems for them now?

What is the source of your knowledge? Is it authority, the president knows all, the newspapers know all, the professors know all, or is it the wisdom of crowds? Not social proof. That's voting, but the wisdom of crowds is described by people like James Surowiecki, where the organization and the structure of society represents the knowledge that it contains.

Are you ready to live with the fact that your class might know more than you? That's a reality I deal with every day when I do one of these talks. I walk up here, and I know the audience knows more than me. It's intimidating, but it's also true. At any given point, anything that I say, any sentence that I say, one of you knows more about that topic than me. Probably more than one.

Are you providing people with credentials? Is that the thing that you sell, credentials? Really? Badges. People want badges. Did you get up this morning, say, "Yeah! I'm going to get a badge today." Or, are you offering learning? Or, are you offering connections?

I sometimes talk about what I call the Yale advantage. People certainly don't go to Yale for badges. I don't know if Yale offers them. They don't even go to Yale for learning, because frankly, it's not really that great. I've worked with institutions all over the world, and it's not the learning.

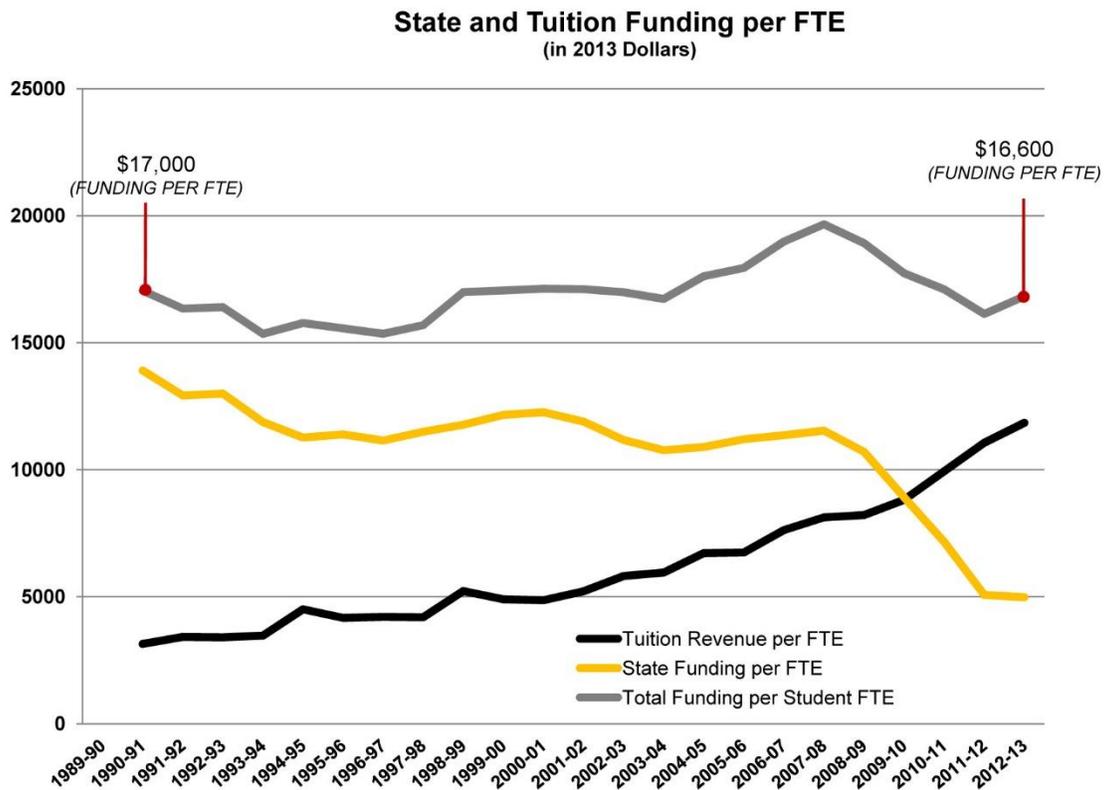
Actually one of the neat things is when these universities started opening up their coursework, their course materials with open course and all that. I went and looked because I studied Philosophy at the well-known institutions, the University of Calgary and the University of

Alberta (which are actually very good schools) and not only was the course material in Philosophy similar at MIT and Harvard, they used exactly the same books, and they covered exactly the same curriculum. I would have got the same knowledge paying \$40,000 at Harvard or Yale, or MIT, as I get paying \$1,500 at the University of Calgary.

But there still is this Harvard and Yale advantage. What is that? What is that they are really selling at Yale? It's not credentials, it's not badges, it's not knowledge. It's connections. If you're really, truly, seriously interested in open education, accessibility, etc., then that's the advantage you need to address. How are you addressing it? Are you addressing it? Or are you offering employment training, because that's the best you can do? For jobs that won't exist?

Speaking of challenges to educational institutions, consider this chart. You've all seen the chart: government support, state support is bottomed out. That's the yellow line there, that's in free fall. Your students are now paying the bills. That's why your students are acting like consumers because they're paying the bills.

BURDEN SHIFTED TO STUDENTS AND FAMILIES



University of Washington, 2014⁷²⁹

Even today, I heard somebody refer to "the competition." You guys in the public education business, why is there competition? How does that make sense? Unless you're viewing yourself as an organization that sells something for profit.

Is that the model? Is that going to be the model in the future when everybody has their personal learning environment? How are you funded? Tuition grants? Research? Are you part of the patent? The whole patent pile, patent mess? The privatization of knowledge itself?

Are you using enterprise software? Enterprise sign-on? Enterprise learning records? Or are you thinking distributed? What about transcripts and what do you do when blockchain comes along and somebody can get all of their learning records in a blockchain and they don't need you to attest to their education anymore because I do to your market, what does that do to your value proposition?

These are challenges. Things that didn't change in the past are still going to change in the future. It's going to happen, just ask your local newspaper. Moving forward, are you really going to do competencies for job performance or are you going to focus on capabilities and capacities? Are you really going to do badges?

What about when everything a person does is available on the Internet through their personal server and artificial intelligence that already exists today can look at everything that they've done and tell you with more accuracy than a degree or diploma what their qualifications are? That's the credential of the future. The credential of the future is the online presence.

Why am I standing up here right now? It's not because I have a degree from Yale, because I don't, and they wouldn't have me and I wouldn't want it. It's because of the online presence. I got into the game a bit sooner, that's all. I'm not special, just you guys can tell what I can do. I've put 400 and some-odd presentations online, you can see that. I'm going to give a good talk or I'm not, whatever.

Are you offering classes? You're still offering classes. Do you offer performance support? Has it even crossed your mind that that might be 90 percent of the educational market in 10, 20 years? Microlearning, have you been thinking about it? What about spaced learning? Again, as opposed to classes. Are you thinking about being the Netflix of learning?

⁷²⁹ University of Washington. 2014. Special Report on State Disinvestment in Public Higher Education. <http://depts.washington.edu/opbblog/2014/03/special-report-state-disinvestment-public-higher-education/>

There already are Netflixes of learning. Or maybe subscription-based learning? Again, fine, but applying to be admitted to an institution, in a world where education can be almost free, the whole idea almost doesn't make sense anymore.

Finally, in this world of challenges, what does it mean to do the right thing? It's now an open question. We have war, pestilence, famine. We have social media, fake news, and all of that. Are you doing the right thing? Challenges to ask yourself, "Who are your clients? Who are you serving? Are you doing your work for the state or for the governor?"

"Are you doing your work to support technology companies? Do you view them as your clients?" I face that every day at NRC, "Your client is the technology company that will commercialize your invention." I say, "No, I'm not working for the tech companies. Are you crazy?"

Is your primary loyalty to your department or your institution? I always see a lot of that when I come to these conferences. "I'm from SUNY. My loyalty is to SUNY." Is it really? You get up in the morning, say, "Yeah, I want to go support SUNY." Or, are your clients the students who are in your classes and, even more importantly, the students who are not in your classes?

A Final Note

What is it to do the right thing? This is a time of crisis and conflict, a time of criticism, a time of marching in the streets and all of that.

To my mind, activism is building more than anything else. Ask yourself, "What are you building?" Are you reacting against costs and events, and crises, and growth, and fear, and everything else? Or, are you pursuing what I might put into the category of attractors -- values, goals, desires even, needs? Do you see yourself as working towards something or reacting against something? What is it to do the right thing?

A final note. The final note. In Canada, we have a guy called Stuart McLean who's been on public radio, CBC for many, many years. He recently passed away. He's a storyteller, and he would talk like this, and I would always parody the voice, but he told good stories.

One of the stories he told was about a boy who believed he could predict the future.⁷³⁰ "Tomorrow, I predict I'm not going to clean my room." Behold, tomorrow came and the room had not been cleaned.

⁷³⁰ Stuart Mclean. 2016. Sam's Predictions. Vinyl Café. CBC Radio 1. <http://www.cbc.ca/listen/shows/vinyl-cafe/episode/9993634>

This created a crisis of confidence for the boy, because he kept predicting bad things and they happened. He was worried, "What if I predict a bad thing, and it happens, and it's my fault?" He gets a piece of advice: "The story always ends on a happy note."

The story always has a happy ending, always. He says, "What if the story doesn't have a happy ending?" Well then, he was told, "The story isn't over yet."

And that's what 'doing the right thing' means. It means that you know that you're working toward the end of the story. It means not being afraid to work for change. Perhaps you won't be successful today, but there's always another day, or another person, and success will come eventually.

*Syracuse, United States
March 9, 2017*
