



Disruptive Innovations in Learning

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<http://www.downes.ca/presentation/389>

1. Innovation



1. Innovation

What is Innovation?

Idea + Execution + Benefit

- Change that creates a new dimension of performance - Peter Drucker <http://en.wikipedia.org/wiki/Innovation>
- “the systematic application of (new) knowledge to (new) resources to produce (new) goods or (new) services” - Maciej Soltynski [Innovation.cc](http://www.freshconsulting.com/what-is-innovation/)

- <https://www.ideatovalue.com/inno/nickskillicorn/2016/03/innovation-15-experts-share-innovation-definition/>
- <http://www.freshconsulting.com/what-is-innovation/>

The Idea

- **Product** innovation – a new type of product or service
- **Process** innovation – change in the production function, eg. change in input mix
- **Organizational** innovation – change in managerial procedures
- **Market** innovation – eg. developing a new market for an existing product
- **Input** innovation – new raw material, new energy source, etc

The Benefit (Sustaining)

Different ways of talking about direction

- Better **quality** of experience
 - - eg. 4K – bigger pictures
 - ‘student success’
- Lower **cost**
- Increased **efficiency** and productivity
 - Typically, ‘standards’
- **Solutions** to problems
 - Access, engagement, completion

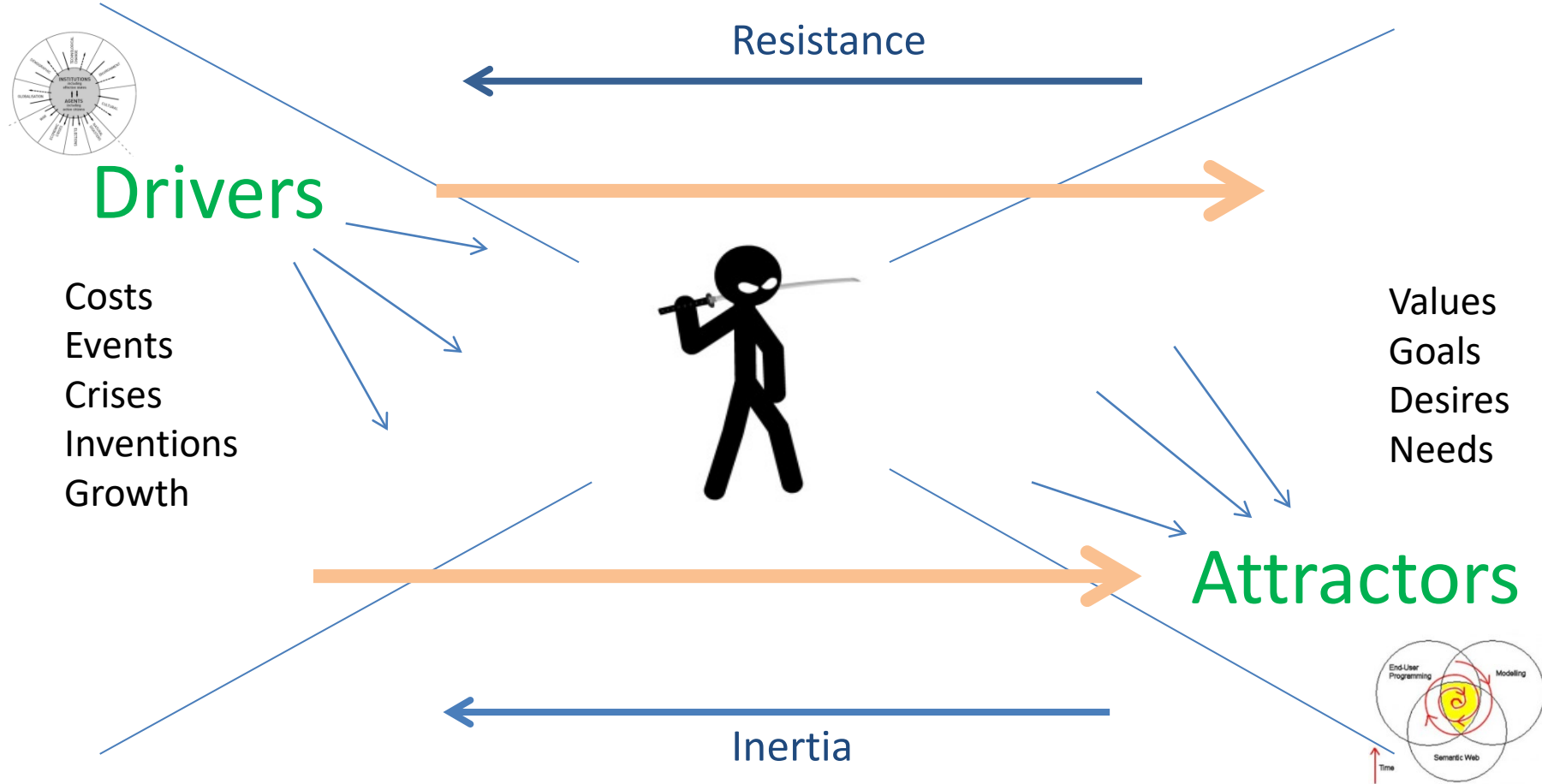
The Benefit (Disruptive)

- Incumbents target high end customers
- Disruptors target with **product & price advantage**:
 - low-end footholds
 - new market footholds
- Not just product innovations;
- Can be business model, etc.



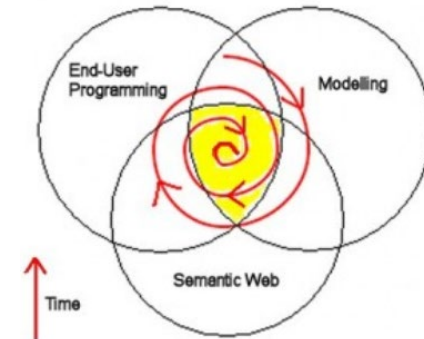
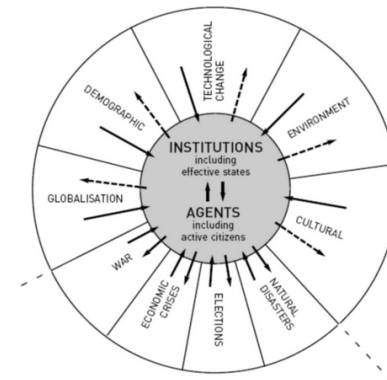
Tbilisi, Georgia, 2014

Causes of Change



Innovation as an Attractor

- We think of change an innovation as working in the same direction, but typically they are working in opposite directions:
 - **Drivers**: out from the centre, toward uncertainty and chaos
 - **Attractors**: toward the centre, toward order
 - And especially preserving what was
 - Sometimes: adaptation to change



Innovation in Education



Mexico City, Mexico, 2016

- Is education “ripe for disruption”?
- Changes in tech that didn’t change learning
 - TV, Video, overhead projectors
 - Portable classrooms
 - Learning management system
 - Clickers?
 - Second Life

Innovations but not disruptions

- Tony Bates. 2014. A Short History of Educational Technology. <http://www.tonybates.ca/2014/12/10/a-short-history-of-educational-technology/>

A Candidate for Disruption?

- Online Learning (1995f) & The MOOC (2008f)
 - “Stalled efforts to push MOOCs through the institutional membrane that surrounds higher-education credentialing have cast doubt on whether large-scale free courses will end up disrupting anything.”
Steve Kolowich
 - “The reality of online learning... a substantial increase even in years of financial pressures on enrollments.”

What Counts as Innovation?

- It depends on how the world sees you
 - Is there ‘demand’ for the new thing (eg., a market, buyers, users)
 - Is there a ‘business case’ for it? (Cost/value model)
 - Is there a ‘benefit’ for the customer (greater income, lower cost, amusement)?
- What happens when these change?

Who Speaks for Us?

- Who defines innovation?
- Who defines student success?



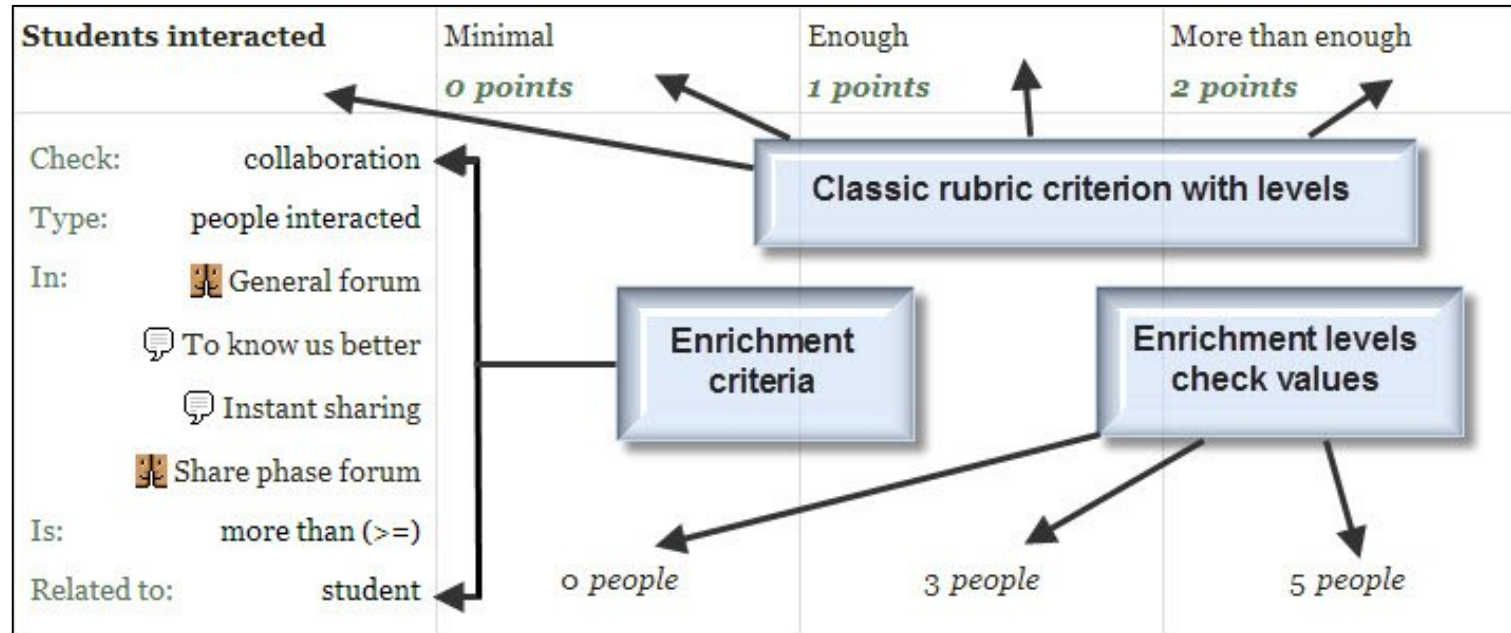
George Couros. 2016. Who is Defining Student Success? <http://connectedprincipals.com/archives/12581>

Curitiba, Brazil, 2015

2. Innovations



Machine learning and AI?



- **decision engines** - these are expert systems that are based on rule-driven strategies
- **pattern recognition** - perceptual systems that identify patterns from partial or disorganized data
- **cluster detection** - detecting nearest neighbours and categories of things

Personalization

Recognition Networks

The "what" of learning



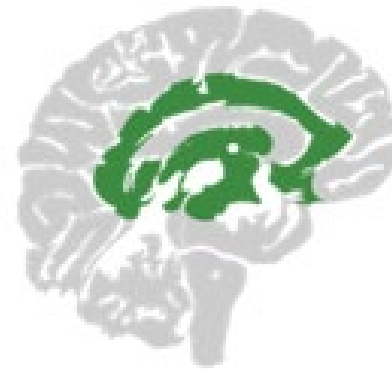
Strategic Networks

The "how" of learning



Affective Networks

The "why" of learning



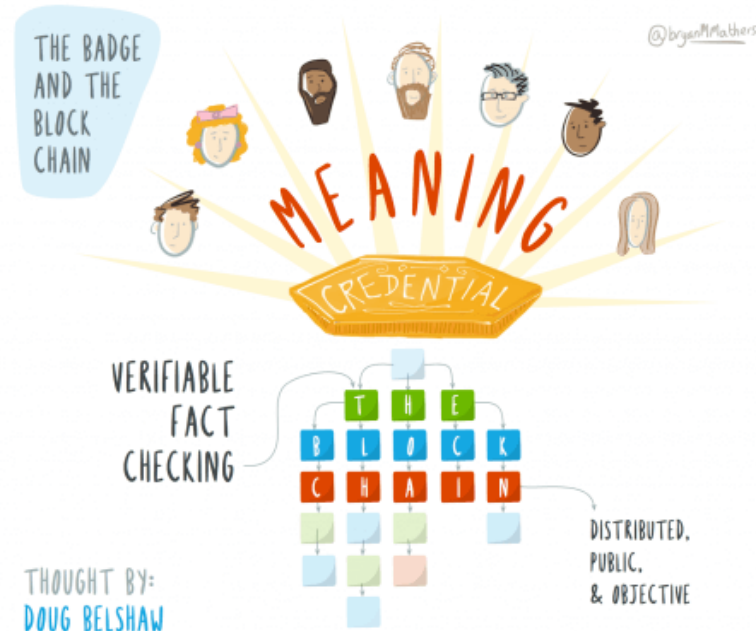
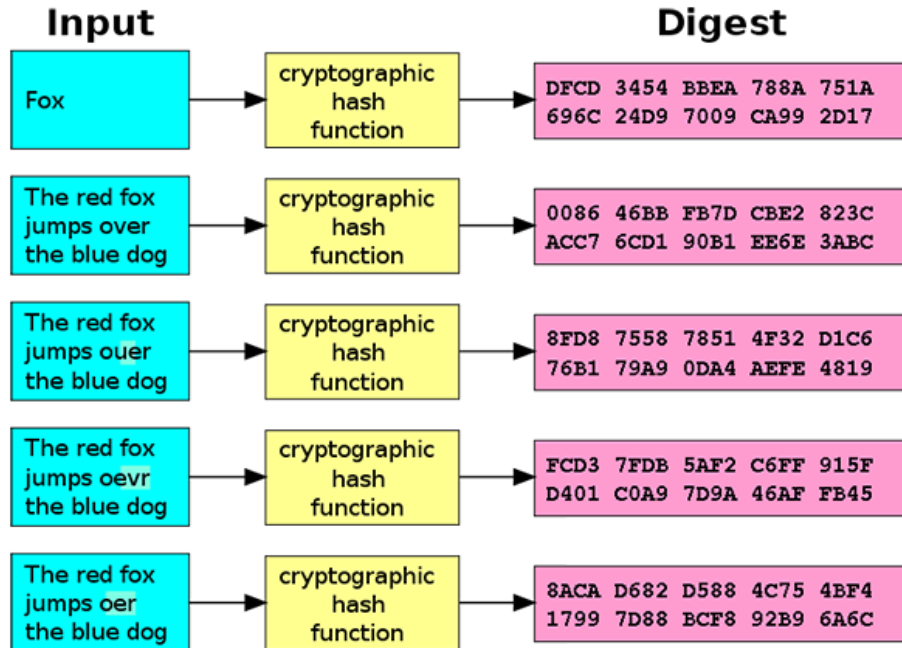
- Rules-Based Events (like notifications)
- User Models
- Adaptive Learning

Handheld Learning



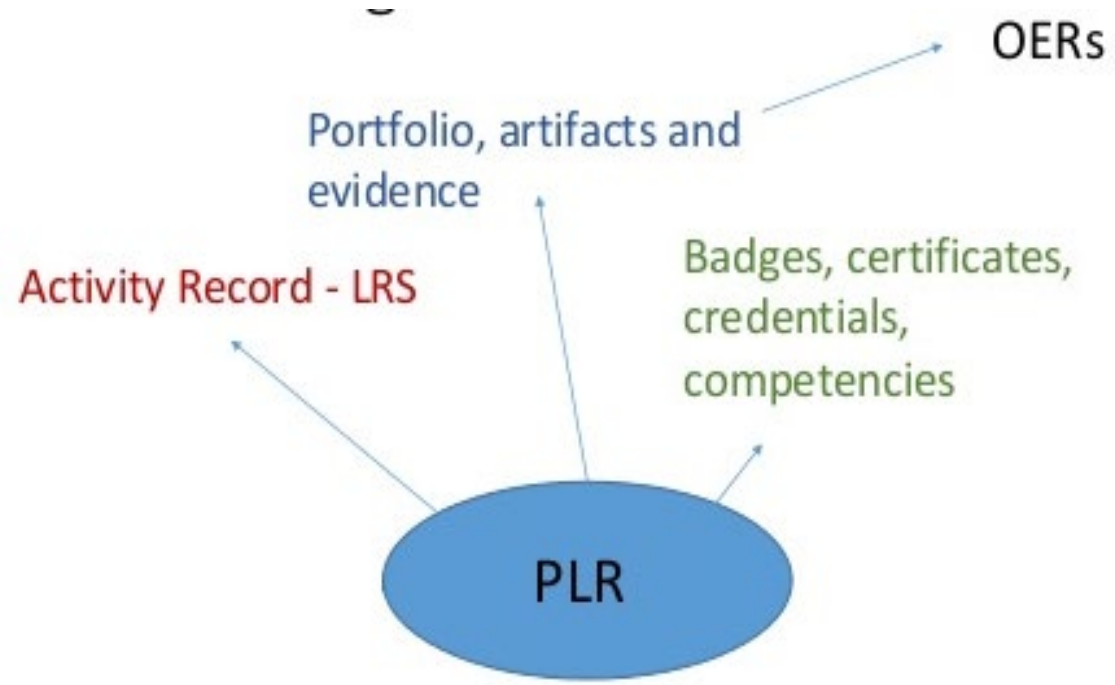
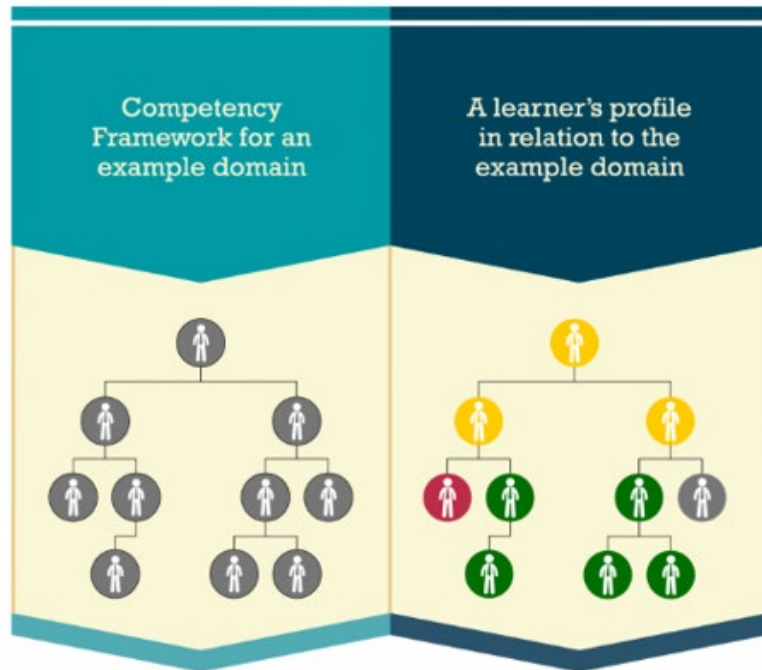
- Performance Support
 - The future of learning isn't the mobile phone
 - It's in the *integrated* performance support system

Badges and Blockchain

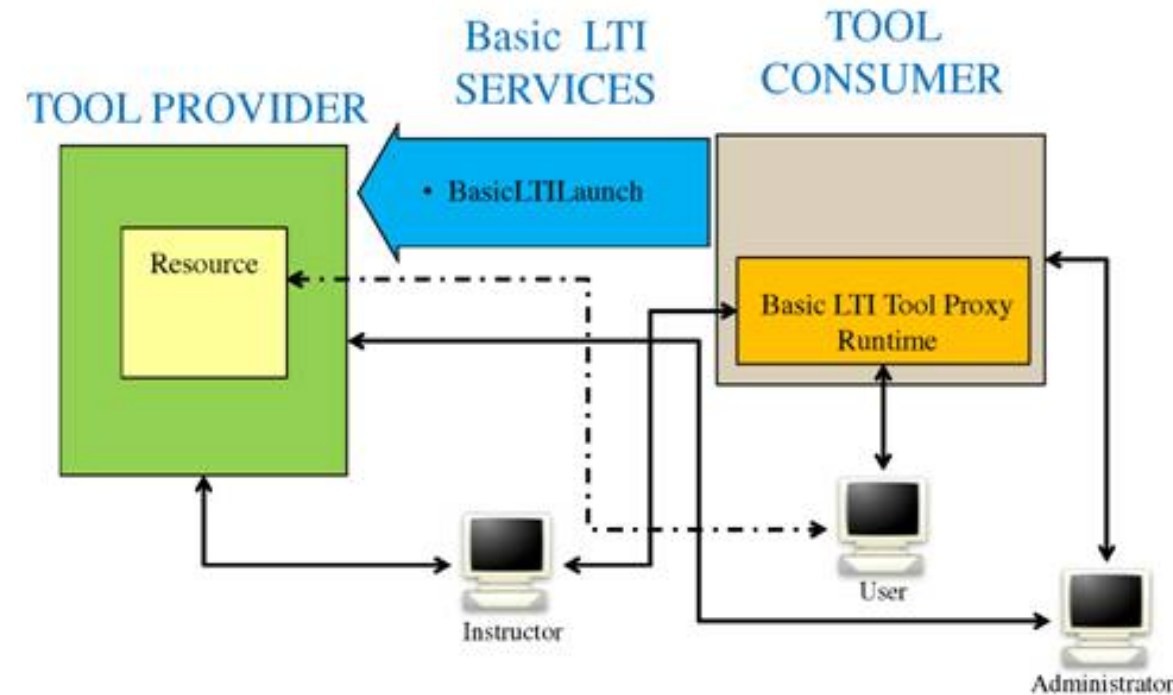


- Belshaw: we could prove beyond reasonable doubt that the person receiving badge Y is the same person who created evidence X.
- Sony plans to launch a testing platform powered by blockchain and that IBM plans to offer 'blockchain-as-a-service,'"

Competency and Skills System (CASS)

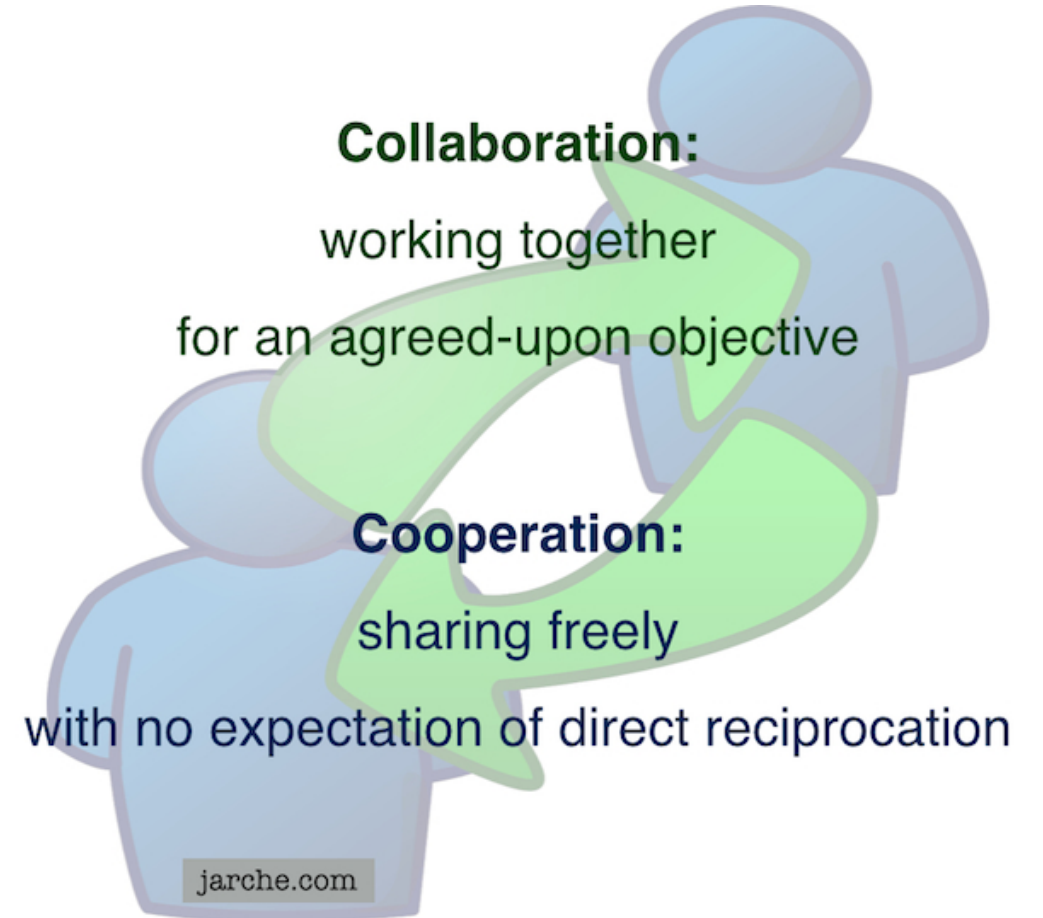


Games, Sims and Virtual Reality



- ‘Gamification’ – adds game elements to learning
- ‘Serious Games’ – employs a game to facilitate learning
- What happens when companies know the state of all your devices?
- Learning Tools
 - LTI Producer – provides features
 - LTI Consumer – connects to features

Translation and Collaborative Technology



- Communication is and will be everywhere
- But the future lies in cooperation, not collaboration

What happens when companies know the state of all your devices?

3. Transformation



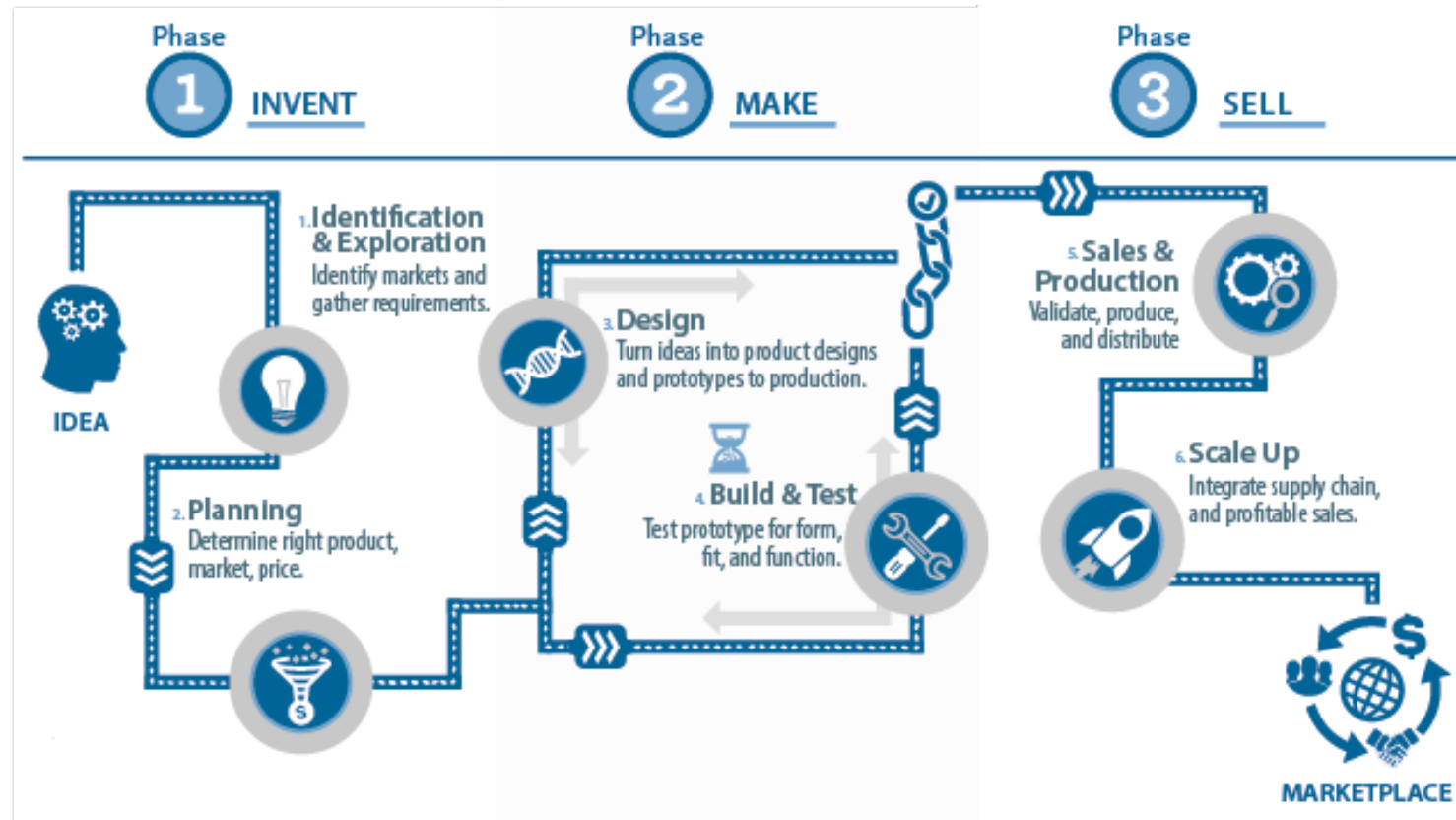
What are Research & Development?



Riyadh, Saudi Arabia, 2015

Science as a "combination of evaluating evidence, coordinating evidence and models, and arriving at evidence-based judgments that are communicated through argumentation."

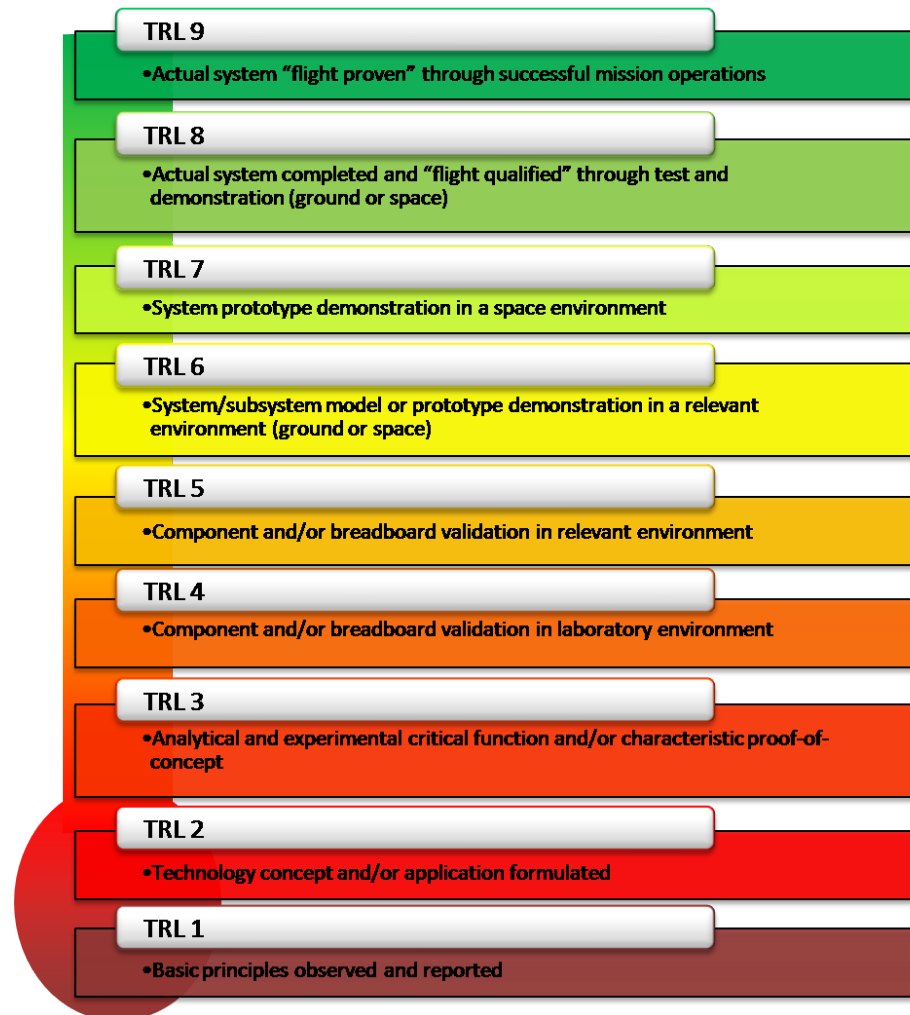
Stages of Innovation



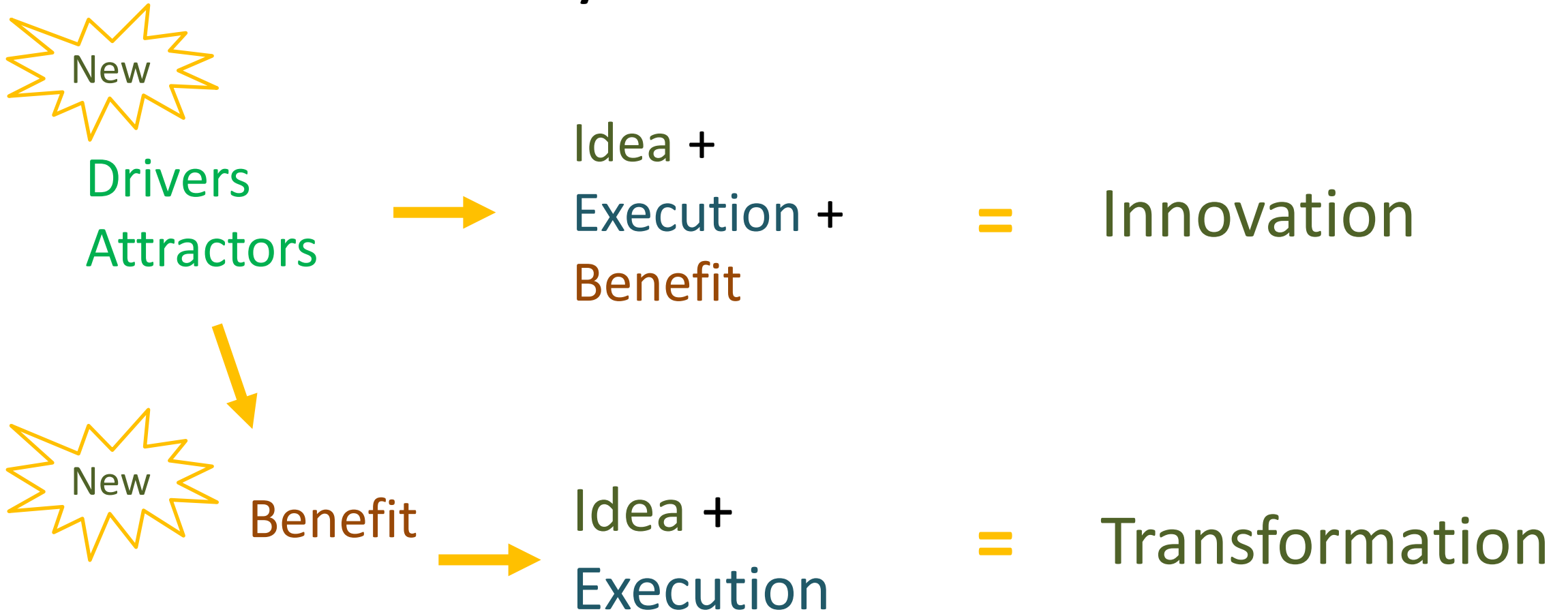
- Does selling really come after making?

Technology Readiness Levels

- From concept to prototype to qualification to proof...



Beyond Innovation



What is Transformation?

- “In an organizational context, a process of profound and radical change that orients an organization in a **new direction** and takes it to an entirely **different level** of effectiveness.”
- “Transformation implies a **basic change of character** and little or no resemblance with the past configuration or structure.”

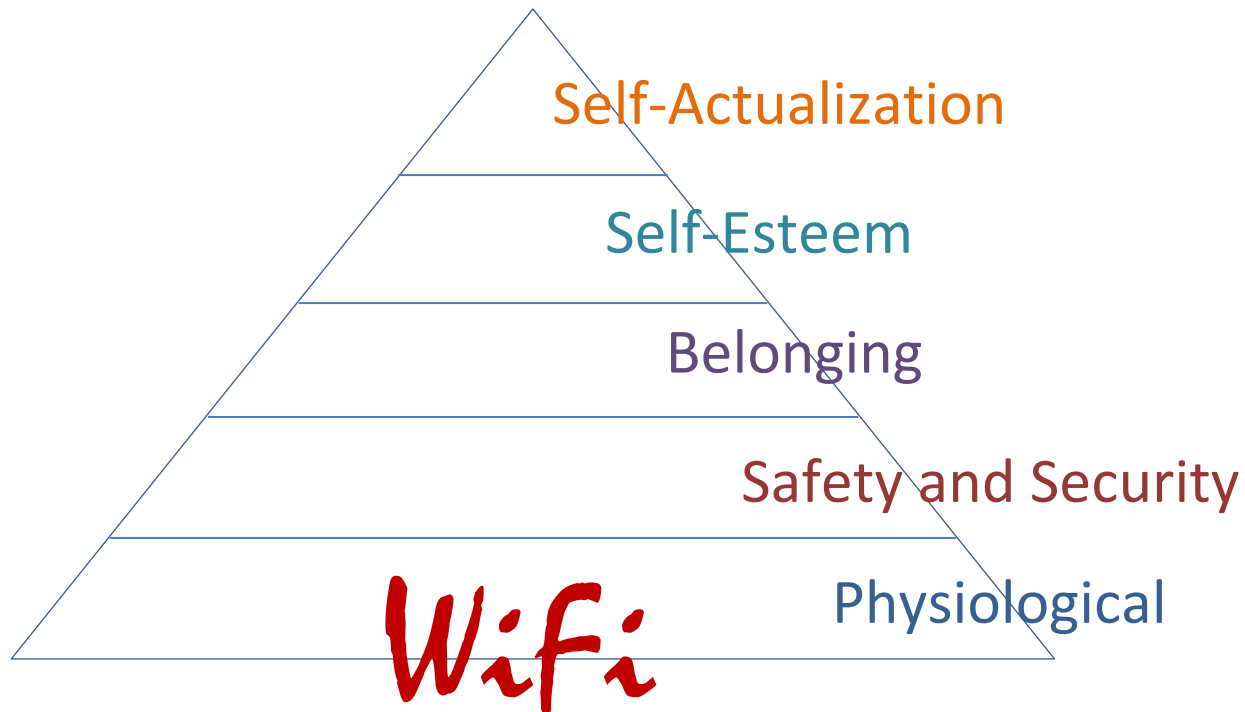
Microsoft's Vision

- Learning community
- Teacher capacity
- Efficient schools
- Personalization
- Physical learning environments
- Curriculum & assessment
- Is this really transformation?
- Are these things we really want?



Questions to Ask

- What will new technology enable?
- How will our wants and needs change?



Does Maslow
speak for us?

Transformation of Education

- *Now* we're asking the right kind of question
- Look at how education has been transformed through the years based on changing definitions of need:
 - past needs: storytelling
 - present needs: 'apprenticeship' (aka child labour)
 - future needs: preparing for the factory
 - potential needs: the route to academia

What Next?

- *What is* the right kind of question?
- How will education be transformed into the future based on changing definitions of need:
 - my needs: how can I become a knowing person?
 - our needs: how can we create new knowledge together?

4. Transformations



Reframing the Issues in Education

- Students must pay too much to study and learn
- Assessment is unreliable and (often) unfair
- Texts and resources are locked behind paywalls
- Content is poorly communicated
- Life as a student is incredibly stressful
- Research studies are poorly designed.
- Education science rarely replicates

- <http://www.vox.com/2016/7/14/12016710/science-challenges-research-funding-peer-review-process>

New Models of Deployment

Conventional Wisdom

Focus on one innovation
(low cost, product, customer)

Target small group first, then mainstream

Low cost feature-poor technologies

Strategic Discipline

New-Product Marketing

Innovation Method

Big Bang Wisdom

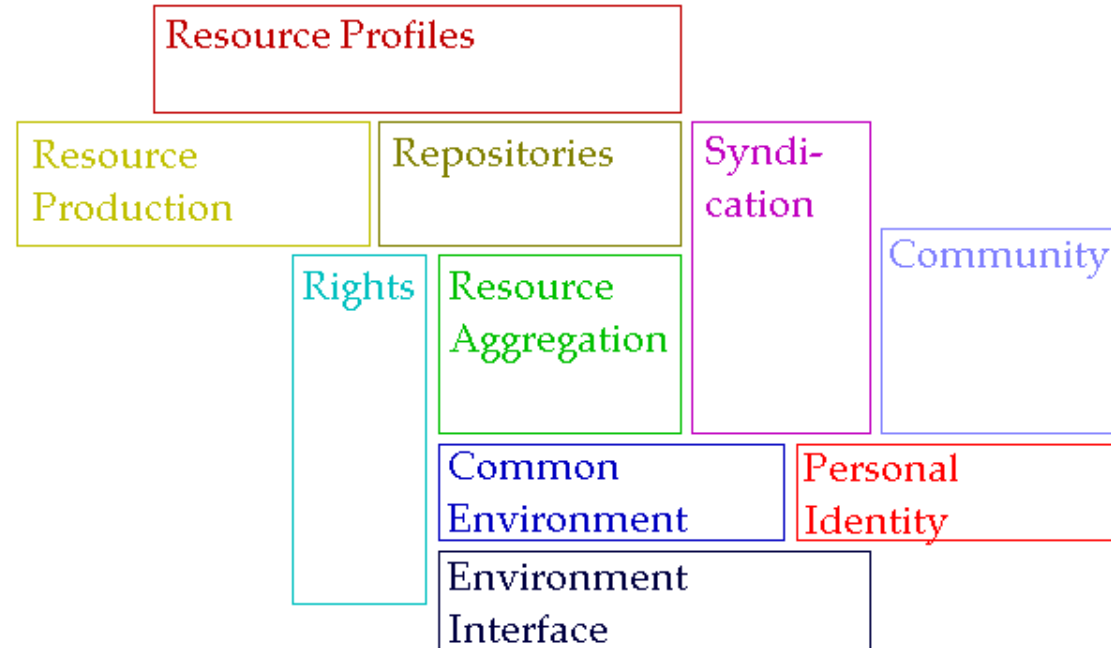
Focus on all three at once

Market to all at once, scale swiftly

Experimentation on popular platforms

- Adapted from Larry Downes and Paul F. Nunes. 2013. Dig Bang Disruption. Harvard Business Review. c/o Accenture.
https://www.accenture.com/t20150521T020819_w_us-en_acnmedia/Accenture/Conversion-Assets/Blogs/Documents/1/Accenture-Big-Bang-Disruption.pdf

The New Institutional Perspective

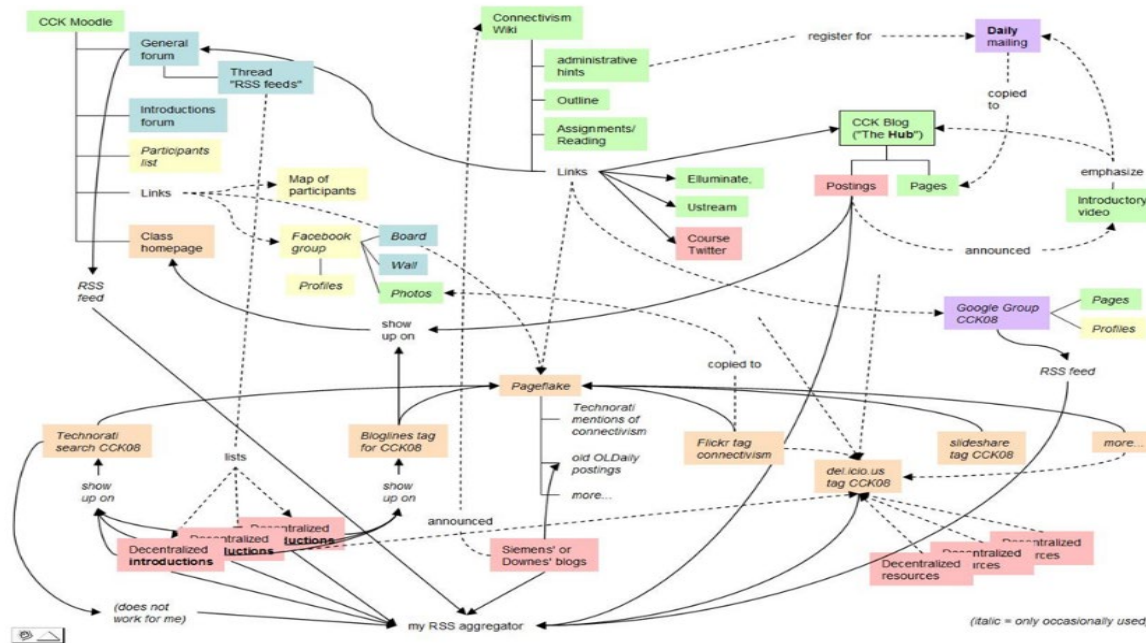


- Don't do things to people, do things with people, **help people** do things
- If we have to ask "how do we motivate people" then we're taking the wrong approach – Kohn; "**Knowledge sharing** is your job" – Buckman; Provide opportunities for **autonomy, mastery, purpose** – Pink

New learning Paradigms

| Path | Field |
|----------------------------|-------------------------------|
| Course | Curriculum (as in 'mapping') |
| Sequence / Prerequisite | Core / periphery / foundation |
| Movement / covered | Inquiry / Discovery / Gaps |
| Threshold / Levels | Coverage / Construction |
| Positioning – first / last | Grouping / Clustering |
| Objective / target | Serendipity / emergence |
| Leading / Led | Centred |

The Connectivist MOOC (cMOOC) Design



A MOOC is a Web, not a Website

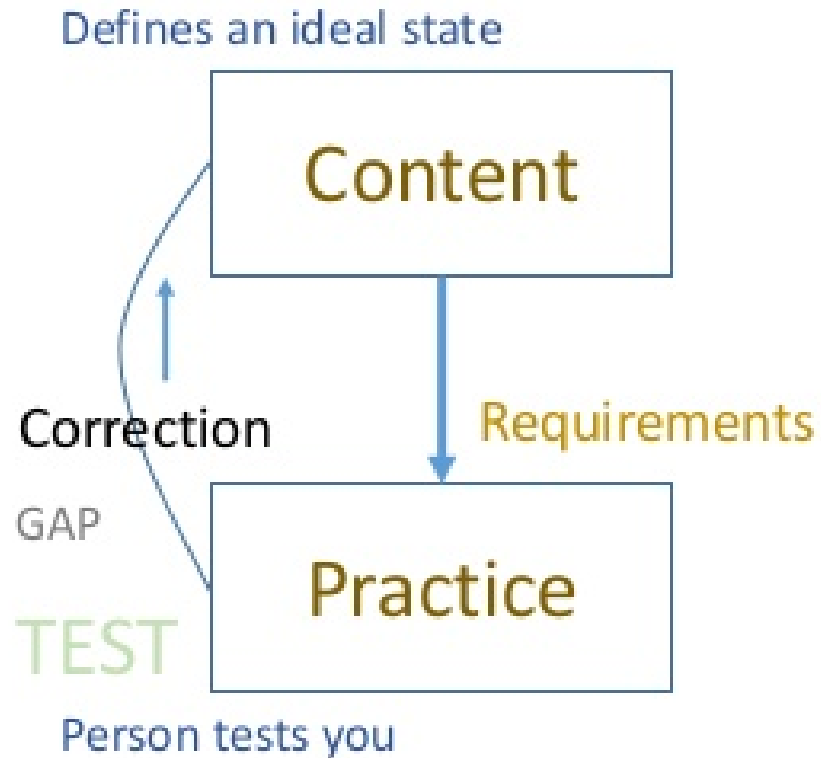


Instead of seeing a course as a series of contents to be presented, a course is a **network of participants** who find and exchange resources with each other

- An initial structure is developed and 'seeded' with existing **OERs**
- Participants **encouraged** to use their own sites to create or share resources
- A mechanism (gRSShopper) is employed to **connect them**

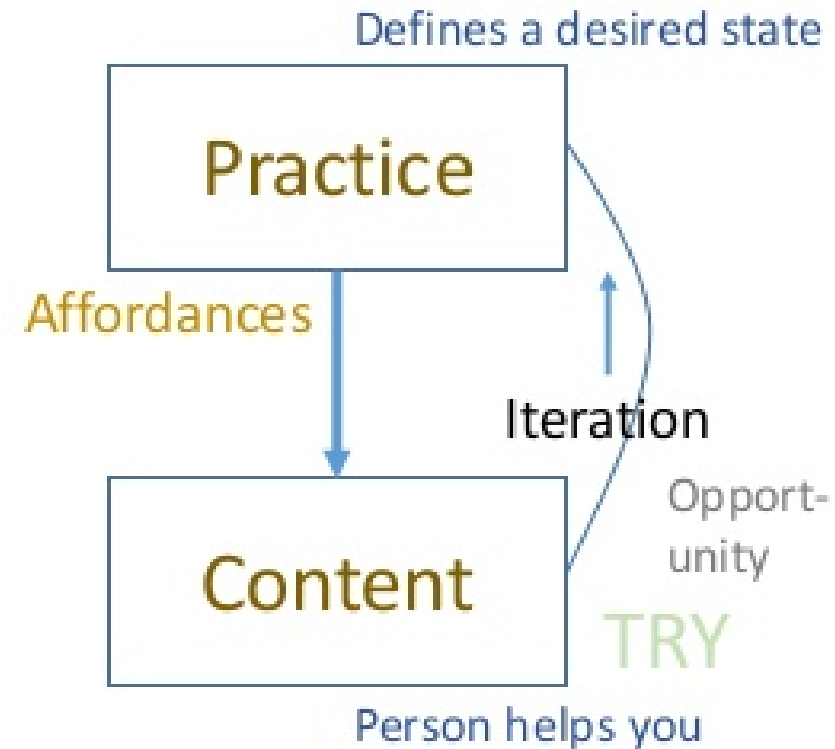
Personalized

We do for you



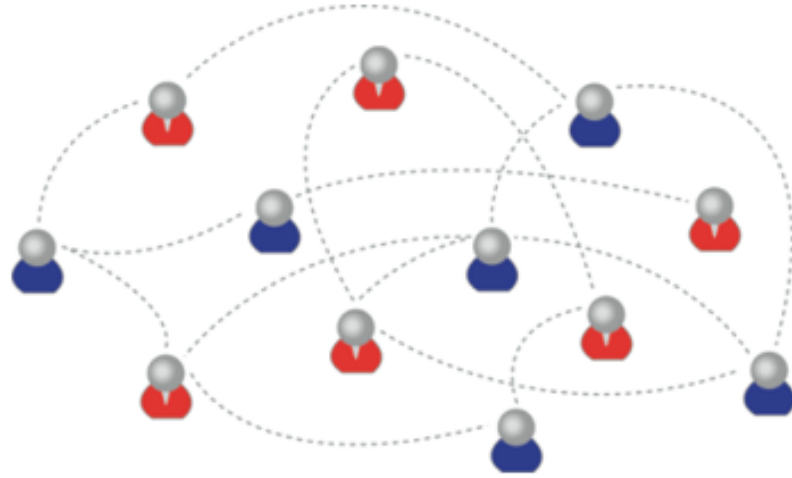
Personal

You do for yourself



Learning is Personal

Learning Outcomes



We are using one of these

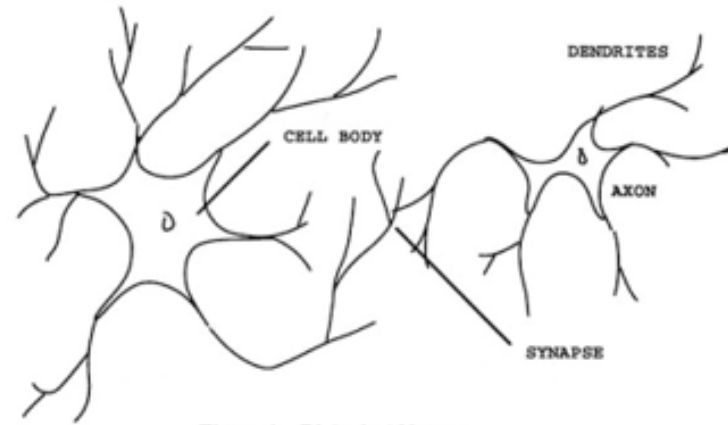


Figure 1. Biological Neuron

To create one of these

- Learning a discipline is a total state and not a collection of specific states
- It is obtained through immersion in an environment rather than acquisition of particular entities
- It is expressed functionally (can you perform 'as a geographer'?) rather than cognitively (can you state 'geography facts' or do 'geography tasks'?)

The New Model of Work and Learning



- **Sharing** - create linked documents, data, and objects in a distributed network
- **Contributing** - employ social networking applications of the Web to facilitate group communication
- **Co-creating** - work through networks that facilitate cooperative group work toward common goals

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