Disruptive Innovations in Learning

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Bangkok, Thailand
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http://www.downes.ca/presentation/389

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

- 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 of 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

- Jati Sengupta, 2014, Theory of Innovation: A New Paradigm of Growth, p. 4 (Schumpeterian model) http://www.springer.com/us/book/9783319021829

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

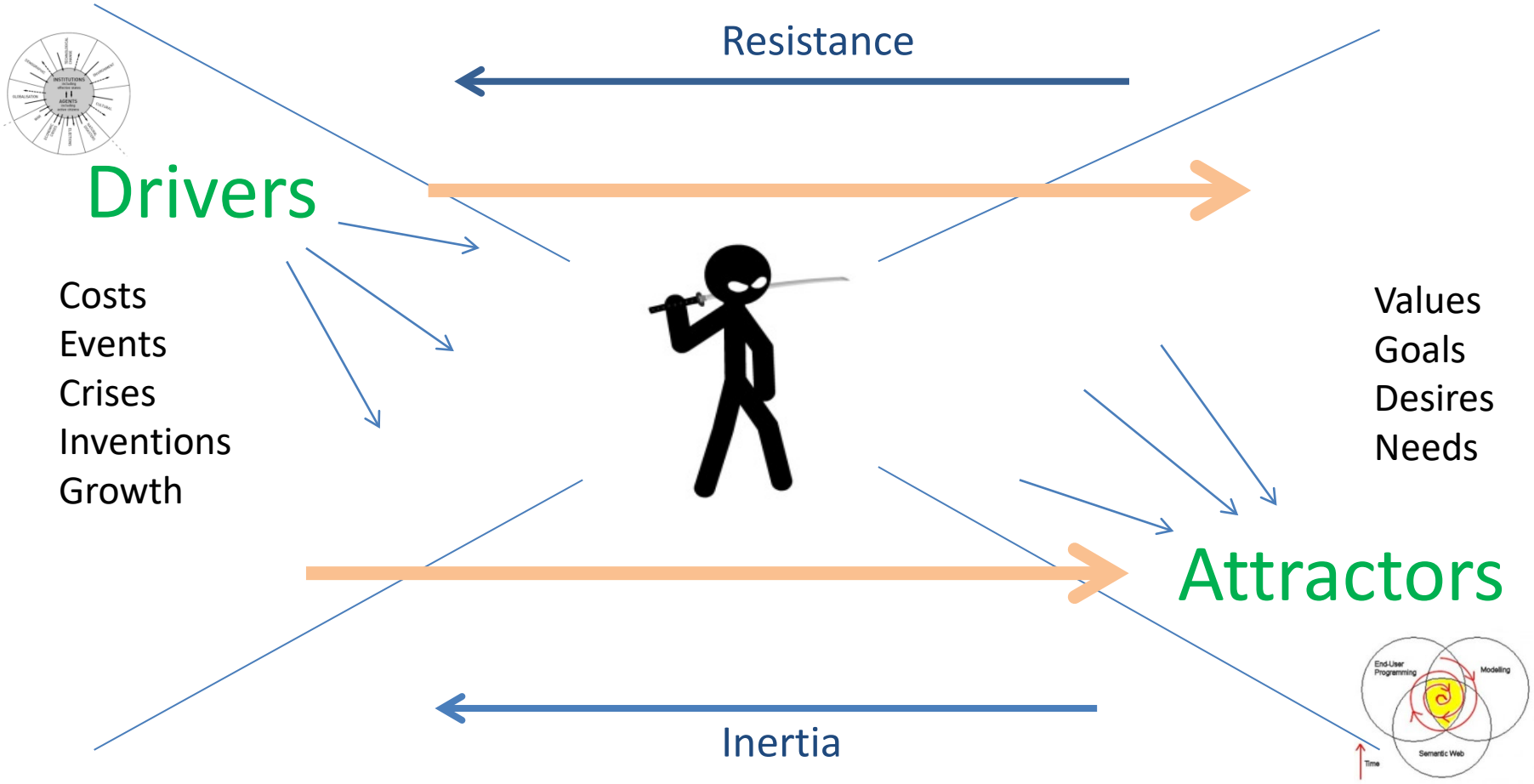
The Benefit (Disruptive)

- 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

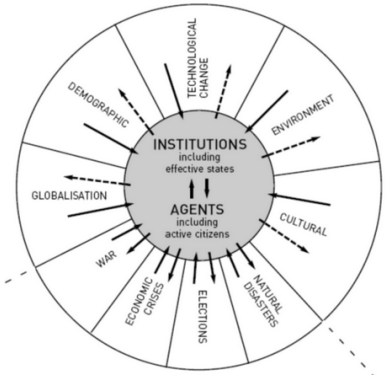
- Clayton M. Christensen, Michael E. Raynor, Rory McDonald, 2015. What is Disriptive Innovation? https://hbr.org/2015/12/what-is-disruptive-innovation

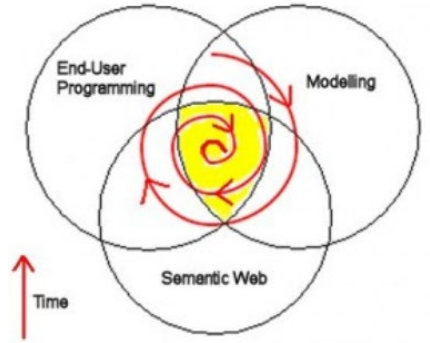
Causes of Change



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."

- Jim Farmer, 2013, MOOCs: A Disruptive Innovation or Not? http://mfeldstein.com/moocs-a-disruptive-innovation-or-not/

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?

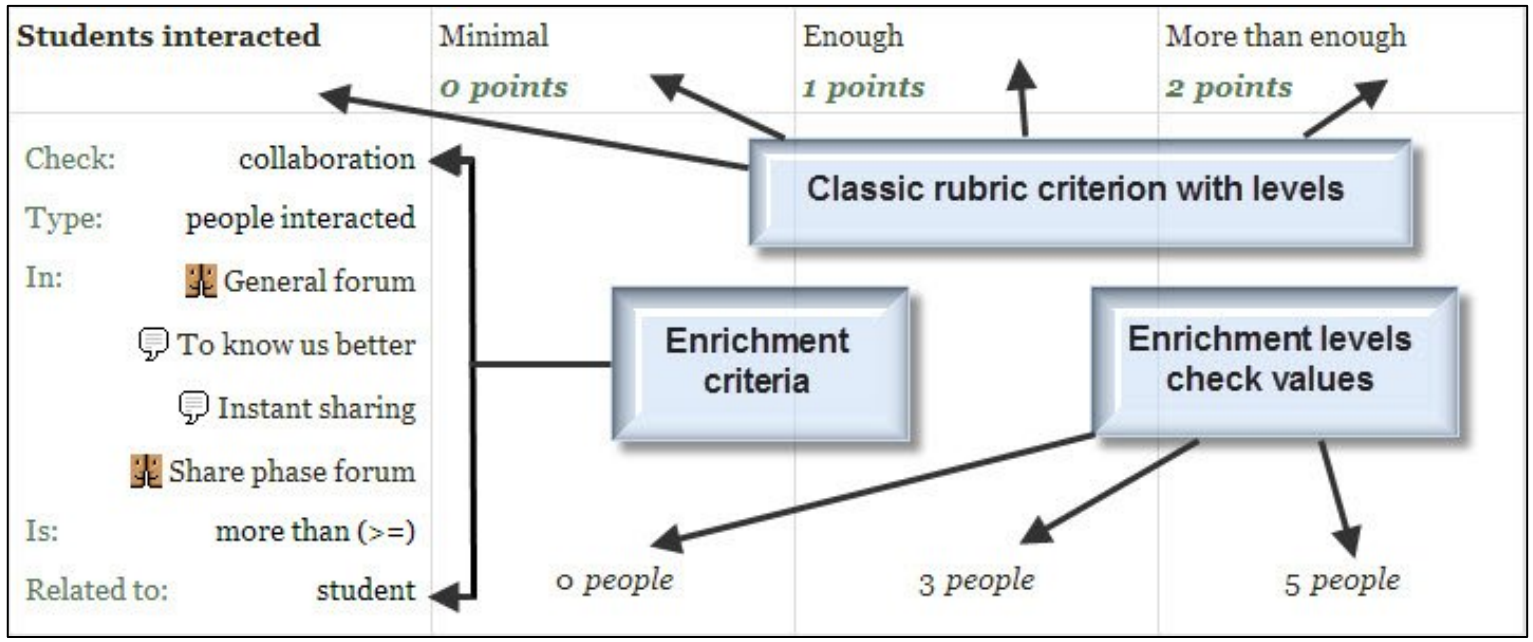
- Who defines innovation?
- Who defines student success?

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

Curitiba, Brazil, 2015

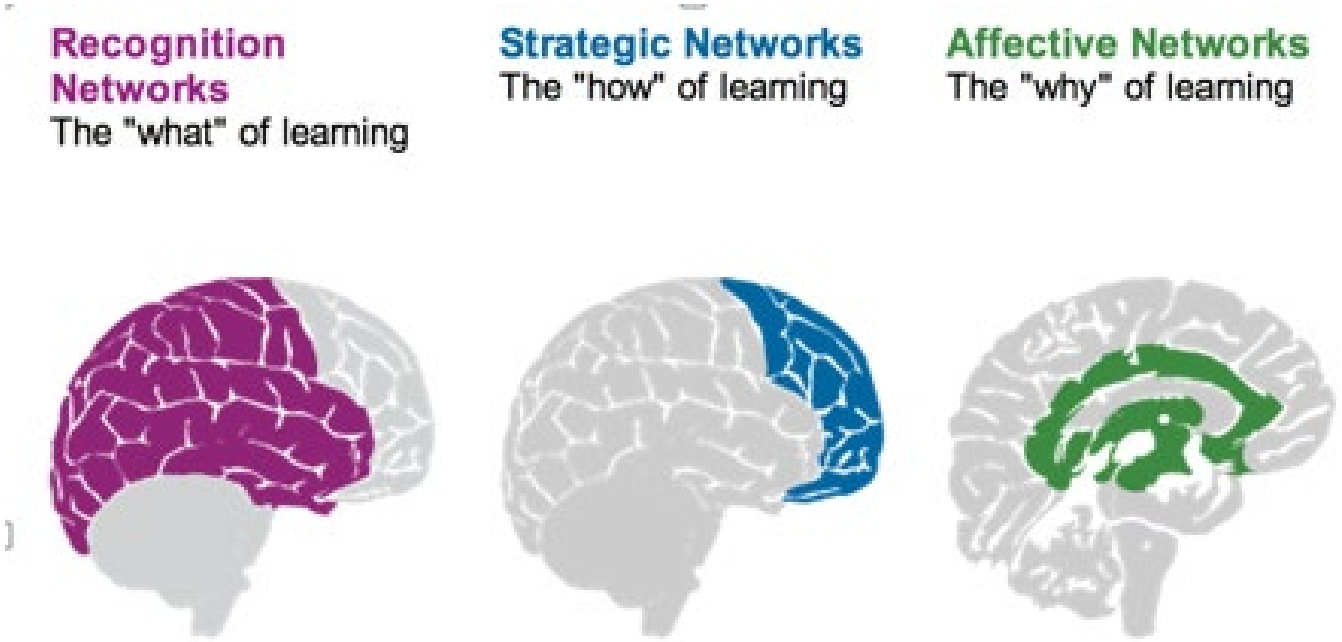
2. Innovations

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

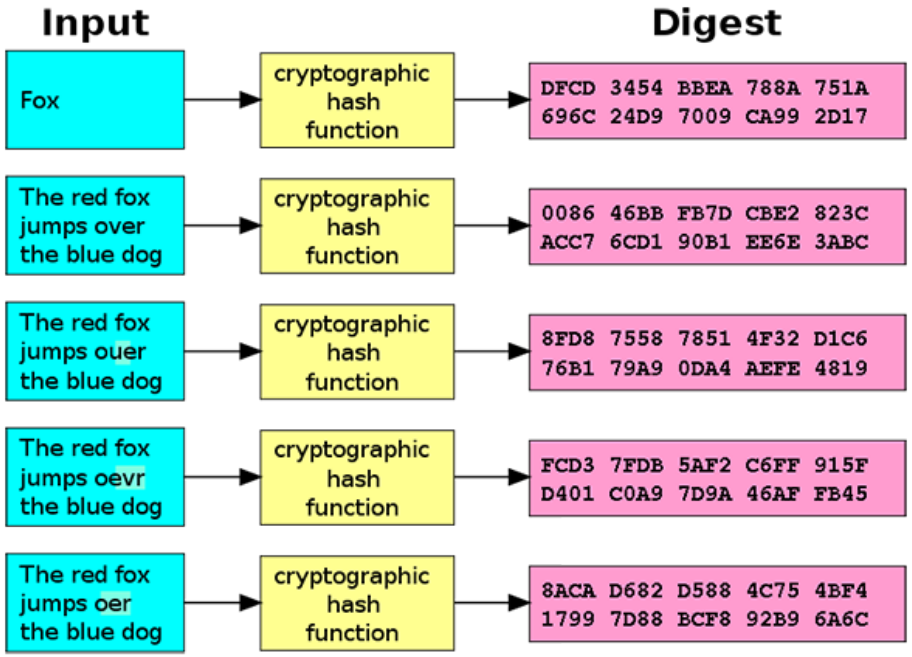


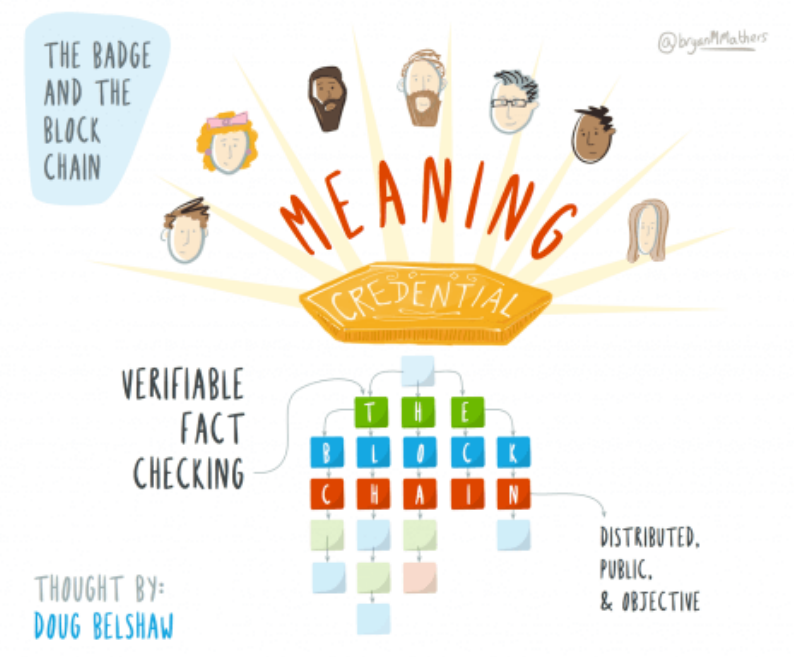
- Rules-Based Events (like notifications)
- User Models
- Adaptive Learning

Handheld Learning

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

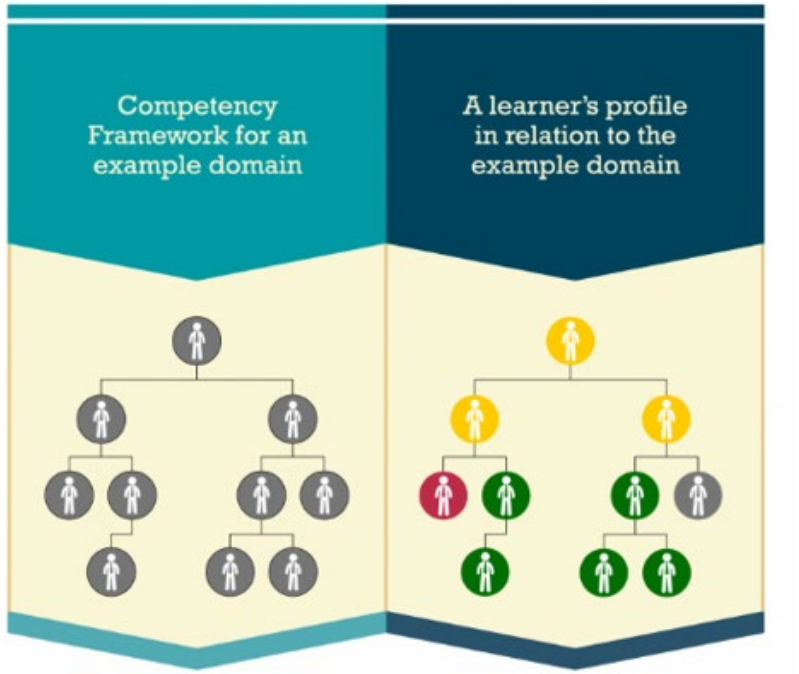
Badges and Blockchain

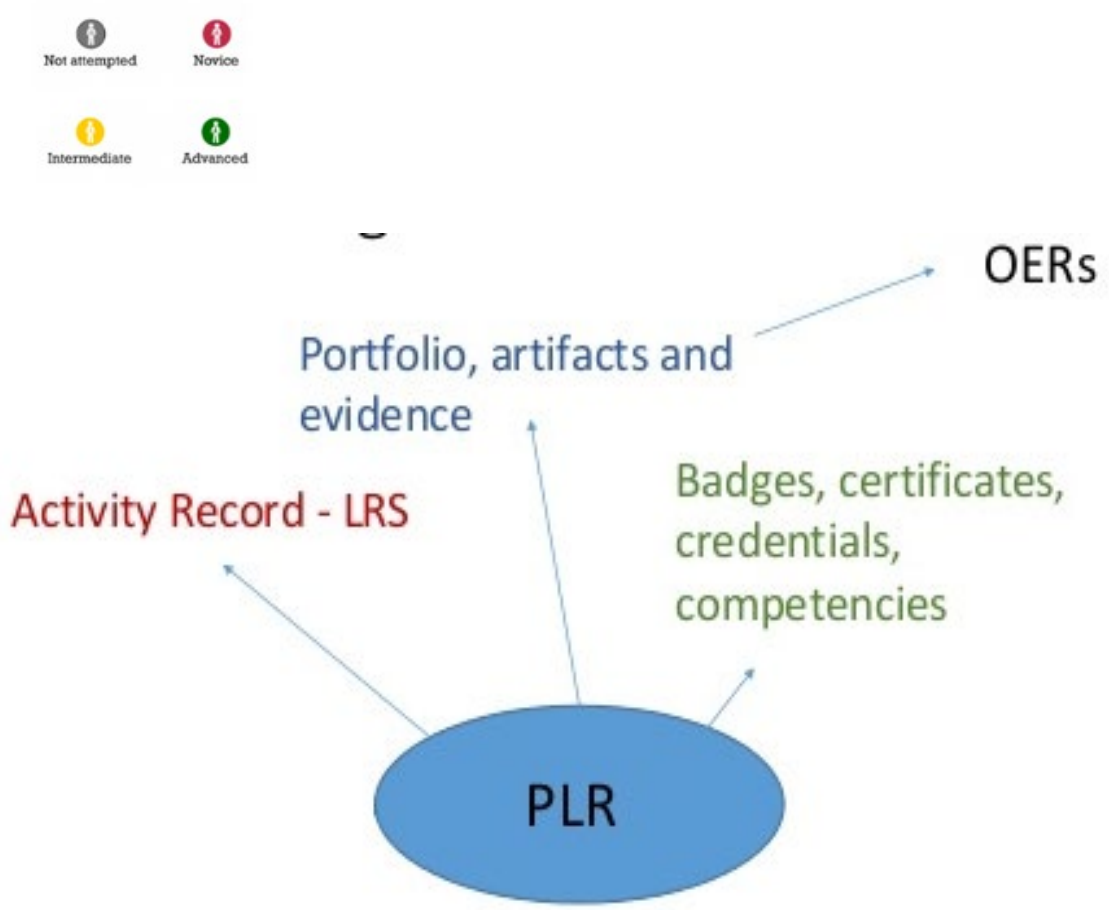




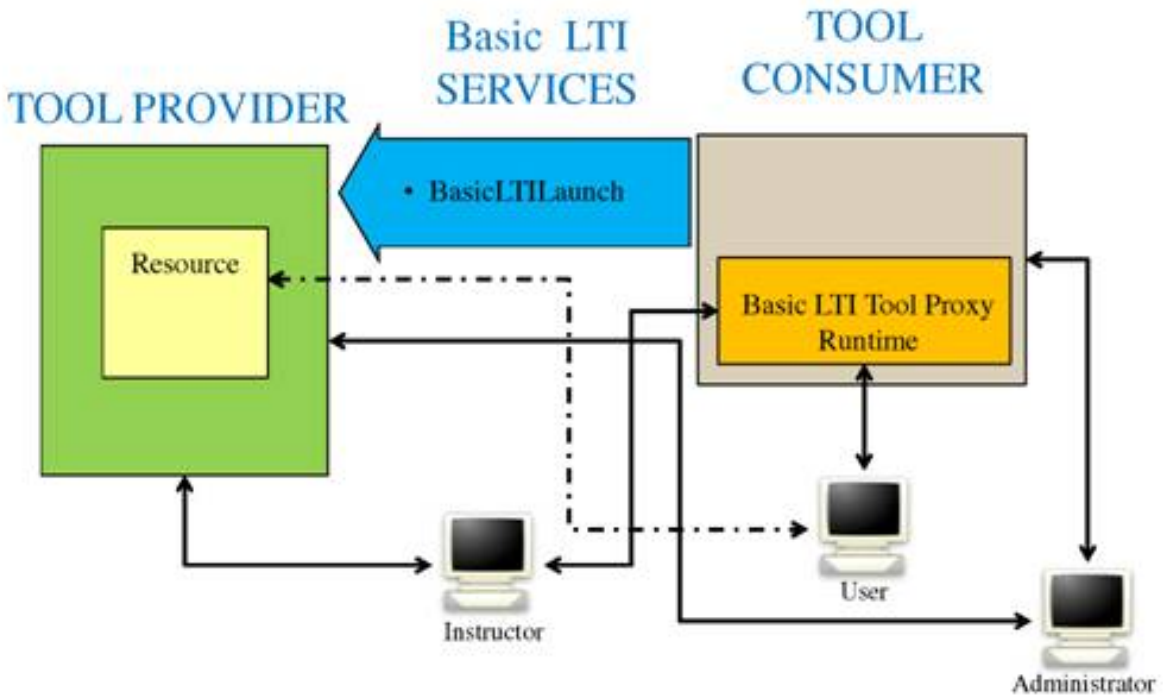
- Belshaw: we could prove beyond reasonable doubt that the person receiving badge Y is the same person who created evidence X.
- Sony plans to launch a testing platform powered by blockchain and that IBM plans to offer 'blockchain-as-a-service,'"

Competency and Skills System (CASS)





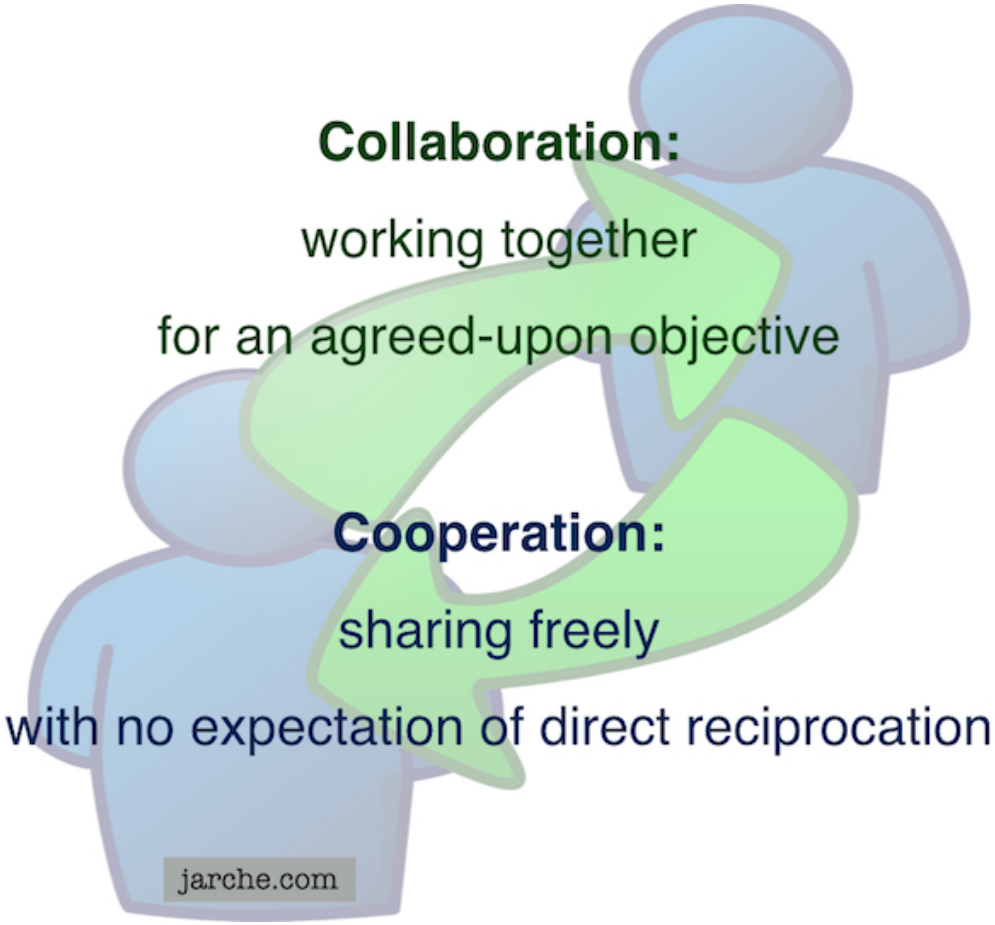
Games, Sims and Virtual Reality



- 'Gamification' – adds game elements to l
- '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

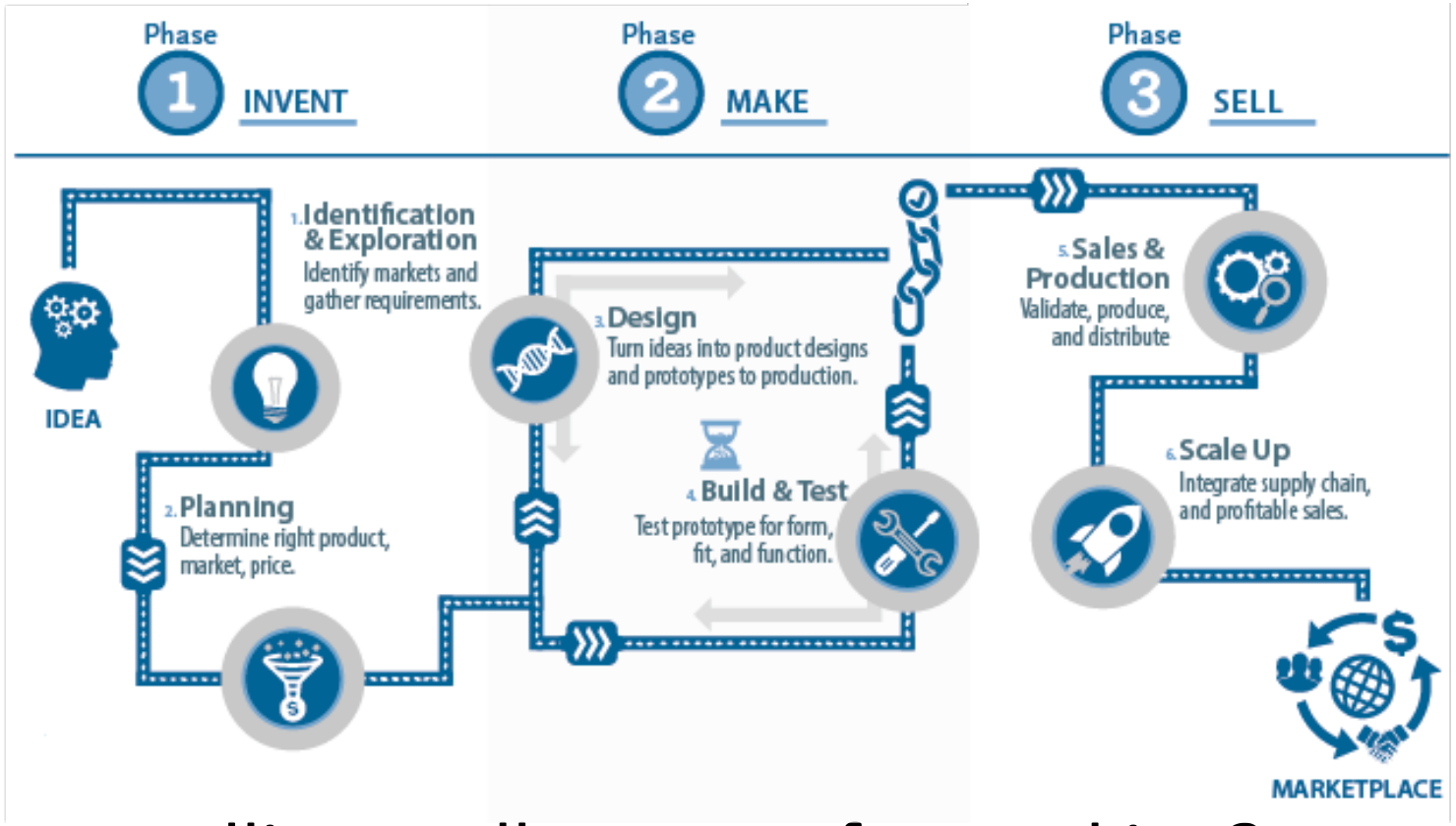
What are Research & Development?

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."

Ronald W. Rinehart, et.al. 2016. Critical Design Decisions for Successful Model-Based Inquiry in Science Classrooms. https://scholarworks.iu.edu/journals/index.php/ijdl/article/view/20137/28269

Stages of Innovation

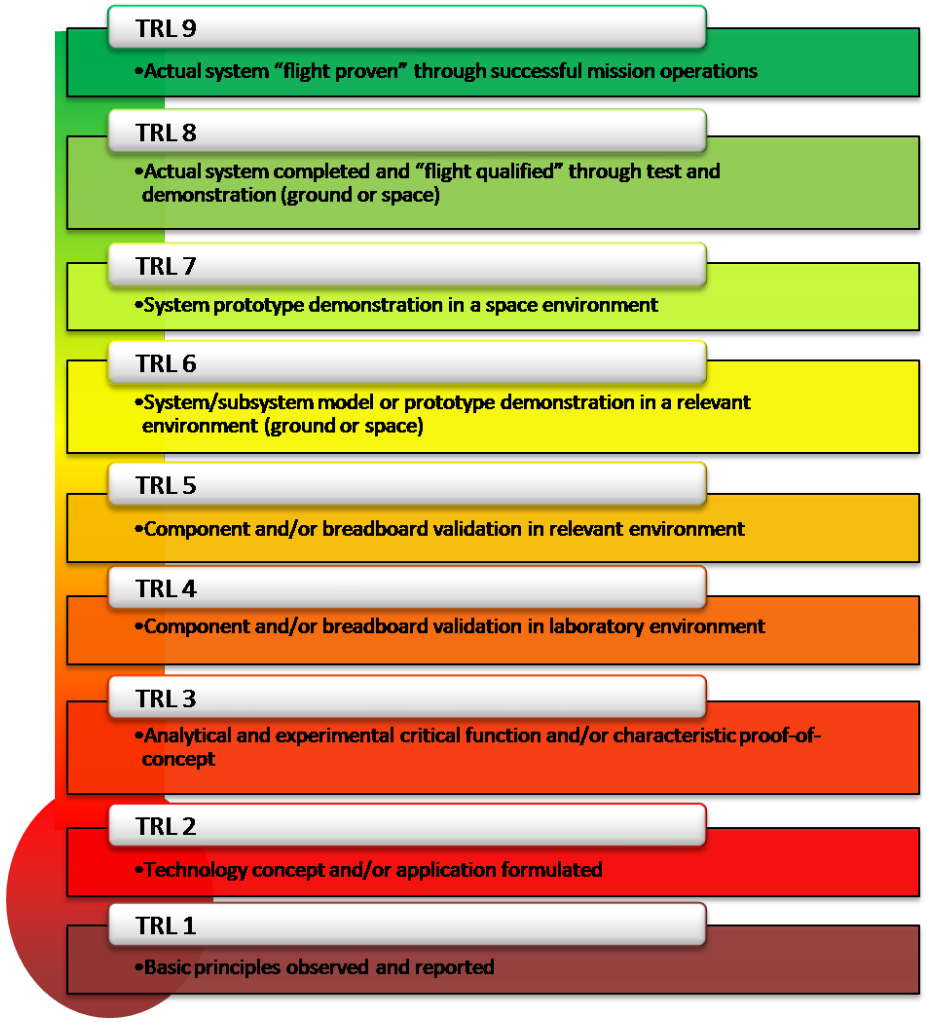


- Does selling really come after making?

- Image: SD Manufacturing, http://www.sdmanufacturing.com/services/innovation/

Technology Readiness Levels

- From concept to prototype to qualification to proof…



- Image: NASA https://www.nasa.gov/directorates/heo/scan/engineering/technology/txt_accordion1.html

Beyond Innovation

Drivers
Attractors

→ Idea +
Execution +
Benefit = Innovation

Benefit → Idea +
Execution = Transformation

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.”

- Read more: http://www.businessdictionary.com/definition/transformation.html

Microsoft's Vision

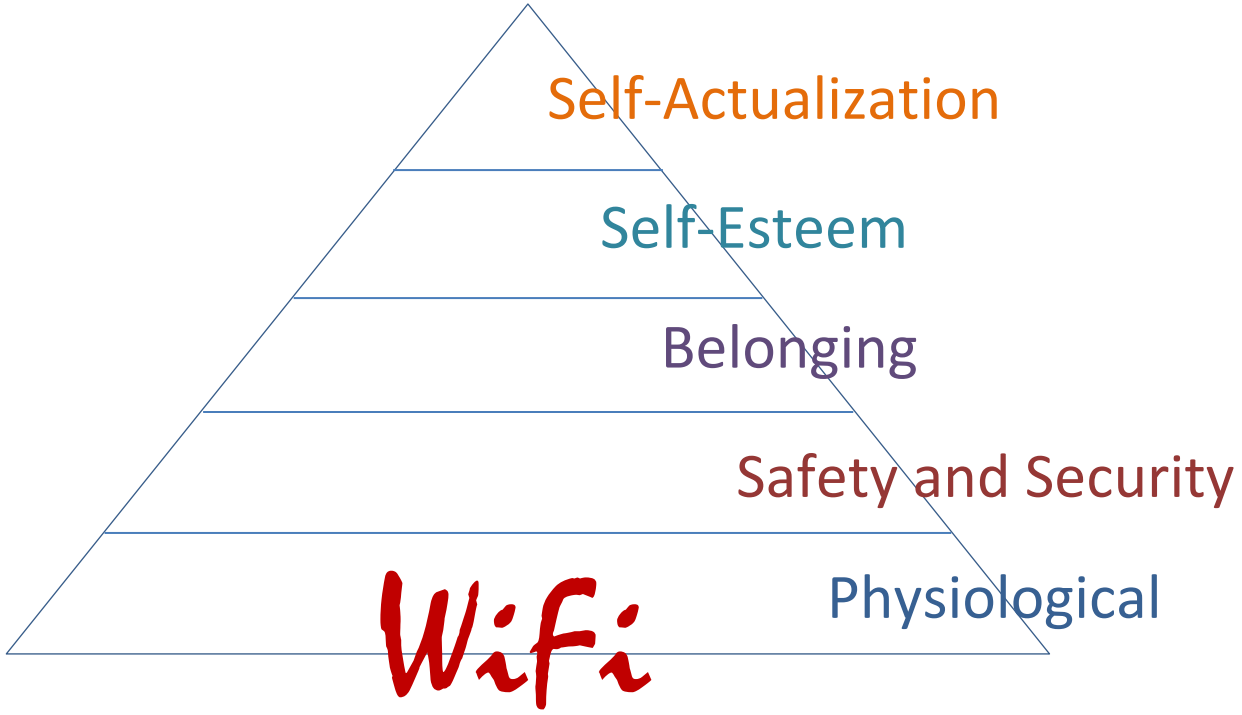
- Learning community
- Teacher capacity
- Efficient schools
- Personalization
- Physical learning environments
- Curriculum & assessment

- Is this really transformation?
- Are these things we really want?

- Microsoft, 2015. Education Transformation Toolkit. http://www.is-toolkit.com/education_transformation.html

Questions to Ask

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



Does Maslow speak for us?

- Maslow, A. 1943. Hierarchy of Needs: A Theory of Human Motivation. http://psychclassics.yorku.ca/Maslow/motivation.htm

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

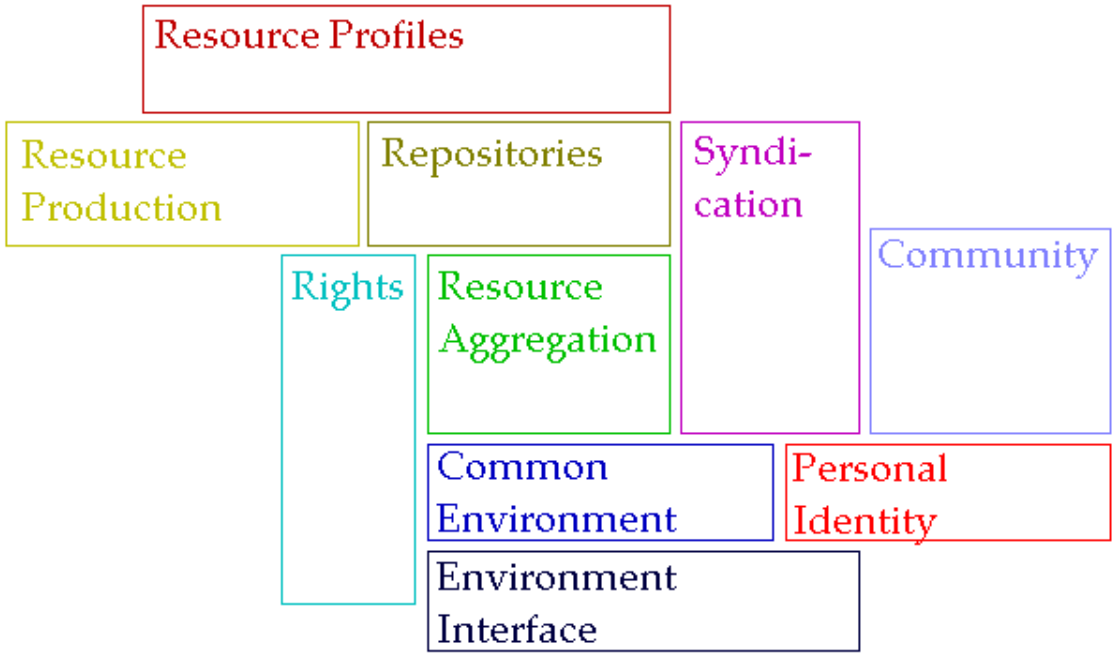
- Students must pay too much to study and learn
- Assessment is unreliable and (often) unfair
- Texts and resources are locked behind paywalls
- Content is poorly communicated
- Life as a student is incredibly stressful
- Research studies are poorly designed.
- Education science rarely replicates
    - http://www.vox.com/2016/7/14/12016710/science-challeges-research-funding-peer-review-process

New Models of Deployment

Conventional Wisdom		Big Bang Wisdom
Focus on one innovation (low cost, product, customer)	Strategic Discipline	Focus on all three at once
Target small group first, then mainstream	New-Product Marketing	Market to all at once, scale swiftly
Low cost feature-poor technologies	Innovation Method	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



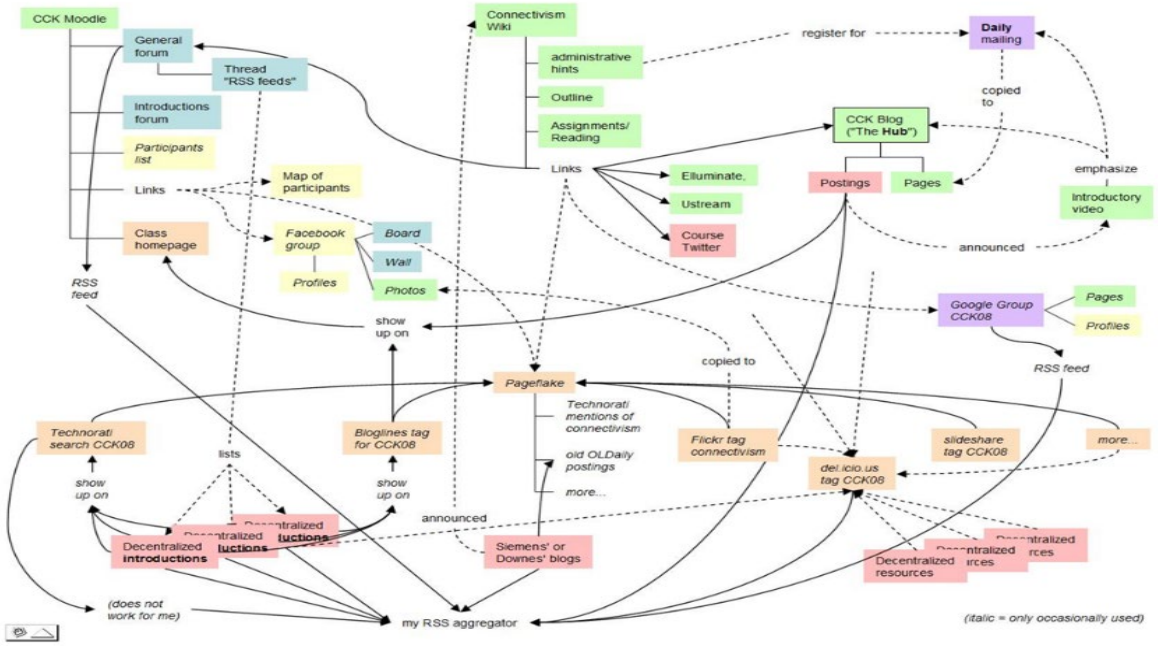
- Don’t do things to people, do things with people, help people do things
- If we have to ask “how do we motivate people” then we’re taking the wrong approach – Kohn; “Knowledge sharing is your job” – Buckman; Provide opportunities for autonomy, mastery, purpose – Pink

New learning Paradigms

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

Carrie Paechter, Metaphors of Space in Educational Theory and Practice
http://www.tandfonline.com/doi/pdf/10.1080/1468136040020202

The Connectivist MOOC (cMOOC) Design

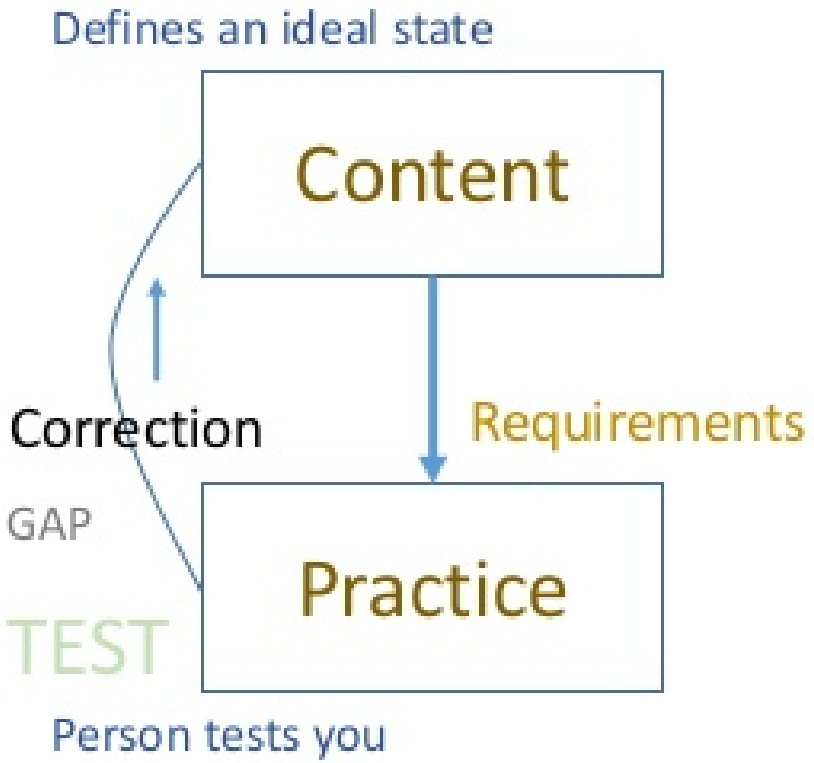


Instead of seeing a course as a series of contents to be presented, a course is a network of participants who find and exchange resources with each other

- 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

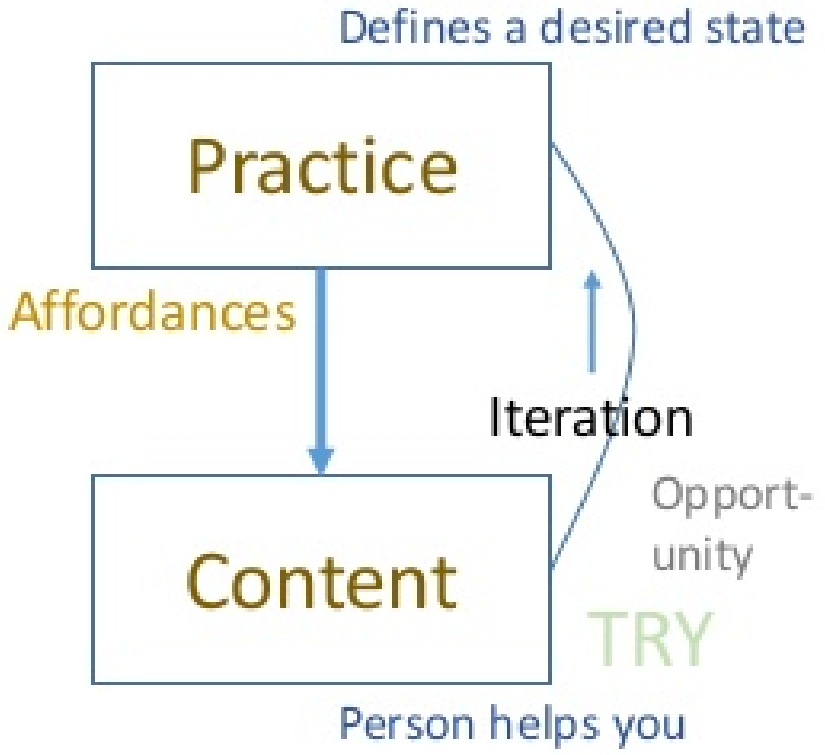
Personalized

We do for you



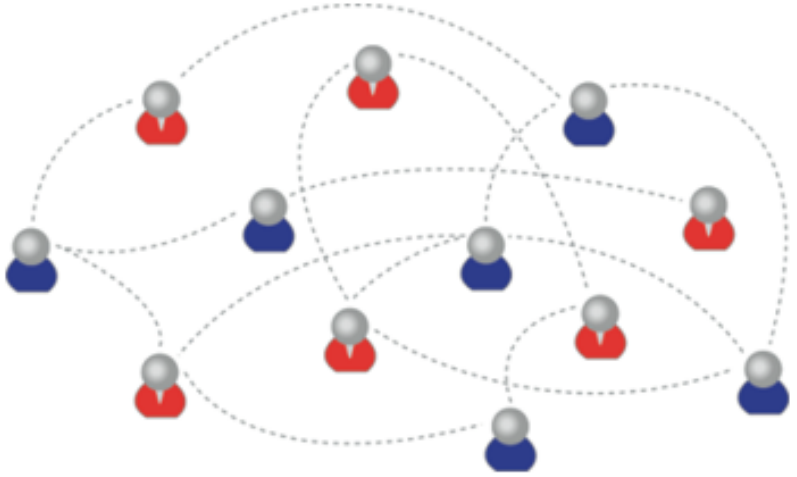
Personal

You do for yourself



Learning is Personal

Learning Outcomes



We are using one of these

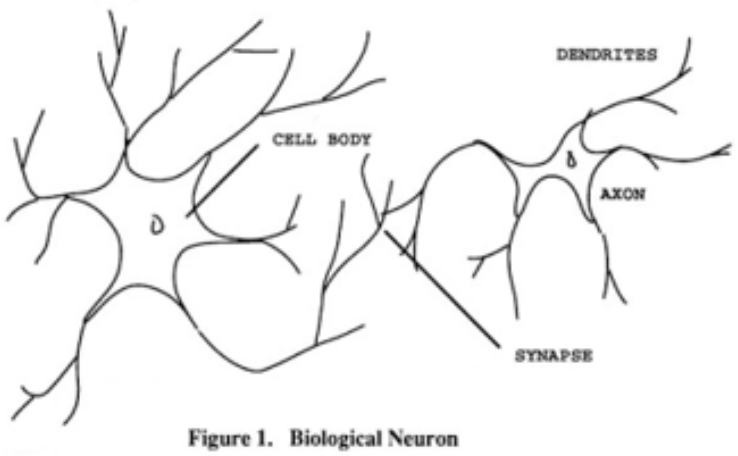


Figure 1. Biological Neuron

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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http://www.downes.ca

Moncton, Canada, 2005

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