The Disruption Connection

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30 November 2017
Knowledge Economy
or Learning Society

“Learning and work are now inseparable.”

-Institute for Public Policy Research
In 2009, McKinsey analysts estimated that 178 skillsets were needed in the modern workforce.

By 2012, 924 skillsets were needed.

But learn what?
But learn what?
Disruption in Education

*Is it a new thing?*
1900 Postcard Predicting the Future of Education in 2000

Credit: Jean-Marc Côte
Liberal arts can claim to be the oldest higher education programme in Western history. -Wikipedia
<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001-099</td>
<td>Generalities</td>
<td>Encyclopedia curiosities unexplained materials</td>
</tr>
<tr>
<td>100-199</td>
<td>Philosophy</td>
<td>Books about philosophy. About people, feelings, etc.</td>
</tr>
<tr>
<td>200-299</td>
<td>Religion</td>
<td>Who made me? Cultures, traditions, customs, laws, maps, fairy tales</td>
</tr>
<tr>
<td>300-399</td>
<td>Social Science</td>
<td>Who's the guy in the next cave?</td>
</tr>
<tr>
<td>400-499</td>
<td>Languages</td>
<td>How do I talk to that guy? Dictionaries, parts of speech, sign language</td>
</tr>
<tr>
<td>500-599</td>
<td>Natural Science</td>
<td>Let's talk about the world we see. Mathematics, earth, astronomy, chemistry,</td>
</tr>
<tr>
<td>600-699</td>
<td>Applied Science</td>
<td>Now let's make stuff out of what we see. Inventions, robots, transportation,</td>
</tr>
<tr>
<td>700-799</td>
<td>Arts and Recreation</td>
<td>Now let's have some fun. Art, drawing, comics, handicrafts, music, games,</td>
</tr>
<tr>
<td>800-899</td>
<td>Literature</td>
<td>Let's tell our children how wonderful we are. Poetry, plays, classic literature,</td>
</tr>
<tr>
<td>900-999</td>
<td>Geography and History</td>
<td>Let's tell our future children how wonderful we were. Landforms, travel,</td>
</tr>
<tr>
<td>92 and 920</td>
<td>Biography and Collective Biography</td>
<td>Find out about famous people. Single person: filed by last name of subject. Multiples people: by author</td>
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</tbody>
</table>
Post Industrial Age Schools:
- Curriculum is pre-planned (and often fixed)
- Assumes learners start from the same level and progress at the same pace
What’s old…

One Room Schoolhouse:
- Individualized and personalized learning
- Peer-to-peer instruction
...is new!

30% is the new 10-20

Blended Learning: ditto
Except…it’s not
Tom Gordon was 45 when his lucrative career as an oil trader suddenly faced a new threat. Electronic trading, which *originally had been introduced to expand trading capacity* overnight, was now operating head-to-head with Gordon and his colleagues on the floor of the exchange during the day.

For Gordon, working alongside the electronic market was like being hit by a truck. “I saw the transition was coming and knew [traders] were going to get run over,”

He *retrained* as a social worker.

In 2016, CME Group *closed its commodity-trading pits*.

REF: Financial Times https://www.ft.com/content/a0b8e562-3734-11e7-99bd-13beb0903fa3
FINANCIAL TIMES

Artificial Intelligence and Robotics

Can a robot do your job?

Find out how much of your job can technically be automated.

Find your occupation:

1. Select a job category

2. Select an occupation

Or choose an example:

Financial specialist, Healthcare support, Postsecondary teacher, Random

REF: Financial Times Interactive
https://ig.ft.com/can-a-robot-do-your-job/
Eating our own dog food

My battle to prove I write better than an AI robot called ‘Emma’

Sarah O’Connor’s face-off with a computer program to pen a news story

REF: Financial Times https://ig.ft.com/can-a-robot-do-your-job/
“Knowledge, without context, is a commodity.”

Source Unknown
Disrupting a Presentation

Thank you Dr. Jose Escamilla de los Santos
Pop Quiz!

• Today, the median age of a university student today is ____.
• By 2020, ____% of all university students will be ____ years or older.
• From 1995-2015, the average tuition / fees at private universities increased ____%.
• A Class of 2016 student, has an average debt of $____.
• Student loan debt in the US now exceeds $__.
• ____% of students who start college, actually graduate within ____ years.
• How many Americans have some college experience but no degree.
• Today, ____% of the academic labor force in the US are adjunct or contingent faculty.
• ____% of American teaching faculty are employed full-time.

REF: Weise and Christensen’s Hire Education  AND  REF: Tapscott and Tapscott’s The Blockchain Revolution
Pop Quiz!

• Today, the median age of a university student today is **25**.
• By 2020, **42%** of all university students will be **25 years** or older.
• From 1995-2015, the average tuition / fees at private universities increased **179%**
• A Class of 2016 student, has an average debt of **$37,000**.
• Student loan debt in the US now exceeds **$1 trillion**.
• **50%** of students who start college, actually graduate within **six** years.
• **37 million** Americans have some college experience but no degree.
• Today, **76%** of the academic labor force in the US are adjunct or contingent faculty.
• **50%** of American teaching faculty are employed full-time.

REF: Weise and Christensen’s Hire Education  AND  REF: Tapscott and Tapscott’s The Blockchain Revolution
Innovation, as Christensen reminds us, comes in two varieties:

• **SUSTAINING** Innovations are built around a company’s historic success.

• **DISRUPTIVE** Innovations gain traction by offering simpler, more affordable, more convenient products / services to the non-consumers of the original product. For these people who cannot afford college tuition fees, **nothing** is often their alternative.
Hire Education

Traditional brick-and-mortar universities have three business models:

• **Research** (Knowledge Creation). These can sometimes be very profitable when applied to tech or business sectors, where they can charge a fee; but less so in the soft disciplines.

• **Teaching** (Knowledge Transfer). Charing a fee for imparting knowledge or skillsets to the novice.

• **Facilitated Networking**. This covers the physical maintenance of campus, but also alumni networks, sports, etc.

Hence, problems arise because most traditional universities offer all three businesses bundled together.

REF: Weise and Christensen’s Hire Education
Yet the value propositions around knowledge creation, knowledge transfer and networking for life / career are distinct and often conflict. Bundling these three has given rise to administrative bloat.

**********

In 2010, The Goldwater Institute explained that between 1993 and 2007, the number of full time administrators grew by 39%, while the teaching, research and service staff grew by 18%. Spending on administration per student increased by 61%, while instructional spending per student rose 39%.
“Disruption doesn’t necessarily entail a technology breakthrough, but instead combines nascent technologies with business model innovations.”

Weise and Christensen: Hire Education
Hacking an Education

• Mastery / Modularization (Competency-based)
• MOOCs: the untold story (data, data, data)
• Certification:
  • V1: Badging
  • V2: Blockchain
Mastery / Modularization
Or Competency-Based

Detroit
• Plant’s assembly line: 58 sec
• In one hour: four out of 60 successfully completed
• Quality assurance is critical

Toyota
• Perfect every time
• Not necessary to check every car off the assembly line
Mastery / Modularization
Or Competency-Based

At Toyota, its training was variable, but the results were fixed.

Just the reverse for the Detroit Big Three. Here, the training was fixed, but the results varied.
Mastery / Modularization
Or Competency-Based

Learning in Action: How Competent Professionals Learn
Eulho Jung, Minkyoung Kim, and Charles M. Reigeluth


The studies pertaining to expertise development are diverse and broad (Bjork, 1994; Einstein & McDaniel, 2005; Schneider et al., 2002), yet empirical research that bridges expertise development into instructional design theories is still in its very formative stages (Ertmer et al., 2008; Fadd, 2000). From a personal communication with Peter J. Fadd, a scholar whose major scholarly works center on the intersection of instructional systems design with expertise studies, it is evident that traditional instructional design theories have been oriented toward initial-to-competence learning, whereas expertise-based training has focused on the competence-to-expertise learning process (Fadd, personal communication, October 14, 2014). That is, traditional instructional design theories seek to provide effective applications for learning concepts, rules, and procedures—components that are necessary and appropriate for initial learning and competence building. However, research has
Mastery / Modularization
Or Competency-Based

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>BASIC PROFICIENCY CATEGORIES (ADAPTED FROM H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naïve</td>
<td>One who is ignorant of a domain.</td>
</tr>
<tr>
<td>Novice</td>
<td>Someone who is new—a probationary member who has had some exposure to the domain.</td>
</tr>
<tr>
<td>Initiate</td>
<td>Someone who has been through an initiation ceremony—a novice with introductory instruction.</td>
</tr>
<tr>
<td>Apprentice</td>
<td>One who is learning—a student undergoing a program of introductory level. Traditionally, the apprentice is immersed in the craft and assisting someone at a higher level. The length of an apprentice’s domain, ranging from about one to 12 years in the craft guilds.</td>
</tr>
<tr>
<td>Journeyman</td>
<td>A person who can perform a day’s labor unsupervised, although it is not expected to be perfect. An experienced and reliable worker, or one who has achieved a level of proficiency that is possible to remain at this level for life.</td>
</tr>
<tr>
<td>Expert</td>
<td>The distinguished or brilliant journeyman, highly regarded by peers, who is considered to be uncommonly accurate and reliable, whose performance shows a high degree of consistency and economy of effort, and who can deal effectively with certain types of problems in their area of expertise. Also, an expert is one who has special skills or knowledge in a particular field or area of expertise with subdomains.</td>
</tr>
<tr>
<td>Master</td>
<td>Traditionally, a master is any journeyman or expert who is also qualified to teach at a lower level. A master is a member of an elite group of experts with a reputation for reliability, consistency, and high standards. Also, a master can be that expert by having mastered the skill and the “real” expert, especially with knowledge.</td>
</tr>
</tbody>
</table>

REF: Jung, Kim, Reigeluth: Learning in Action: How Competent Professionals Learn
Mastery / Modularization
Or Competency-Based

CAUTION: Where do Artificial Intelligence, Augmented Intelligence and Machine Learning fit in?

FIGURE 2. EXPERTISE DEVELOPMENT MODEL FOR JOURNEYMEN

REF: Jung, Kim, Reigeluth: Learning in Action: How Competent Professionals Learn
Hacking an Education

• Mastery / Modularization (Competency-based)
• MOOCs: the untold story (data, data, data)
• Certification:
  • V1: Badging
  • V2: Blockchain
MOOCs
The Untold Story

"Citizens and Electronic" (6.002x), which began in March 2012, was the first MOOC developed by edX, the consortium led by MIT and Harvard. Over 153,000 students initially registered for 6.002x, which was composed of video lectures, interactive problems, online laboratories, and a discussion forum. As the course ended in June 2012, researchers began to analyze the rich sources of data it generated. This article describes both the first stage of this research, which examined the student's use of resources by time spent on each, and a second stage that is producing an in-depth picture of who the 6.002x students were, how their own background and capabilities related to their achievement and persistence, and how their interactions with 6.002x's curricular and pedagogical components contributed to their level of success in the course.

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Part of this work has been submitted to presentation publication at the American Educational Research Association (AERA) conference, the International Conference on Interaction Design and Children (IDC) conference, the MIT Learning Technologies Conference, the IEEE Computer Society Conference on Computer Sciences (CS), and Communications, Associations for Computer Machinery.
MOOCs
The Untold Story

To date, the average completion rate of MOOCs is ~10%. This course was <5%

Figure 9. Stop out rate of students throughout the course.

REF: Breslow et al’s Studying Learning in the Worldwide Classroom Research into edXs First MOOC
MOOCs
The Untold Story

The messiness of Time data:
- Time represents the principle cost for students.
- Most time spent on lecture videos

Figure 3. Time on task. Certificate earners average time spent in hours per week on each course component. Midterm and final exam weeks are shaded.

REF: Breslow et al’s Studying Learning in the Worldwide Classroom Research into edXs First MOOC
MOOCs
The Untold Story

Majority were in 20 and 30 year olds.
Range from teens to over 70

Figure 7. Age distribution

[Text reference: Breslow et al’s Studying Learning in the Worldwide Classroom Research into edXs First MOOC]
MOOCs
The Untold Story

REF: Breslow et al’s Studying Learning in the Worldwide Classroom Research into edXs First MOOC
The strongest correlate of success was whether or not the learner worked offline with anyone on the course material.
Hacking an Education

• Mastery / Modularization (Competency-based)
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• Certification:
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  • V2: Blockchain
Certification

Earn
Earn Open Badges for skills you learn online and in person

Issue
Anyone can create & issue Open Badges to recognize the achievements of others

Display
Share your Open Badges as verifiable records of your learning

Understand
Verify Open Badges and accept them as records of achievement.
Certification

Issue
Fully digitize your program and expand the reach of your brand with badges.
Learn More ›

Earn
Show employers what you know, where you learned it, and why they should hire you.
Learn More ›

Verify
Ensure job applicants are qualified candidates with one easy click.
Learn More ›
Certification

Badge Details

Title
Bayesian Networks for Research, Analytics, and Reasoning

Issue Date
10/30/17

Issuer Details

Issuer
Bayesia

Share on
Facebook
Twitter
LinkedIn
Certification

Blockchain

“What if there was an Internet of value — a global, distributed, highly secure platform, ledger, or database where we could store and exchange things of value and where we could trust each other without powerful intermediaries? That is the blockchain.”

REF: Tapscott, Don and Tapscott, Alex: The Blockchain Revolution and Higher Education
Certification
Blockchain

“The blockchain provides a rich, secure, and transparent platform on which to create a global network for higher learning.

This Internet of value can help to reinvent higher education in a way the Internet of information alone could not.”

REF: Tapscott, Don and Tapscott, Alex: The Blockchain Revolution and Higher Education
Conclusion

“Learning and work are now inseparable.”

-Institute for Public Policy Research
Learning Architects needed

For life long learning, we just might need help in charting a viable path through this Brave New World of AI.
We were warned that Orwell’s Big Brother would be watching us; but we’ve ended up watching *Big Brother*.

So, Huxley was right. *Brave New World* suggested that we will be controlled through our distractions.

The exponential increase in distractions is preventing us from thinking deeply. This is a big challenge for corporate learning.

Abbie Hoffman, the 1960s counter-culture activist, once boasted that he could make unsympathetic news about his ‘*Chicago Eight*’ trial disappear from the front pages. The next day, he arrived at court doing handstands. The media loved it, he stole the headlines, the distraction worked.

REF: FT | IE Corporate Learning Alliance website http://www.ftiecla.com/2017/05/10/learning-in-the-age-of-distraction/


Mandeville, Gertrude, Technology Supported Learning Consultant. Interviews from 2017


Thank you