Topics in Distributed Learning Technology

Athabasca University

Faculty of Health Disciplines Professional Development Workshop

Stephen Downes September 25, 2019

- The Learning Context
 - Critical Literacies
 - Open Pedagogy
- Data and Cloud
 - Content: developing an understanding of dynamic and fluid data networks, how to access open data, and how to work with data in cloud-based resources.
 - Hands-on activities: access to and use of open data; exploration of a cloud environment.
- Graph and Resources
 - Content: new types of graph-based resources, including distributed knowledge networks.
 - Hands-on activities: experience developing graphs, use of distributed resources such as Jupyter Notebooks.
- Identity and Recognition
 - Content: how we know who someone is, how we project ourselves on the internet, and how we can be safe and secure; how we know what someone has learned.
 - Hands-on activities: creation of 'identity graphs', creation of public and private keys, and creation of digital credentials
- Experience, Community and Agency
 - Content: how to enable learning experiences based on hands-on practice and knowledge creation sufficient to support a rapidly evolving sense of community based on information exchange and consensus.
- Actionable Practices
 - Community network development and management, and
 - Personal learning management and support

Agenda

A Word of Advice...

It's the experience Not the content

Perspectives

Philosophy

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My degrees are in philosophy and I specialized in philosophies of mind, science, knowledge and logic. I ask questions about the bases for arguments and claims, look for presumptions about meaning and value, and consider ways of sensing, comprehending and knowing.

Education

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I am interested in the processes of learning, inference and discovery on a practical level. I ask what it is to learn – why and how people learn - and what are the conditions for best learning outcomes. I am focused on learning experience and personal agency.

Computing

I took a few courses but have mostly taught myself computer programming over the years, learning a number of languages, and building websites, content management systems, and learning technology. I think of programming as a means of expression.

Media

Since my days as a newspaper carrier to my involvement in student journalism to my work today in online media I have worked on new and better means of conveying information, illustration and photography, community-building and interactivity.

Perspectives



Your Notes / Our Notes

Edit this document or make your own copy:

http://bit.ly/au-workshop

The Long Game



- Give your table group a name
- You will need a flag or a coat of arms
- What kind of group are you? (Nation, linguistic, family, religion, company, etc?)
- Who is your leader? What are they? (President, Imam, CEO, Monarch, Godfather, , etc.?)
- What do you believe? (E.g., "Grease is the word")
- How do you recognie each other (Handshape, greeting, clothing?)

The Learning Context



State of the Art



Core Concepts



Open Online Learning



Zawacki-Richter, Bozkurt, Alturki, and Aldraiweesh. 2018. What Research Says About MOOCs – An Explorative Content Analysis. International Review of Research in Open and Distributed LearningVolume 19, Number 1. https://files.eric.ed.gov/fulltext/EJ1174059.pdf

OER Repositories



https://ocw.mit.edu/

Open Resources, Open Teaching

- Open Pedagogy Using OER to Chane How We Teach – Heather Ross <u>https://words.usask.ca/gmcte/2016/09/26/open-pedagogy-using-oer-to-change-how-we-teach/</u>
- Open Education, Open Questions Catherine Cronin

https://er.educause.edu/articles/2017/10/openeducation-open-questions

"The use of open practices by learners and educators is complex, personal, and contextual; it is also continually negotiated."



1. A Model for Networked Education (*Credit:* Image by Catherine Cronin ^丘, buildin letworked Teacher ^丘" by Alec Couros. CC BY-SA)

Origins of the MOOC



The idea was to recreate the concept of the 'course of lectures' from the traditional university. Students are responsible for their own education, often forming communities or societies to collaborate. Students would bring in additional resources, contribute to the discussions, and over time, develop their own thoughts and theses.

OERs as Student Production

- DS106 assignment bank http://assignments.ds106.us/
- Domain of One's Own https://reclaimhosting.com/domain-of-ones-own/
- Creation of OERs through 'renewable assignments' – Christina Hendricks http://flexible.learning.ubc.ca/news-events/renewableassignments-student-work-adding-value-to-the-world/



Introduction to Philosophy: Philosophy of Mind

https://press.rebus.community/intro-to-phil-of-mind

Open Case Studies

- case studies that can be used by anyone, at UBC or elsewhere.
- Many focus on topics in sustainability
- cases on this site are open educational resources: they have an open license to allow for revision and reuse of the cases in other courses and contexts





Adaptations: xMOOC and Beyond



The xMOOCs which followed (Stanford AI, EdX, etc

- they depended mostly on pre-recorded videos for content
- they dispensed pretty much entirely with the community
- the assignments were created centrally and became the means of assessment
- they commercialized and monetized the course (as opposed to the education)



In 2016, "23 million people worldwide registered for a MOOC for the first time ever... This makes the total number of students who signed up for at least one MOOC estimated to be 58 million. 2,600+ new courses (vs. 1800 last year) were announced, taking the total number of courses to 6,850 from over 700 universities." (Class Central)

Open Pedagogy

Participatory	Interacting via social networks and mobile apps
People and trust	Develop trust, confidence and openness working with others
Innovation & creativity	Encourage spontaneous innovation and creativity
Sharing ideas and resources	Share freely to disseminate ideas and thoughts
Connected community	Participate in a community of practice
Learner-generated	Facilitate learner contributions to OER
Reflective practice	Create opportunities for dialogue and reflection
Peer review	Contribute to an open critique of scholarship

Gráinne Conole. 2015. MOOCs as disruptive technologies: strategies for enhancing the learner experience and quality of MOOCs. Revista de Educación a Distancia. Número 39. <u>http://www.um.es/ead/red/39</u>

Bronwyn Hegarty. 2015. Attributes of Open Pedagogy: A Model for Using Open Educational Resources. Educational Technology, July/August, 2015. <u>https://upload.wikimedia.org/wikipedia/commons/c/ca/Ed Tech Hegarty 2015 article attributes of open pedagogy.pdf</u>

Critical Literacies





Criticisms of the MOOCs

MOOCs have face a storm of criticism – unprepared students, bad pedagogy, lack of educational standards, a failure to engage, and ultimately, dropouts.

Image: http://mfeldstein.com/emerging-student-patterns-in-moocs-a-revised-graphical-view/

A Wider Conception of Learning



What does it mean to 'complete' a newspaper?

What is the proper foundation for a buffet?

What does it mean to be literate?



- Literacy
- Numeracy
- Financial literacy
- Emotional literacy
- Digital literacy
- Etc. Etc.

Meaning – it's not just semantics any more

Child Chaos Birth/Life Forgiveness Friends Future Destinu Heaven Healing Harmony Good Fortune Heart Direction Father Early Honor Dream Energy

This brings us back to language – what is the 'core' of a language? What are the foundations?

What is the 'core' of a *discipline* – like medicine, law or physics? What are the foundations?

Image: http://www.alegoo.com/pictures7/art-tattoos-2/tattoos-with-meaning-029/

Knowledge as Recognition



Knowledge as Recognition



Knowledge as Recognition



Whose cake are you eating?





Semantics is association

- this isn't just a statement about language, it's a statement about knowledge generally
 - people aren't 'constructing models' in their minds, they're constructing them in the world – in social communities
 - but if they're *learning*, they're creating associations (which are, literally, connections between neurons)

This assertion is the core of Wittgenstein's private language argument.

These connections are self-organizing

- neural networks are *prediction* engines
 - we are constantly predicting what we expect next
 - these appear as sensations (or part of sensations) along with our other sensations
 - it's a *natural* process no construction, no management
- this includes language

- mentally, a language is nothing more than a series of shapes and sounds we read, hear and speak

- the *formal* properties of language (syntax, semantics, etc) aren't part of consciousness at all

Syntax	Cognition
Semantics	Context
Pragmatics	Change

This is a frame for understanding new media – and for understanding what it is to know, learn, and understand

The Critical Literacies – How We Recognize

Syntax: Not just rules and grammar



Forms: archetypes? Platonic ideals? Rules: grammar = logical syntax Operations: procedures, motor skills Patterns: regularities, substitutivity (eggcorns, tropes) Similarities: Tversky - properties, etc

Semantics

theories of truth / meaning / purpose / goal



- Sense and reference (connotation and denotation)
- Interpretation (Eg. In probability, Carnap logical space;
 Reichenbach frequency; Ramsey wagering / strength of belief)
- Forms of association: Hebbian, contiguity, back-prop, Boltzmann
- Decisions and decision theory: voting / consensus / emergence

Pragmatics: use, actions, impact



- Speech acts (J.L. Austin, Searle) assertives, directives, commissives, expressives, declarations (but also - harmful acts, harassment, etc)
- Interrogation (Heidegger) and presupposition
- Meaning (Wittgenstein meaning is use)

Cognition: reasoning, inference and explanation



- description X (definite description, allegory, metaphor)
- definition X is Y (ostensive, lexical, logical (necess. & suff conds), family resemblance but also, identity, personal identity, etc
- argument X therefore Y inductive, deductive, abductive (but also: modal, probability (Bayesian), deontic (obligations), doxastic (belief), etc.)
- explanation X because of Y (causal, statistical, chaotic/emergent)

Context: placement, environment, alternatives



http://www.occasionbasedmarketing.com/what-it-is

- explanation (Hanson, van Fraassen, Heidegger)
- meaning (Quine); tense range of possibilities
- vocabulary (Derrida); ontologies, logical space
- Frames (Lakoff) and worldviews
Change



- relation and connection: I Ching, logical relation
- flow: Hegel historicity, directionality; McLuhan 4 things
- progression / logic -- games, for example: quiz&points, branchand-tree, database
- scheduling timetabling events; activity theory / LaaN

Your Critical Reflections

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This part of the workshop addresses two conceptual challenges: first, the shift in our understanding of content from documents to data; and second, the shift in our understanding of data from centralized to decentralized.

Ψ	From Document to Data Storing our content as data makes it more flexible and more useful. One piece of data could be inserted into another piece of data, such as a template. Our perspective shifts from a <i>linear</i> organization to something more complex.	A	Learning with Data Learning with data isn't the same as learning with books. It's interactive, immersive and engaging, a process of learning how to perceive and comprehend rather than to decode and store.
	Application Interfaces The central role played by platforms is diminished in favour of direct interactions between peers, that is, a distributed web, which communicate with each other by means of application programming interfaces (API).	[1]	Linked Data Today we are seeing a trend toward decentralized linked data. This is the idea that each person can manage his or her own data, storing it wherever they want, and using it whenever they like.



Data as distributed and dynamic



The linked open data cloud

https://www.w3.org/wiki/LinkedData

The Linked Open Data Cloud



LinkedData is to spreadsheets and databases what the Web of hypertext documents is to word processor files.

https://lodcloud.net/

https://ontotext.com/linked-open-data-cultural-heritage/

Linked Open Data



Workbench

Introduction to Data Journalism Per capita crime rates					
Source: U.S. Federal Bureau of Investigation	^	ROWS COLUMI	NS No rows select	ed 🗸	
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Workbench is a free and open source data journalism platform "that enables all stages of data journalism: getting data (including scraping), then cleaning, analyzing, visualizing, and sharing it.

https://www.dataquest.io/blog/jupyternotebook-tips-tricks-shortcuts/

Big Idea 1: Course(?) as Open Data



Course as Open Data in gRSShopper

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[New][List] Badge	Read what's new
[New][List] Box	Find online courses
[New][List] Channel	Add a new content source
[New][List] Chat	Write a new post
[New][List] Course	Make a new web page
[New][List] Event	Edit personal profile
[New][List] Ferm	Configure Social Media Accounte
[New][List] Graph	
[New][List] Link	

https://el30.mooc.ca

Content Syndication

CONTENT DISTRIBUTION CHANNELS





- Blog posts and comments were the core of CCK08
 - gRSShopper <u>http://grsshopper.downes.ca</u>
- FeedPress <u>https://wordpress.org/plugins/feedpress/</u>
- FeedBurner <u>https://feedburner.google.com</u>

Open Data as OERs



- Civic engagement in Italy
- Intro programming assignments
- Article-level metrics
- Geodata and Land Walks in Wales
- Open data for sustainable development

Atenas, J., & Havemann, L. (Eds.). (2015). Open Data as Open Educational Resources: Case studies of emerging practice. London: Open Knowledge, Open Education Working Group. <u>http://dx.doi.org/10.6084/m9.figshare.1590031</u> Also: Leo Havemann, slides <u>http://eprints.bbk.ac.uk/14750/1/Leo_ODasOER_UCL_4March16.pdf</u>

Scrapy



- Python framework to aggregate and store content in RSS feeds and web sites
- Forms the core of the NRCdeveloped 'Beeyard' application



Feedly

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https://feedly.com/

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Q Filter Applets

IFTTT

If new public photo tagged 2019365 on Stephen Downes's photostream, then create a photo post on your Blogger blog By downes	If new feed item from http://letsmakesomeartd ammit.blogspot.com /feeds/posts/default, then send me an email at stephen@downes.ca By downes	If new public photo tagged 2018365 on Stephen Downes's photostream, then post a tweet with image to @Downes By downes
If new article saved for later, then save later for stephen@downes.ca	Upload to dropbox - push through to flickr	YT to Blogger
By downes Connected	By georgechilcott O Connected 😻 🐽	By vernonedunn O Disconnected

https://ifttt.com/

More

- Open Government Portal: Enables access to open data on the government of Canada website. <u>https://open.canada.ca/data/en/dataset?res_format=JSON</u>
- Solid. Tim Berners-Lee. Solid (derived from "social linked data") is a proposed set of conventions and tools for building decentralized social applications. <u>https://solid.mit.edu/</u>
- IndieWeb. The IndieWeb is a <u>people</u>-focused alternative to the "corporate web". <u>https://indieweb.org/</u>
- An Increasingly Less-Brief Guide to Mastodon. Noëlle Anthony. GitHub. <u>https://github.com/joyeusenoelle/GuideToMastodon/</u>

Activity

- Make a blog
- Get the RSS Feed
- Subscribe to it in Feedly
- Use IFTTT to send blog post to Twitter

Cloud



Cloud

Cloud computing involves using servers and infrastructure hosted by internet-based providers. You can then access these from any computer, and also link them together for advanced applications.:

ψ	Computing as Commodity The conceptual challenge is that it doesn't matter whose computer it is, that it could change any time, and that we should begin to think of "computing" and "storage" as commodities, more like "water" or "electricity".	Q	Direct Experience Students are now able to edit and create new tools to create text, music and art. They will be able to directly experience the relation between algorithm and outcome, or between mathematics and music, as the case may be.
	Virtualization Server virtualization begins with applications such as VMWare or Parallels, and progresses through a range of increasingly sophisticated computing containers created using programs like Docker and run using services like Amazon Web Services.	[I]	New Possibilities These new resources allow us to redefine what we mean by 'textbooks' and even 'learning objects'. By putting powerful applications into the hands of students we create new possibilities for manipulation, visualization and creativity.

XAMPP

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×	FileZila			Stat	Admin	Config	Logs	Senice
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https://www.apachefriends.org/index.html

"XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use."

XAMPP on a USB Stick

https://portableapps.com/apps/development/xampp

https://willtan.com/installing-xampp-on-usb-flash-drive/

Moodle on a Stick

"Spoodle is an up to date portable moodle / 'moodle on a stick' solution for learners to access Moodle courses without requiring constant internet access."



https://moodle.org/mod/forum/discuss.php?d=342367 https://www.youtube.com/watch?v=EsHEgSYKr4A

Embedding Applications in Other Applications

• gRSShopper as a Firefox Sidebar



https://addons.mozilla.org/en-US/firefox/search/?q=sidebar&platform=WINNT&appver=58.0

Embedding Applications in Other Applications

• gRSShopper in Vivaldi





https://vivaldi.com/

Embedding Applications in Other Applications

Research and References in an MS-Word Plugin

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Headings Pages Results review	of modernize online program development and delivery strategies, evaluated the School's	3 topics, 6 sources Insert all topics
Abstract current	t progress against those strategies, and recommended an integrated set of proposed activities ould augment online presence for learners, identify and deliver key learning and performance	History of the Internet +
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Mobile Technologies The Sch	hool's mandate is to:	+
Personalized Learning	encourage pride and excellence in the public service;	.COM / www.walthowe.com
Crowdsourcing	foster a common sense of the purposes, values and traditions of the public service;	A Brief History of the Internet
Virtual Library	help ensure that public servants have the knowledge, skills and competencies they need to do	
Integration with Other Platforms	their jobs effectively; assist deputy heads in meeting the learning needs of their organization; and	
Discussion	pursue excellence in public management.	Empire State Building
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https://www.officetooltips.com/office_2013/tips/advanced_research_with_research_pane.html

Server Virtualization

- Parallels <u>https://www.parallels.com/</u>
- VMWare https://www.vmware.com/

- Virtual Box <u>https://www.virtualbox.org/</u>
- Hyper-V <u>https://docs.microsoft.com/en-</u> <u>us/virtualization/hyper-v-on-windows/quick-start/enable-</u> <u>hyper-v</u>



Virtualization Platforms - Vagrant



https://www.vagrantup.com/

Loading and Running Vagrant Boxes

- Scotch Box
 - <u>https://box.scotch.io/</u> -- <u>http://192.168.33.10/</u>
 - WPDistillery <u>https://wpdistillery.org/</u> for WordPress

Homestead

• Instructions - <u>https://laravel.com/docs/5.5/homestead#first-steps</u>





Docker



Canvas on Docker

canvas-docker image

spencerolson tweak docker_dev_setup script 2 contributors 🕵 🚱 Executable File | 313 lines (254 sloc) | 8.58 KB 1 #!/bin/bash 3 set -e 5 # shellcheck disable=1004 6 echo ' 13 N____N_N_N_N_N_/ N__/ 16 Welcome! This script will guide you through the process of setting up a 17 Canvas development environment with docker and dinghy/dory. 19 When you git pull new changes, you can run this script again to bring 20 everything up to date.' 22 if [["\$USER" == 'root']]; then 23 echo 'Please do not run this script as root!'

https://github.com/instructure/canvaslms/blob/master/script/docker_dev_setup.sh



http://slides.com/jamesluker/how-to-docker-2#/

Big Blue Button in Docker



https://hub.docker.com/r/bigbluebutton/bigbluebutton/

Moodle on Docker

docker-moodle No Maintenance Intended ×

A Dockerfile that installs and runs the latest Moodle stable.

Installation

git clone https://github.com/jda/docker-moodle
cd docker-moodle
docker build -t moodle .

Usage

To spawn a new instance of Moodle:

docker run -d --name DB -p 3306:3306 -e MYSQL_D docker run -d -P --name moodle --link DB:DB -e № ✓ You can visit the following URL in a browser to get started:

http://192.168.59.103:8080

Moodle ► Administration ► Modules ► Activities							
Site Administration	Activities						
 Notifications Users 	Activity mod	jule Ac	tivities	Version	Hide/Show	Delete	Settings
Courses	Assign	iment	0	2007020200		Delete	Settings
Location Language	💭 Chat		0	2007020200	48	Delete	Settings
Modules	? Choice		0	2007020200	æ	Delete	
Activities Blocks	i Databa	se	0	2007022601	۲	Delete	Settings
• Filters	<u>非</u> Forum	0.0	0	2007020202			Settings
Appearance	Gloss	iry	0	2007020200	۲	Delete	Settings
Front Page	💓 Hot Po	tatoes Quiz	0	2007020202	~	Delete	Settings
Server Networking	Dourna	ıl	0	2007020200	~	Delete	
Reports	M LAMS		0	2007020200	~	Delete	Settings
Miscellaneous	Label	1	0	2007020200	1	Delete	
Search	B Lesson	n	0	2007020201	۲	Delete	
	🖓 Quiz		0	2007020200	۲	Delete	Settings
dmin bookmarks	- Resou	rce	0	2007020200	۲	Delete	Settings
okmark this page	SCORI	M/AICC	0	2007070300	۲	Delete	Settings
	 Survey 	(0	2007020200	۲	Delete	
	E WIKI		0	2007020200	۲	Delete	
	Works	hop	0	2007020200	۲	Delete	

https://hub.docker.com/r/jauer/moodle/

Options



https://bitnami.com/stack/moodle/containers

Cloud Infrastructure Providers



 AWS – Amazon -<u>https://aws.amazon.com/</u>



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Azure – Microsoft https://azure.microsoft.com



Bluemix – IBM Cloud https://www.ibm.com/cloud/



Google Cloud Platform https://cloud.google.com/

ORACLE

Oracle Cloud https://cloud.oracle.com/



https://www.srgresearch. com/articles/microsoftgoogle-and-ibm-chargepublic-cloud-expensesmaller-providers

Cloud Computing for Education



Amazon Web Services - https://aws.amazon.com/education/



coursera





OER and Virtualization

 Open Distribution of Virtual Containers as a Key Framework for Open

S



igure 3: Some educational resources that are distributed as classic virtual machines (WWT, CloVR, vGATE a VirtualBox image for chemistry teaching)

http://www.ejel.org/issue/do wnload.html?idArticle=575

"Unikernels represent and deeper simplification of the virtual container approach, given \lberto Corbi that all necessary computing elements (operative system kernel, basic libraries, frameworks, drivers, scientific application, etc.)"
Big Idea 2: Course(?) in Containers



Tools that enable cloud-on-demand applications and services

https://www.techradar.com/news/ what-is-container-technology

amazon webservices™

gRSShopper in a Box https://www.downes.ca/presentation/482

Re-Decentralizing the Web



Decentralized Data and Service Providers



Decentralized Data and Service Providers



Decentralized Social Networks



- Solid
- IndieWeb
- Mastodon
- MeFi
- ActivityPub

https://www.w3.org/TR/activitypub/

https://solid.mit.edu/

Activity

Instructions

- Create a demo account at a cloud service like <u>https://cloud.digitalocean.com</u>
- Use the demo account to create an instance of WordPress
- Log in to your Word Press account and create a new post
- Optional subscribe to your new blog

Graph



Graph

When we connect things together we have created a graph. A graph has two types of component: the entities being connected (sometimes called nodes), and the connections between those entities (sometimes called edges).

Ψ	Philosophy In connectivism we have explored the idea of thinking of knowledge as a graph. Yet, what <i>makes</i> it knowledge? In the Semantic Web, we are faced with a similar question. What is the "source of truth" of a distributed representation in the Semantic Web? What grounds ontologies, or assertions of trust in the Web of Trust?	E li id c t	Education t helps learners understand that each dea connects to another, and it's not the ndividual idea that's important, but ather how the entire graph grows and develops. It protects us from ategorization errors and helps prevent things like confirmation bias.
	Computing The data structures we can build using these technologies have created a new type of content. One example is BitCoin, based on the recording of transactions in a blockchain, which is essentially a has chain. Another example is the collection of updated versions of software stored in GitHub.	I A e v a a b	Vedia As repositories of knowledge, graphs enable the same data to be viewed from a variety of perspectives. Manipulations of and <u>inferences</u> from these data structures allow us to draw conclusions and make new connections - drawing associations between similar entities, for example

Web3



Web3 is to a large degree a reaction against centralization Eg. IPFS, IPLD, dat://

http://whatdoesthequantsay.com/2015/09/13/i pfs-introduction-by-example

Graph as the conceptual basis for web3 networks



Graph connects all the resources across these services using relationships.

Graph Data Connect provides a way to interact with the data that's available through the Graph APIs.

https://docs.microsoft.com/en-us/graph/overview

Big Idea 3: Graph, Not Story



The types of questions graph analytics answer



Figure 1-9. The types of questions graph analytics answer

- Investigate the route of a disease or a cascading transport failure.
- Uncover the most vulnerable, or damaging, components in a network attack.
- Identify the least costly or fastest way to route information or resources.

https://neo4j.com/graph-algorithms-book/

More

- A Gentle Introduction To Graph Theory. Vaidehi Joshi. <u>https://medium.com/basecs/a-gentle-introduction-to-graph-theory-77969829ead8</u>
- The Neural Network Zoo. Fjodor van Veen. Neural Networks are types of graphs. <u>http://www.asimovinstitute.org/neural-network-zoo/</u>
- Graph Data Structure And Algorithms. This page has a very brief description of a graph data structure and then a *long* list of things that can be done with graphs - cycling, sorting, spanning, searching. <u>https://www.geeksforgeeks.org/graph-data-structure-and-algorithms/</u>
- GQL Is Now a Global Standards Project alongside SQL. <u>https://gql.today/</u>
- Social Network Analysis. Philip Leifeld. <u>http://www.bearnetwork.ca/wp-content/uploads/2018/10/slides-leifeld-bear.pdf</u>

Activity

- Instructions
- Create a model graph of some aspect of this workshop (it doesn't have to be an actual graph, only a representation of what an actual graph might look like. We've already seen, eg., graphs on the relations between people in the workshop. Could there be other types of graphs?
- In your model, consider how the states of the entities in that graph might vary. Consider not only how nodes might vary (eg., a person might have a different height over time) but also how the edges might vary (eg., a person might have a different strength of relation (calculated how?) with another person over time).
- In your model, consider how knowledge about the changes in states in the graph might be used.
- •

Create your graph using an online service like <u>https://www.draw.io/</u> - of if you prefer, use the space below (note that you will need to specify a cloud account to store your graph when you use draw.io)

Resources



Resources

Learning resources have traditionally been things like textbooks and media, but now learning resources can be anything from video to virtual reality to application. How we describe these, and access them, is changing.

ψ	Philosophy Since the early days the web has been increasingly locked down, and the once- seamless interaction between people and data has been locked more and more behind paywalls and content silos. Web3 is to a large degree a reaction against this	A	Education Content Addressable Resources for Education create mechanisms for the creation of resource graphs linking data, media, software and people, redefining our idea of an open course (and open pedagogy).
	Computing We have already seen more transitional contents, such as books, media and music, being distributed through IPFS. Similar technologies support more complex content, for example, distributed applications (dApps), subscriptions and lists, contract networks, and even distributed organizations.	[1]	Media The concept of Content Addressable Resources for Education addresses the question of the sustainability of open educational resources. These resources will be packaged and distributed across a content-addressable network, whereupon they become <i>permanently</i> open

Directed Acyclic Graph (DAG)



Used to create collections of related data elements

https://en.wikipedia.org/wiki/Directed_acyclic_graph



A Distributed GitHub for Learning Resources

Cla	assroom for GitHub	GitHub Education 👬 🚯 🖟
S ©©	oftware Engineering	CitHub Education Settings Settings Integs://citassroom.github.c Copy invitation link Integs://citassroom.github.c Copy invitation link
	Assignments	New assignment
	Mobile Application Development with IOS Group assignment	https://classroom.github.c
	Web Development with Rails Group assignment	https://classroom.github.c
	Working with Threads Group assignment	https://classroom.github.c
	Operation Sorting Algorithms Homework Individual assignment Individual assignment	https://classroom.github.c 🛛 🔂 Copy invitation link
	Sorting Algorithms Homework Individual assignment https://classroom.github.c C Opy Invitation link P C Shell Homework Individual assignment https://classroom.github.c C Opy Invitation link	https://classroom.github.c 🔀 Copy invitation link
	Image: Sorting Algorithms Homework https://classroom.github.x Image: Copy invitation link Image: Shell Homework https://classroom.github.x Image: Copy invitation link	

Creativity happens in a context, in a community, where building on each other's work and sharing is the norm

https://github.com/topics/educational-materials

https://github.blog/2015-09-22-teachers-manage-your-courses-with-classroom-for-github/

From semantics to cryptography

Merkle Trees (Hash Trees)



Leaves: hashes of data blocks. Nodes: hashes of their children.

Used to detect inconsistencies between replicas (anti-entropy) and to minimise the amount of transferred data

The transition: the Merkle graph

https://www.slideshare.net/quipo/nosql -databases-why-what-and-when/91-Merkle Trees Hash Trees Leaves

Hashgraphs and Merkle Chains



https://www.blockchainappfactory.com/blog/dag-vs-blockchain-vs-hashgraph/

Hash Addresses



Distributed Hash Table

Each piece of content has a unique address, which is a hash of its content

https://ipfs.io/ipfs/QmXoypizjW 3WknFiJnKLwHCnL72vedxjQkDD P1mXWo6uco/wiki/Distributed hash_table.html

4.4 IPFS - IPLD

IPFS white paper: <u>IPFS - Content Addressed</u>, <u>Versioned</u>, <u>P2P File System (DRAFT 3)</u>.

- PFS consists of a network of peer-to-peer nodes (aka computers that talk to each other directly)
- These nodes can store content (any type of file)
- Content is represented by a hash and is immutable (if the content changes, so does the hash) In the case of IPFS, the key of the distributed hash table is a hash over the content.

Hosting a website on IPFS - <u>https://ipfs.io/ipfs/QmdPtC3T7Kcu9iJg6hYzLBWR5XCDcYMY7HV685E3kH3Ec</u> S/2015/09/15/hosting-a-website-on-ipfs/

- IPLD Inter Planetary Linked Data
- <u>IPLD website</u> (Inter Planetary Linked Data) -<u>https://ipld.io/</u>
- the IPLD specs and the IPLD implementations.



https://whatdoesthequantsay.com/2015/09/13/ipfsintroduction-by-example

Big Idea 4: CARE



CARE is based on the idea of distributed hashgraph networks

A lot like Git http://www.gthub.com

https://www.youtube.com/ watch?v=QNKpK InQHQ



The web's centralization limits opportunity

Our apps are addicted to the backbone

Open educational resources in the future

- Each piece of content has a unique hash address
- OER will be more like tools that students use in order to create their own learning
- The learning happens through the *use* of the content.
- Licensing fades to the background
- Most resources are created and used only once.
- The resource taps into current data and may be localized or adapted to the content consumer.
- Technologies such as encryption, hashing and <u>blockchain</u> create a record of ownership and provenance of any resource.

Cognii – SquirrelAI – Magpie – X5GON

Cognii

What are the structures of a typical neuron?

Student

Neurons are the basic building blocks of the nervous system. A neuron consists of dendrites and a cell body called soma.

Cognii

Very close! Would you like to explain the neural transmitter?

Cognii Virtual Learning Assistant engages a student in a chatbot-style learning conversation by prompting them to construct an answer, giving them instant formative assessment - <u>http://cognii.com/</u>

Squirrel AI - pure-play AI-powered adaptive education provider in China... provides personalized and high-quality K-12 after-school tutoring - <u>http://squirrelai.com/</u>

magpie recommends high-quality content and integrates with your learning systems - starts with a configurable chatbot conversation - prioritises most relevant content for each user. <u>https://learn.filtered.com/magpie</u>

X5GON.org – fully automated creation of OER courses https://www.x5gon.org/follow/oer/

AI-Generated Music



- MuseNet, " a deep neural network that can generate 4minute musical compositions with 10 different instruments, and can combine styles from country to Mozart to the Beatles."
- <u>Relentless Doppelganger</u>, the <u>Bot Prownies</u>, who produce an almost-acceptable brand of punk. If you prefer guitar metal, <u>Coditany of Timeness</u> might be more to your taste. Not quite as successful is <u>Evolution 22</u> by Deep the Beatles. For something a little softer (and quite good) try <u>On the Edge</u>, by AIVA. AIVA also does a nice <u>classical tune</u> or movie score. Need royalty-free music for your videos? Try <u>JukeDeck</u> (a little too house for my tastes). Taryn Southern, meanwhile, uses an AI to compose the music, then adds her own lyrics and vocals her song <u>Break Free</u> is quite nice.

More

- OER World Map. A couple years or so ago UNESCO launched an OER mapping project. <u>https://oerworldmap.org/</u>
- Introducing the Dweb. Dietrich Ayala. The "d" in "dweb" usually stands for either decentralized or distributed. https://hacks.mozilla.org/2018/07/introducing-the-d-web/
- Distributed Hash Table. Type of decentralized distributed system. <u>https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6</u> <u>uco/wiki/Distributed hash table.html</u>
- **Beaker.** Beaker brings *peer-to-peer publishing* to the Web. <u>https://beakerbrowser.com/</u>
- A Look at the Future of Open Educational Resources. https://www.ijoer.org/a-look-at-the-future-of-open-educational-resources/

Activity

Instructions:

- Offline activity: design a scenario where students could obtain content or data, revise or remix that content or daya, and create a new learning resource for their own use.
- Online activity:
 - 1. Create an account at GitHub and Create a new repository <u>https://github.com</u>
 - 2. Create some content for your repository
 - 3. Practice sharing your repository with others, and cloning other's repositories
- *Bonus:* try downloading and using the Beaker browser

Identity



Identity

In this workshop we look at identity relatively narrowly, asking how we know who someone is, how we project ourselves on the internet, and how we can be safe and secure.

Ψ	Philosophy Instead of demographics being about <u>quantity</u> we will now have access to a rich tapestry of data and relations. <u>Instead</u> of grades or scores our self-assessments will be based on the quality of the experience. The "quantified self" will give way to the "qualified self".	Ą	Education Should we think of identity from the outside in or from the inside out. Can we <u>teach</u> 'identity'? is 'identity' something that can be done to us or for us? Or is it inherent in our nature, something we <i>bring</i> to education as course participants, something that <u>informs</u> how we see and how we learn?.
	Computing Much of the technological discussion of identity looks at it relatively narrowly, asking how we know who someone is, how we project ourselves on the internet, and how we can be safe and secure. In a wider sense, however, what we are developing is a mechanism for the creation of a <i>digital identity</i> .	[1]	Media We were the <u>client</u> , we were the <u>product</u> - are we, at last, the content? <i>We</i> are the thread that runs through an otherwise disconnected set of data. Knowledge about ourselves will create an underlying fabric against which the value and relevance of everything else will be measured

Identity



In social networks, we were the product – what about now?

https://thepsychologist.bps.org.uk /volume-30/may-2017/cautionidentity-under-construction

An end to passwords



(and even to twofactor authentication)

https://www.channelfutures.com/businessmodels/new-guidelines-end-frequentpassword-changes

Symmetric vs Asymmetric Keys

Symmetric Encryption

Asymmetric Encryption



https://www.thesslstore.com/blog/differ ence-asymmetric-encryption-algorithmsvs-symmetric-encryption-algorithms/

Big Idea 5: We are the Content


Self-Sovereign Identity



Symmetric Encryption

Asymmetric Encryption

Session

One key

https://medium.com/@carrascosa.cobos/will-europe-aim-for-digital-identity-796afa3ce6cd

Identity Graph



https://twitter.com/merkle/status/938123229335613440

More

- Identity Graphs: how online trackers follow you across devices. Robert Heaton. https://robertheaton.com/2017/11/24/identity-graphs-how-online-trackersfollow-you-across-devices/
- What Is Identity? OpenLearn. Read through the first part of this short course. https://www.open.edu/openlearn/people-politics-law/politics-policypeople/sociology/identity-question/content-section-1.1
- Identity as Evolving, Dynamic, Contextual. Maha Bali. https://blog.mahabali.me/writing/identity-as-evolving-dynamic-contextual-el30/
- Keybase.io Downes. This is my Keybase page. https://keybase.io/downes
- The Basics of Decentralized Identity. Kames. <u>https://medium.com/uport/the-basics-of-decentralized-identity-d1ff01f15df1</u>
- Decentralized Identifiers. A new World Wide Web Confortium (W3C) specification. <u>https://w3c-ccg.github.io/did-spec/</u>

Activity

Instructions

- Create an Identity Graph: We are expanding on the marketing definition of an identity graph. It can be anything you like, but with one stipulation: your graph should not contain a self-referential node titled 'me' or 'self' or anything similar
 - Think of this graph as you defining your identity, not what some advertiser, recruiter or other third party might want you to define.
 - Don't worry about creating the whole identity graph focusing on a single facet will be sufficient. And don't post anything you're not comfortable with sharing. It doesn't have to be a real identity graph, just an identity graph, however you conceive it.

Recognition



Recognition

How do we know a course has been successful? How do we know what someone has learned? How can we know whether to trust in the education of our mechanics, doctors, engineers and pilots.

ψ	Philosophy There is not clear agreement on what counts as success. Different outcomes from learning events can be tracked and measured in any number of ways. And there is the danger of bad actors - of those who cheat on tests, fake certificates, or misrepresent their qualifications.	- (l	Education There are numerous competency definition standards, everything from Australia's National Competency Standards to the NIH's Nursing Competency standard. Activity tracking has been formalized by xAPI and records are stored in Learning Record Stores (LRS).
	Computing Actual AI-based assessment of competent performance will be used to create competency models that can inform AI- based speech-raters, competency systems, and professional evaluation. Actual authentic tasks designed (or contributed) by humans may be needed to balance the possibility of biased algorithms	[1]	Media The certificate of the future will be a job offer. Software is being developed to map directly from a person's online profile to job and work. These today are unreliable and superficial, but with trustworthy data from distributed networks we will be able to much more accurately determine the skills - and potential - of every individual.

Measuring activities

Figure 2: xAPI and LRS Connectivity



xAPI and the Learning Record Store

https://xapi.com/overview/

What counts as success?



Competencies?

https://www.pearson.com/us/highereducation/products-services-institutions/careersuccess-program.html

Competencies and Skills





Competency and Skills System



Competency & Skills System (CaSS). Advanced Distributed Learning. <u>https://adlnet.gov/projects/cass</u>

Disaggregation of the traditional degree, breaking it into component parts (Horizon Report). "To be profitable privatisation depends on standardisation to scale." (We The Educators). Credentials earn careers, but competencies earn gigs.

Badges, Microcredentials...



Open Badges are the global standard for verifiable digital credentials.

https://openbadges.org/ https://www.openbadges.me/ https://openbadgefactory.com/ https://badgr.com/



Doug Belshaw: "If we used the blockchain for Open Badges, then we could prove beyond reasonable doubt that the person receiving badge Y is the same person who created evidence X." Sony plans to launch a testing platform powered by blockchain and that IBM plans to offer 'blockchain-as-a-service.'

Activity Records, xAPI...



xAPI lets you capture (big) data on human performance, along with associated instructional content or performance context information...

https://adlnet.gov/research/performance-tracking-analysis/experience-api/ https://www.yetanalytics.com/xapi-lrs

Learning Analytics

Recognition Networks The "what" of learning Strategic Networks The "how" of learning Affective Networks The "why" of learning



Siemens and Long - Course-level: learning trails, social network analysis, discourse analysis

- ^g Educational data-mining: predictive modeling, clustering, pattern mining
 - Intelligent curriculum: semantically defined curricular resources
 - Adaptive content: content sequence based on behavior, recommendation
 - Adaptive learning: social interactions, learning activity, learner support

Analytics and Big Data





Tells us about the person

Personal Learning Record



Personal Learning Record

This is a *new* type of data – it's called the *personal graph*.

Each person has their own *private* personal graph.



The PLR contains all a person's learning records, including:

- certificates, badges and credentials
- activity records, test results, scores
- Assignments, papers, drawings, things they create

Identity and Recognition



The quantified self will give way to the qualified self

http://quantifiedself.com/reporter-app/

Icons from The Noun Project: Chicken by Kate Vogel, Fish by Jens Tärning, Lamb by Unrecognized MJ, Mushroom by Alessandro Suraci, Shrimp by Krause, Steak by saakshi vyas

Old MacDonald had a calendar and on that calendar were lots and lots of chickens.



Will the 'connected self' be more reflective? Will 'the connective self' more honestly reflect our hopes, aspirations and dreams?

https://jennymackness.wordpre ss.com/tag/digital-identity/

https://mitpress.mit.edu/books/qualified-self https://markcarrigan.net/2014/07/23/qualitative-self-tracking-and-the-qualified-self/

Big Idea 6: AI-Based Learning Recognition



What happens when we recognize skills and competencies rather than content knowledge?

We no longer need to depend on tests and exams and can instead rely on a body of work.

Recognizing Learning as a Totality of Achievement





LEADERSHIP SUPPORT (e.g. role models and champions)

MANAGEMENT (e.g. workplace health coordinator, committee)

(e.g. goals and strategies)

DEDICATED RESOURCES (e.g. costs, partners/vendors, staffing)

COMMUNICATIONS (e.g. marketing, messages, systems)

3 IMPLEMENTATION

PROGRAMS (e.g. education and counseling)

POLICIES (e.g. organizational rules)

BENEFITS (e.g. insurance, incentives)

ENVIRONMENTAL SUPPORT (e.g. access points, opportunities, physical/social) We can also gather data outside the school or program, looking at actual results and feedback from the workplace.

https://www.cdc.gov/chronicdisease/resources/publications/aag/workplace-health.htm

More

- China's Social Credit System: A Mark of Progress or a Threat to Privacy? <u>https://piie.com/publications/policy-briefs/chinas-social-credit-system-mark-progress-or-threat-privacy</u>
- Open Badges. General information page about badges. <u>https://openbadges.org/</u>
- An Experience API for learning everywhere (also in virtual worlds). Roland Legrand. <u>https://www.mixedrealities.com/2018/10/25/an-</u> <u>experience-api-for-learning-everywhere-also-in-virtual-worlds/</u>
- 2018 Technical Report on xAPI. IEEE LTSC TAGxAPI. https://www.tagxapi.org/ieee-technical-report/

Activity

Instructions

- If you have internet access, create a free account on a Badge service (<u>https://badgr.com/</u>, <u>https://www.openbadges.me/</u>, <u>https://openbadgefactory.com/</u>). Otherwise, use this space to design your badge, clearly identifying different data elements:
 - create a badge and give it a name, criteria, design
 - award it to yourself or describe how it would be awarded.
 - use a blog post on your blog as the 'evidence' for awarding yourself the badge
 - place the badge on the blog post.

Community



Community

The fundamental challenge to community is to make decisions on matters affecting everybody while leaving to individuals, companies and institutions those matters not effectively managed by consensus.

Ψ	Philosophy The traditional concept of community was built on sameness, on collections of people from the same family, speaking the same language, living in the same place, believing the same things. This was challenged by social and political reforms through the last few centuries.	Ą	Education What is required for learning to work is not merely control, but <i>agreement</i> on the part of the members of the community. Underlying this is a respect for law, institutions and processes, and when these break down, and when consensus is lost, it is very difficult to restore
	Computing Digital currencies such as Bitcoin and Ethereum use a "proof of work". Other types of content create other types of consensus: "proof of stake" relies on guarantees of resources or assets; "proof of authority" depends on certification or validation.	[I]	Media The critical literacies include not just being able to <i>communicate</i> with each other, but to be able to build and create. Consensus, ultimately, is a question of stigmergy, and we will look not only how it is created, but also how it is undermined (think, for example, of 'dark patterns').

The Byzantine Generals Problem



How to find the 'source of truth' in a world filled with bad actors and unknown quantities

Trust no one...

From cs4410 fall 08 lecture

https://slideplayer.com/slide/5163640/

Distributed ledgers

"A distributed ledger technology (DLT) is a system where we share information and we don't trust each other individually, but we trust the group as a whole. DLTs allow us to come up with a consensus on the order of transactions and timestamps."



Construction of a blockchain



https://hackernoon.com/how-does-blockchain-technology-work-ceeeee47eaba

Consensus – Proof of Work

"The best known and most widely deployed mechanism is of course proof-of-work (aka. Nakamoto consensus). Forks can occur, and are resolved by PoW consensus, which amounts to picking the chain with the most accumulated work."



https://blog.acolyer.org/2018/02/12/sok-consensus-in-the-age-of-blockchains/

Consensus - Alternatives



https://www.deviantart.com/azza1070/art/Blockc hain-Protocols-PoB-PoW-PoS-PoI-PoC-PoA-734159319

ConsensusPedia: An Encyclopedia of 30 Consensus Algorithms. Consensus algorithms are the basis of all the blockchains/DAGs. https://hackernoon.com/consensuspedia-anencyclopedia-of-29-consensus-algorithmse9c4b4b7d08f

Blockchain-based protocol for autonomous business activity



Example

 Typical work scenario of Drone Employee. Dashed arrows indicate waiting of contract appearance. A set of all contracts in the network are integrated into decentralized market block.

Blockchain-based protocol of autonomous business activity for multi-agent systems consisting of UAVs. Available from: https://www.researchgate.net/publication/325451400 Blockchainbased_protocol_of_autonomous_business_activity_for_multi-agent_systems_consisting_of_UAVs [accessed Apr 28 2019].

Truffle (NRC example)

- a development framework for Ethereum - <u>http://truffleframework.com/</u>
 - Truffle takes care of managing your contract artifacts so you don't have to.
 - Ganache -<u>https://truffleframework.com/ganache</u>
 one-click blockchain
 - Drizzle- A collection of front-end libraries that make writing dapp user interfaces easier and more predictable.



https://www.slideshare.net/MartinKppelmann/build-dapps-13dev-tools

Big Idea 7: Community as Consensus



Creating Community

- The mechanisms we use to interact and reach consensus are what define us as a community...
- Is consensus based in work, stake, importance, authority...? What are the conditions for consensus?

Paxos <u>https://en.wikipedia.org/wiki/Paxos (computer science)</u>

More

- Trust, Truth, Consensus and Community on the distributed web Jenny Mackness - <u>https://jennymackness.wordpress.com/2018/12/09/trust-</u> <u>truth-consensus-and-community-on-the-distributed-web/</u>
- How Does Distributed Consensus Work? Preethi Kasireddy. Distributed systems and consensus. <u>https://medium.com/s/story/lets-take-a-crack-at-understanding-distributed-consensus-dad23d0dc95</u>
- What is Blockchain? Lucas Mostazo, YouTube. Blockchain explained in plain English. <u>https://www.youtube.com/watch?v=3xGLc-zz9cA</u>
- Education Blockchain Market Map. HolonIQ. https://www.holoniq.com/blockchain

Activity

Instructions

- As a community, create an assignment the completion of which denotes being a member of the community. For the purposes of this task, there can only be one community for the entire workshop.
- Use the space above to contain your contribution to the community.
- For each participant, your being a member of the community completes the task.

Note: in the workshop, you will be presented with the 'Byzantine Generals Problem' and left to consider how you, as a community of communities, might solve it.

Experience


Experience

It is a truism that we learn from experience, and yet creating a role for experience in learning has been one of the most difficult problems in education. And so much of education continues to rely on indirect methods depending on knowledge transfer - reading, lectures, videos - rather than hands-on practice and knowledge creation.

Ψ	Philosophy No experience is inherently meaningful. What a new experience means depends on previous experience. And experience is active. "Observation alone is not enough. We have to understand the significance of what we see, hear, and touch." This is determined by us, as recognition.	A	Education Just as multiple authors can edit Wikipedia articles or work on code in GitHub, participatory learning media enables learners to interact creatively without management or direction; the outcome is a consensus determined not by voting but by participation.
	Computing New technology is beginning to <i>combine</i> the ability of teachers and role models to model and demonstrate successful practice and the need for learners to practice and reflect on their learning in that environment. Live streaming events are transforming real-world events into hands-on learning experiences	[1]	Media The <i>creation</i> of the content becomes a part of the content itself. We see this with the recent self-shredding art by Banksy or the inside look at how the single-scene time-lapse sequence was filmed. Some artists have made working openly part of the act - Deadmau5, for example, showing how electronic music is produced

A Basis in Personal Experience



Truth begins with personal knowledge... We can describe how it works in a specific domain

https://partiallyexaminedlife.com/2018/ 08/06/ep196-1-simon-blackburn/

https://halfanhour.blogspot.com/2016/12/detecting-fake-news.html

Practice and Reflection



We learn from experience... And reflecting on experience. We are beginning to *combine* the experience and reflection

https://charles-jennings.blogspot.com/2016/07/the-power-ofreflection-in-ever.html

https://www.epicgames.com/fortnite/en-US/home

Content and Creation



Creation of the content is becoming a part of the content itself.

Livecaster

https://intrsection.com/2017/04/8396/

Twitch

https://www.twitch.tv/

Open Broadcaster

https://obsproject.com/

High School Math ML Problem



- Here we have a case where a high school student has been given the problem of optimizing traffic flow in his school parking lot.
- When they're in trafic, it's not about what you want to teach them, it's about what they need to know; it's not about what you can do for them, it's about what they can do for themselves

https://www.reddit.com/r/MachineLearning/comments/bhp6bw/p_can_you_solve_this_high_school_ml_problem/

Creating With OpenAl

Completion

A poem, constrained,

by words and context; Not even the poet knows what happens next ... I can just imagine how that story looks: The wind whistling against the sky ... the ocean glitters ... a distant land Crawling on the sea floor, growing thicker and darker The trees have been robbed and gone It's been so long since someone used to love me, When I was so scared, I forgot

My old mother would hold me So tight her fingers hurt as he Lifted them out while she whispered To me as if she was still alive ...

She whispered the same words every night, she said I'd never love her But I did. She wanted everything, so she gave it to me.

I am what I am when I'm no longer Something that mustn't be forgotten... ... a person so beautiful.



http://dogtrax.edublogs.org/2019/05/18/writing-collaboration-with-openai-context-and-constraints/

Big Idea 8: Content and Creation Combined



https://www.mediavill age.com/article/howbanksys-disruptiveapproach-informs-thebest-creativecampaigns/

CodePen



https://codepen.io/picks/pens/

New types of learning resources



Jupyter Notebook combines data and code in a document

JupyterLab Environment work with code, data, and the Jupyter notebook format.

https://jupyter.org/try (Binder demo)

https://www.dataquest.io/blog/jupyter-notebook-tips-tricks-shortcuts/

Notebooks



Jupyter Notebook combines data and code in a document

JupyterLab Environment work with code, data, and the Jupyter notebook format.

https://www.dataquest.io/blog/jupyternotebook-tips-tricks-shortcuts/

A gallery of interesting Jupyter Notebooks



https://github.com/jupyter/jupyter/wiki/Agallery-of-interesting-Jupyter-Notebooks#machine-learning-statistics-andprobability поізе, тоталонаї ани угастаї зеізтногоду, ани тноге.

Linguistics and Text Mining

- Workshop on text analysis by Neal Caren.
- Detecting Algorithmically Generated Domains, part of the Data Hacking collection on securityoriented data analysis with IPython & friends.
- Mining the Social Web (2nd Edition). A complete collection of notebooks accompanying Matthew Russel's book by O'Reilly.

Signal Processing

- Sound Analysis with the Fourier Transform. A set of IPython Notebooks by Caleb Madrigal to explain what the Fourier Transform is and how to use it for basic audio processing applications.
- An introduction to Compressed Sensing, part of Python for Signal Processing: an entire book (and blog) on the subject by Jose Unpingco. ádasd
- Kalman and Bayesian Filters in Python. A textbook and accompanying filtering library on the topic of Kalman filtering and other related Bayesian filtering techniques.
- Classify human movements using Dynamic Time Warping & K Nearest Neighbors: Signals from a smart phone gyroscope and accelerometer are used to classify if the person is running, walking, sitting standing etc. This IPython notebook contains a python implementation of DTW and KNN algorithms along with explanations and a practical application.
- Digital Signal Processing A collection of notebooks that accompanies a masters course on the topic.
- An introduction to openCV An introduction course into using openCV for computer vision in python

Engineering Education

 Introduction to Chemical Engineering Analysis by Jeff Kantor. A collection of IPython notebooks illustrating tonics in introductory chemical engineering analysis including

Cretivity and Consensus



Workplaces, are beginning to create self-organizing consensus-based coproduction networks.

https://www.sciencedirect.com/science/articl e/pii/S000368701630093X

Jupytext – Notebook plus version control



Jupytext saves two (synced) versions of your notebook. A .ipynb file and a .py file. (Other formats are possible as well.) Y

Creating and learning – code and outcome - combine in a single environment



https://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/

Excreences This is simulated circuitry that can compute as you watch. The switches on the left turn the current on and off at random, and the logic gates direct the flow of the current.

Agency



Agency

This part of the workshop addresses two conceptual challenges: first, the shift in our understanding of content from documents to data; and second, the shift in our understanding of data from centralized to decentralized.

Ψ	Philosophy McLuhan said that technology is a projection of ourselves into the world. Our senses are amplified by virtual and augmented reality, our cognitive capacities extended by machine vision and AI, and our economic and social agency is represented by our bots and agents.	ل ال ال ال ال ال ال ال ال ال ال ال ال ال	Education earning therefore demands more than ust the transmission or creation of mowledge. Our learning will need to emphasize and promote individual agency is much as they need to develop the tools and capacities needed to support social, political and economic development.
	Computing What we learn, and what makes learning successful, depends on <i>why</i> we learn. Four key elements of the new technological framework: security, identity, voice and opportunity. These elements are in turn what consensus-based decentralized communities are designed to augment.	T H to a a tf	Vedia low do we ensure that what we project o the world is what we want to project, ooth as teachers and learners? As content and media become more sophisticated and more autonomous, how do we bind hese to our personal cultural and ethical rameworks?

Agency: What is It?



Image: https://www.emotivebrand.com/agency-of-the-future/

The relative standing of the individual with respect to community, institutions, and governments

Self-Efficacy

Self-efficacy refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1977, 1986, 1997). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behavior, and social environment.

https://opentextbc.ca/introductiontosociology/chapter/c hapter17-government-and-politics/

https://www.apa.org/pi/aids/resources/education/selfefficacy

Agency Changes

Technological Constructivism Model: it's people that matter most!



Agency changes as technology changes

Agency is based on affordances

Figure 3: A Model of Technological Constructivism

https://www.tcd.ie/Geography/assets/pdf/e nv gov/Hynes 2013 practices of technolo gy.pdf

You're Not Stuck In Traffic, You Are Traffic



"a new generation of designers has emerged, concerned with designing strategies to subvert this "natural default-setting" in which each person understands themselves at the center of the world."

https://jods.mitpress.mit.edu/pub/design-as-participation

Big Idea 9: Redefining Success



Four key outcomes for a modern distributed learning environment: security, identity, voice and opportunity.

https://www.downes.ca/post/68088

https://opentextbc.ca/introductiontosociolog y/chapter/chapter17-government-andpolitics/

Agency



Education must focus on the tools and capacities for agency

Literacies Comprehension, understanding and communication



https://www.globalpartnership.org/blog/building-peacethrough-education https://science.sciencemag.org/content/364/6441/702

Communities and Networks



Future Directions: Personalization



"Personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs... activities are meaningful and relevant to learners, driven by their interests, and often self-initiated." (NEPC)

The State

The Individual







The Individual





The Individual







Networks







Networks Networks Communities MANY WAYS Organic - Biological DIVERSITY MIXTURES SALAD BOWL

Groups
Collectives ONE WAY
Metallic - Elemental
UNITY SOMETIMES EVEN PURITY MELTING POT
COORDINATION

GROUP VALUE

(= LEADER VALUE)

AFFINIT Networks Communities MANY WAYS Organic - Biological

FUTURE

DIVERSITY MIXTURES SALAD BOWL

AUTONOMY COOPERATION EXCHANGE

MUTUAL VA:UE

TODAY	Groups Collectives ONE WAY Metallic - Elemental UNITY SOMETIMES EVEN PURITY MELTING POT
	COORDINATION LEADERS! COLLABORATION GROUP VALUE (= LEADER VALUE) CLOSED

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Organic - Biological

MIXTURES SALAD BOWL

COOPERATION EXCHANGE

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Two Approaches...



Two Approaches...


Two Approaches...



Library

Environment





Identity



We are the thread that runs through an otherwise disconnected set of data

https://www.datadoghq.com/blog/monitorin g-kafka-performance-metrics/

^{····} Coordinates cluster membership

Commit offset (v 0.8)

Personal Learning Environments



Cedric Price



- Cedric Price: "Price was designing not for the uses he wished to see, but for all the uses he couldn't imagine.... As opposed to the 'user' of a building who is interacting with a smart thermostat, the participants in a building are engaged with one another."
- Or as I like to say, we built a trillion-dollar communication system, and people use it to send cat pictures, and that's the beauty of it.

https://www.architectural-review.com/essays/reputations-penportraits-/cedric-price-1934-2003/10026650.article

gRSShopper workflow





- It's personal and you carry it with you
- It's a network we don't put everything in one package, but develop an infrastructure that links relevant resources
- Different types of things, not just courses: access to learning resources, calling cards and communication tools, credentials, permits and licenses

Manage social media accounts

R	eader Subscribers	Newsletters	Accounts	Meetings				2	»	Myself	Discuss	Chatter	Email	
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Register for the course



- **X** Adaptive Leadership in Development
- **X** The Science and Practice of Sustainable **Development**
- ✓ ★ Leaders in Global Development
- **X** Information and Communication Technology (ICT) Accessibility
- **X** Biobased Processes and Implementation
- **X** Biobased Principles and Opportunities
- **X** The Architectural Imagination
- **X** Atomic and Optical Physics: Atom-photon interactions
- **X** Sistemas de Información y ordenadores, Parte 2: Hardware
- **China** (Part 5): From a Global Empire under the Mongols to a Global Economy under the Ming Dynasty
- ☑ X China's Perspective on Climate Change | 应对气 候变化的中国视角



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Critical Development Perspectives

Gain insight into the different perspectives & trends facing development workers to lead more effectively across sectors & organizations.



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There is a vast array of different arguments about what development is and				

Read resources while in my course

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☑ ¥ Episode 41: Jennie Rothschild

☑ 🛠 Episode 42: Emily Lloyd

🗹 🛠 Episode 43: Naomi House

🗹 🗶 Episode 44: Dan Cohen

🗹 🛠 Episode 45: James Larue

X Episode 46: Awful Library Books

🗹 🛠 Episode 47: Kelly Jensen

🗹 🗶 Episode 48: Kristin Lalonde

🗹 🗶 Episode 49: John Chrastka

🕼 🗶 Episode 50: Chattanooga Public Library

🕼 🗶 Episode 51: Elizabeth Keathley

☑ X Expect More 1

☑ X Expect More 2

C & Episode 52: Lost In The Stacks

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On Ed Radio Today	Critical Development Perspectives edx, Jun 06, 2017
William D. Parker: PMP:103 Standing Back Up When You Feel Knocked Down. Feb 21, 2018	There are many approaches and perspectives about what is most important within the development sector. Some practitioners argue that basic water and sanitation is essential to good development, others push for women's economic empowerment. Others still believe that good governance and institutions are the driving factor to sustainable development. In this development studies course, you will engage with contemporary debates and gain new perspectives on what it means to be a leader in development. By gaining a good understanding of the different
William D. Parker: PMP:102 Four Essentials for Advancing in Your Leadership. Feb 14, 2018	challenges facing development workers across the globe, you will be able to lead more effectively across sectors and organizations. The course focuses each module around key readings that argue a particular perspective or idea. Interviews with the author, alongside other academics and practitioners, complement these readings and encourage new ways of thinking about the challenges facing workers in this space. Learners are
Circulating Ideas: 126: Alex Halpern. Feb 13, 2018	encouraged to reflect on their own ideas and practice, and share their perspectives with other learners and the course team. This course is part of the Leadership in Global Development MicroMasters Program. In order to get the most out of this course, we recommend that you have experience working in the development sector or a strong interest in this area. We also recommend you have completed the following courses prior to
Circulating Ideas: Expect More 4. Feb 12, 2018	commencing or in parallel with these courses: Leaders in Global Development The Science and Practice of Sustainable Development Adaptive Leadership in Development
Circulating Ideas: Episode 53: Becky Spratford. Feb 12, 2018	Go to Course
Listen to previous broadcasts (also in .m3u format; will play in your audio player)	
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Critical Development Perspectives

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There are many approaches and perspectives about what is most important within the development sector. Some practitioners argue that basic water and sanitation is essential to good development, others push for women's economic empowerment. Others still believe that good governance and institutions are the driving factor to sustainable development. In this development studies course, you will engage with contemporary debates and gain new perspectives on what it means to be a leader in development. By gaining a good understanding of the different challenges facing development workers across the globe, you will be able to lead more effectively across sectors and organizations. The course focuses each module around key readings that argue a particular perspective or idea. Interviews with the author, alongside other academics and practitioners, complement these readings and encourage new ways of thinking about the challenges facing workers in this space. Learners are encouraged to reflect on their own ideas and practice, and share their perspectives with other learners and the course team. This course is part of the Leadership in Global Development MicroMasters Program. In order to get the most out of this course, we recommend that you have experience working in the development sector or a strong interest in this area. We also recommend you have completed the following courses prior to commencing or in parallel with these courses: Leaders in Global Development The Science and Practice of Sustainable Development Adaptive Leadership in Development Go to Course

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Open Learning, Open Networks - 开放学习、开放网络 Journal Article. Oct 23, 2017. <i>Distance Education in China</i> , 2017 - 10 36-46, [Link] [Full Text]				
Is Technology Making Us Smarter? Yes Column. Jul 03, 2017. <i>The Costco Connection</i> , Volume 30, Number 4 15, [Link] [Full Text]	Account: Logout Change Password			
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Journal Article. Feb 28, 2017. Distance Education in China, 2017:2 5-17, [Link] [Full Text]				
Open Learning in the Future Article. Nov 02, 2016. <i>FutuOER</i> , , [Link] [Full Text]				
New Models of Open and Distance Learning Book Chapter. Aug 18, 2016. Open Education: from OERs to MOOCs, Editors: Mohamed Jemni, Kinshuk, Mohamed Koutheair Khribi., 1-22, Springer [Link] [Full Text]				

Manage my newsletters

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Reader Subscribers

Accounts Meetings

Newsletters

Each newsletter is composed of a page and a list of subscribers. Edit pages at left, and to turn any page into a newsletter, set 'Autopub' to 'yes' and 'Sub' to 'yes'. Newsletter contents are typically created automatically using 'keyword' commands in the page; see keyword help for more information. Users subscribe to newsletters through the 'Options' screen; you can manage user subscriptions directly from this page, either individually or as a group. Selecting 'send newsletter' to all subscribers sends the newsletter by email using the values at the bottom of the screen.

Send Newsletter

Page	List	
Select a newsletter $\ {\scriptstyle imes}$	Select an action \sim	Send Newsletter

Newsletters

Manage Newsletter

Post Issue Rollup

Posts in newsletters can be scheduled for publication ahead of time; see the 'Edit Post' screen for more. This button will show you the list of posts scheduled for upcoiming newsletters.

Rollup

Manage Subscriptions

Autosubscribe

Select an action v to Select a newsletter v Do It

Email Program and Addresses

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Chat with social media friends

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☑ X Episode 41: Jennie Rothschild	, Technically Yours Teamann, Feb 22, 2018	Laura Ritchie @lauraritchie 13r		
✓ ★ Episode 42: Emily Lloyd	How do you as an administrator (or teacher!) feel about conferences? Professional learning? Empowering your teachers?Here are the things we did to maximize	One for all Open Educators: (yes it's a link to birdsplat, but I couldn't res		
🗹 🗶 Episode 43: Naomi House	sending our team of teachers to #TCEA! Make the most out of your next	this one)		
🕼 🗶 Episode 44: Dan Cohen	teaching!), make it impossible to send every teacher we have []	twitter.com/CaAl/status/966279		
I X Episode 45: James Larue	The post Get the most out of your conference/professional development! appeared	@Downes		
🕼 🗶 Episode 46: Awful Library Books	first on Technically Yours Teamann.			
☑ X Episode 47: Kelly Jensen	How do you as an administrator (or teacher!) feel about conferences? Professional learning? Empowering your teachers?Here are the things we did to maximize	 Thomas Steele-Maley @steelemaley @Downes Autopsy of a Failed Holacracypost in OLDaily reminded me at once of Etienne WG work on Learning in Landscapes wenger- 		
🕼 🗶 Episode 48: Kristin Lalonde	sending our team of teachers to #TCEA! Make the most out of your next			
🕼 🗶 Episode 49: John Chrastka	teaching!), make it impossible to send every teacher we have []	trayner.com/resources/p and perhaps even more so Zuboff's meaningful work in the		
🕼 🗶 Episode 50: Chattanooga Public Library	The post Get the most out of your conference/professional development! appeared	domain In the Age of The Smart Machine (really all of her work)		
☑ 🛠 Episode 51: Elizabeth Keathley	first on Technically Yours Teamann.	shoshanazuboff.com/new/books/		
I ★ Expect More 1		· · · · · · · · · · · · · · · · · · ·		
I X Expect More 2		dogtrax @dogtrax 2d @Downes Love Velocity would be a good band name		
✓ ★ Episode 52: Lost In The Stacks				

Create and attend live meetings

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Accounts Meetings

Meetings

This is the gRSShopper interface to Big Blue Button. If there is no instance of BBB available, this section will not be usable.

Current Live Meetings

These are the live meetings currently running ion Stephen's Web. If you would like to enter the confreencing environment and join the meeting, please provide a name and then select the meeting you would like to join.

Enter your name: Stephen Downes

There are currently no live meetings taking place.

Create and Join Meetings



Create Meeting and Join It

Join Standing Administration Meeting

Big Blue Button Configuration

BBB Name : BBB

BBB URL : http://test-install.blindsidenetworks.com/bigbluebutton/api/

BBB Salt : 8cd8ef52e8e101574e400365b55e11a6

_	»	Myself	Discuss	Chatter	Email
	Pe	ersonal Pro	file: View	Edit	
	Pu	ublishing:	Options		
	Pe	ersonal Por	tfolio: View	Edit	
	So	ocial Netwo	rk: Options	View	
	Ad	count: <u>Lo</u>	gout Cha	nge Passwo	rd

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Team Lead/Instructor		
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Victoria, BC	DATA SERVICES TOronto, ON	
IFS Training Specialist - Vancouver / Spécialiste –		
Formation Service en Vol - Vancouver		
<u>Air Canada</u>		
Vancouver, BC	About the Job	
Technical Trainer		
Randstad	Learning & Development Specialist	
Markham, ON		Want more jobs like this?
Trainer (software)	Permanent	
W5 Staffing Inc	Department: Quality, Planning and Analysis (462)	Subscribe
Markham, ON		
Bilingual Trainer (Secret Clearance)	30 Adelaide Str. East	
Modis	Toronto, Ontario, M5C 3G9	
Ottawa, ON	Canada	Job summarv
SUPERVISOR MENTOR/COACHES	Number of Positions: 1	,
Irving Shipbuilding Inc.		Location
Halifax NS	Job Description:	Toronto, ON
Regional Trainer- Greater Toronto area	The Learning & Development Specialist is responsible for the training and onboarding of all new employees within	
Hunter Engineering	Business Operations Transactions Services. The incumbent will support the Transactions Services teams through the	Job type
	Apply	🏷 Save 🔛 Email
	with the division's management team to track individual and group skill deficiencies and subsequent training needs. They	rusieu