What is the Future of Learning?:
Visions of Education 20/20 in Our Changing Learning World!

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Talk Overview
1. Education 20/20
2. New Roles of the Instructor
3. First and Last Principles of Instruction
4. Artificial Intelligence vs. Intelligence Augmentation
5. Megatrends of Learning: Engagement, Access, and Customization (30 ways that learning is changing…)
6. Future Trends and Ideas

(Circa Confucius 551–479 BCE)

What happens to sleeping students?
Education 20/20

20 New Roles of the Instructor

Captain  
Counselor  
Curator  
Cook  
Change Catalyst  
Comedian  
Coach  
Collaborator  
Cameraman  
Community Organizer  
Course Expedition Leader  
Cultivator  
Curator  
Comedian  
Coach  
Collaborator  
Cameraman  
Community Organizer  
Course Expedition Leader  
Cultivator

March 26, 2017  
Long Live the Lecture!  
Miya Tokumitsu  
Chronicle of Higher Education  

Merrill’s First Principles of Teaching/Instruction  
http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html

Bonk’s 20 “Last” Principles of Instruction (LAST = Learning Activation System Template)  
http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html

Choice and Options  
Flexibility  
Support and Feedback  
Nontraditional Learning  
Passion and Inspiration  
Relevance and Meaningfulness  
Trial and Error (i.e., it is ok to fail)  
Expanded Resources  
Empowerment and Autonomy  
Human Connectedness  
Cognitive Apprenticeship

Integration  
Activation  
Problem/Solution  
Application  
Demonstration  
M. ERNEST MERRILL

First Principles of Instruction  
The First Principles Four Phase Cycle of Instruction

Cheerfulness and Optimism  
Spontaneity  
Sharing  
High Expectations  
Purpose and Vision  
Human Connectedness  
Cognitive Apprenticeship
20. ??? (what is missing)
http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html

Clearly...
Learning is Changing!

Poll #1: Remember Education 1.0?
1728: 1st correspondence course advertised Boston (learn shorthand from Caleb Phillips thru weekly mailed lessons)
The First University Correspondence Course
(University of London, External Program, 1858)
1728–1990s – Generally postal system based

Fast Forward 200 Years...
MOOC, Meet MORC (Massive Open Radio Course)
WHA, UW Madison, College of the Air, 1933,
Vocational Training dedicated to Agriculture,
and later Home Economics and Typing (On Wisconsin, Fall 2014)

Poll #2: Fast Forward 50 more Years...
Do you remember education 2.0?
Poll #3: Do you really remember what was to be education 2.0?

Fast Forward 30+ More Years... "Anyone can now learn anything from anyone at any time."

Education 3.0...Education 20/20

“In Education 3.0, classrooms would move away from lectures, such as this one, to having class time be spent on discussions and projects, using digital technology.”

(Per Wikipedia: https://en.wikipedia.org/wiki/Education_3.0

Education 3.0...The Genesis and Emergence of Education 3.0 in Higher Education and its Potential for Africa
First Monday, by Derek Keats and J. Philipp Schmidt, March 2007

Now What is Education 4.0?

"Innovation-producing education. Learn more in: Development of Individual Agency within a Collaborative, Creative Learning Community"

http://www.igi-global.com/dictionary/education-40/41735
https://thinc.in.th/engadmission/education4.html (Chula Engineering)

January 14, 2016
The Fourth Industrial Revolution: What it means, how to respond
Klaus Schwab, Founder and Executive Chairman, World Economic Forum
http://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

(Ubiquitous, mobile supercomputing, artificially intelligent robots, self-driving cars, neurotechnological brain enhancements, genetic editing, etc.)

April 13, 2016
The Fourth Industrial Revolution:
What it means, how to respond
Klaus Schwab, Founder and Executive Chairman, World Economic Forum
http://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

April 30, 2017
‘Those Jobs Are Gone’,
Steve Kolowich, The Chronicle of Higher Education

August 21, 2016
ST Future Economy Roundtable:
Is Asia ready for the Fourth Industrial Revolution?
The Straits Times
http://www.straitstimes.com/asia/is-asia-ready-for-the-fourth-industrial-revolution

“It’s quite clear that the established models of education have to change and adapt to the new environment.”

August 17, 2016
Research: 3D Printing Market to Double by 2020
Joshua Bolkan, Campus Technology

June 7, 2016
Teaching refugees how to code
CNN Money

May 3, 2017
4 out of 5 Companies Have Hired a Coding Bootcamp Graduate
Sri Ravipati, Campus Technology
https://campustechnology.com/articles/2017/05/03/4-out-of-5-companies-have-hired-a-coding-bootcamp-graduate.aspx
June 20, 2016
Coursera on a Mission to Help Refugees
Lauren Camera, US News and World Report

February 9, 2017
More black and Latino students learn to code as Code.org classes swell
Jessica Guynn, USA Today

September 21, 2016
Udacity Unveils Nanodegree Program for Self-Driving Car Engineers
Sri Ravipati, Campus Technology

Poll #4:
Read any good books lately detailing this shift?

The Innovators:
Walter Isaacson (2014)
http://books.simonandschuster.com/The-Innovators/Walter-Isaacson/9781476708690

Machines of Loving Grace:
John Markoff (2015)
http://www.amazon.com/Machines-Loving-Grace-Common-Ground/dp/006140663
Artificial Intelligence
John McCarthy, Stanford AI Lab

John McCarthy
- 1955: Develop the phrase "artificial intelligence"
- 1956: Program with Common Sense
- 1960: First LISP implementation
- 1975: Turing Award Recipient

Intelligence Augmentation and Amplification
Douglas Engelbart’s "The Mother of All Inventions" (1968)
Augmentation Research Center (ARC)
(The live demonstration featured the introduction of the computer mouse, video conferencing, teleconferencing, hypertext, word processing, hypermedia, object addressing and dynamic file linking, and a collaborative real-time editor.)

Knowledge Navigator (1987)
Apple Computer

August 6, 2016
The Web is 25!
Happy (sort of) birthday, World Wide Web,
Erica Fink and Jonathan Tortora, CNN Money (Tech)
http://www.youtube.com/watch?v=hb4AzF6wEoc

The World Wide Web begins on March 12, 1989

January 15, 2016
Wikipedia is 15!
Scott McLemee, Inside Higher Ed

Wikipedia came into the world 15 years ago today - and, voila, what an apple today. The first edition of the online encyclopedia is due April 25, 1998, when Wikipedia was already 16 months old. At first years, it remained a free dictionary before it grew into a full-featured, world-class encyclopedia built on contributions from millions of people.

April 4, 2016
MIT OpenCourseWare is 15!
http://www.mit.edu/about/15-years/
The World is Open: How Web Technology Is Revolutionizing Education

July 2016
I. Elaine Allen and Jeff Seaman, Babson Survey Research Group

Thirty Ways Learning is Changing...
(i.e., it’s more informal, video-based, ubiquitous, collaborative, self-directed, global, mobile, open, massive, etc.)

The Evolution of E-Learning (All 7 year cycles)

Phase I, 1994:
The Age of Portals and Pages (Netscape goes public).
Phase II, 2001:
The Age of Openness (MIT OCW & Wikipedia born).
Phase III, 2008:
The Age of MOOCs (First MOOC Offered).
Phase IV, 2015:
The Age of Personalization.

Other prior significant e-learning dates:
1997: Hypercard first shipped.

30+ Ways Learning is Changing:
The Mega Trends

Learner Engagement
Pervasive Access
Customization & Personalization
How Learning is Changing:
Mega Trend #1. Learner Engagement

Learning is More Social

February 7, 2017 (Engagement)
Learning is More Social
YouTube takes on Facebook with mobile live
Jefferson Graham, USA Today

February 27, 2017 (Engagement)
Learning is More Immersive
Augmented and Virtual Reality Spending to Double in 2017, Sri Ravipati, THE Journal
Worldwide: "forecasts the AR/VR market to reach $13.9 billion in 2017 — up 130.5 percent from the $6.1 billion spent in 2016. Furthermore, AR/VR spending is expected to accelerate over the next several years, achieving a compound annual growth rate (CAGR) of 198 percent over the 2015-2020 forecast period and reaching $143.3 billion in 2020."

June 10, 2015 (Engagement)
Learning is More Immersive
Augmented reality promises 'superpowers', and people are listening
The USA Today, Marco della Cava

May 7, 2015 (Engagement)
Learning is More Adventurous
Aaron Doering, Chasing Seals, TEDx
http://chasingseals.com/
https://twitter.com/chasingseals

Letsee is an AR app from a South Korean company to scan a product and see reviews instantly overlaid onto it.
July 22, 2016 (Engagement)
Learning is More Game-like
When Pokémon Goes to Campus: The Good, the Bad, and the Ugly
Gabriel Sandoval, Chronicle of Higher Education

Pokemon Go players converged last week on the U. of Nebraska at Lincoln’s Memorial Stadium, which officials had opened to the animated-monster hunters. The hit augmented-reality game has prompted many colleges to jump on the bandwagon.

August 23, 2016 (Engagement)
Learning is More Collaborative
e.g., reef videoconferencing
(Great Barrier Reef, Australia)

February 15, 2017 (Engagement)
Learning is More Synchronous
Shindig, Future Trends Forum, Bryan Alexander

February 17, 2016 (Engagement)
Learning is More Mobile
World’s Cheapest Smartphone at $3.67

Want “FREE” engagement?
How about “Adding Some TEC-VARIETY”?
http://tec-variety.com/

How Learning is Changing:
Mega Trend #2. Pervasive Access
Learning is More Online (Access)  
June 15, 2014  
Starbucks offers workers 2 years of free college, CNN Money, Gregory Wallace  
(from Arizona State online programs)

November 22, 2016 (Access)  
Indiana University, Online Course Enrollments  
https://cbi.bi.iu.edu/

May 2, 2017 (Access)  
'Volatile' but Growing Online Ed Market,  
Carl Straumsheim, Inside Higher Ed

April 27, 2017  
Purdue Buys For-Profit Kaplan University for $1 to Create New Kind of Public University, Jeffrey R. Young, EdSurge  

July 21, 2016 (Access)  
Learning is More Ubiquitous  
Facebook's Aquila drone completes first test flight, Jessica Guynn, USA Today

August 1, 2016 (Access)  
Learning is More Ubiquitous  
363 by Idea Group; Study Café Meeting Place; Idea Space (Seoul, Korea)
May 7, 2014 (Access)
Learning is More Global
CNA - Speaking Exchange (video chats)

FCB Brazil and the CNA language school network are launching the Speaking Exchange project, which connects CNA students in Brazil with Americans living in retirement homes.

February 22, 2017 (Access)
Learning is More Informal

Digital citizenship lessons from a 9-year-old with 18,000 Twitter followers, Alan November, eSchool News

May 5, 2015 (Access)
Learning is More Informal

Shubham Jaglan (10 years old) Overwhelmed by "Dream" Return Home After Double World Championship

Shubham Jaglan is a prodigy who has won multiple golf tournaments. He recently returned to India after winning a double world championship.

June 13, 2016 (Access)
Learning is More Free and Open

Nine-Year-Old Anvitha Vijay is the Youngest Developer at WWDC (age 9)

Anvitha Vijay is an Indian girl who is the youngest developer to attend WWDC. She has been recognized for her skills in programming.

May 4, 2016 (Access)
Learning is More Free and Open

This Mongolian Teenager Aced a MOOC

A 14-year-old Mongolian teenager aced a MOOC (Massive Open Online Course) offered by MIT.

May 19, 2016 (Access)
Learning is More Free and Open

From MOOC to bootcamp to MIT

Jin Wu, a former student at MITx, received a full scholarship after attending a bootcamp and later became a master's student at MIT.
**September 28, 2016 (Access)**

**Learning is More Free and Open**

Bookshare, An accessibility online library for people with disabilities

https://www.bookshare.org/
May 14, 2016 (Access)
Learning is More Immediate...
Mastodon bones offer clues of earliest humans in North America, Faith Karimi, CNN
Abstract: http://advances.sciencemag.org/content/2/5/e1600375
Full Article: http://advances.sciencemag.org/content/2/5/e1600375.full
Supplemental materials (PDF): http://advances.sciencemag.org/content/suppl/2016/05/10/2.5.e1600375.DC1
PDF: http://advances.sciencemag.org/content/advances/suppl/2016/05/10/2.5.e1600375.DC1/1600375_SM.pdf

May 9, 2017 (Access)
Learning is More Immediate...
Meet Zuul, the new dinosaur species named after ‘Ghostbusters’ demon
Traci Watson, USA Today
15 second: http://curtbonk.com/ghostbusters15.html
27 second: http://curtbonk.com/ghostbusters27.html

November 19, 2015 (Access)
Learning is More Immediate...
New daddy longlegs named after ‘Lord of the Rings’ character Smeagol, Mary Bowerman, USA Today

June 20, 2016 (Access)
Learning is More Direct from Experts
(e.g., The Expert Café)
http://expertscafe.com/

How Learning is Changing:
Mega Trend #3. Customization
September 7, 2016 (Customization)
Learning is More Modifiable
The Future of Collaboration Spaces Encompasses Video Interactive, Mobil, Julie Johnston, IU, Campus Technology

In the Indiana University Media School lobby, a large display will showcase student work and provide interactive sessions. (photo by Allen Major/The Media School @ Indiana University)

April 10, 2017 (Customization)
Learning is More Modifiable
Miami’s big schools makeover: Out with rows of desks, in with open space, digital tech, Kyra Gurney, Miami Herald

May 9, 2016
Personal Digital Assistants (PDA)
Personal digital assistants are on the rise (and they want to talk) USA Today, Edward Baig (i.e., Google codename of “Chirp”), Elizabeth Weise, USA Today

March 24, 2017 (Customization)
Learning is On Demand
Hey, Alexa: Siri’s not so bad after all! Jefferson Graham, USA Today

Someday, Amazon wants you to have long talks with Alexa

May 2, 2017 (Customization)
Learning is On Demand
Someday, Amazon wants you to have long talks with Alexa

Samsung promises its Galaxy S8 Bixby assistant will be ‘fundamentally different’

Hey, Alexa: Siri’s not so bad after all!

An Amazon Echo powered by Alexa.
May 9, 2017 (Customization)
Amazon Echo Show brings chatty Alexa to a two-way, video touchscreen
Edward G. Baig and Elizabeth Weise, USA Today
https://www.usatoday.com/story/tech/reviews/2017/05/09/amazon-echo-show-touchscreen-video-alexa/101448844/

January 20, 2016 (Customization)
Learning is More Blended
Universities tap growth of craft beer, offer classes, Chicago Tribune

January 20, 2016
Universities tap growth of craft beer, offer classes, Chicago Tribune
Portland State University in Oregon started an online Business of Craft Brewing program in 2013. It has become one of the school's most successful professional certificate programs, drawing people from around the world, said Scott Gallagher, the university's director of communications. "We discovered that there's a huge need for people who wanted to get a certificate," Gallagher said. "They didn't necessarily want to go to college or already had a college degree and wanted to open up a brew pub."

March 23, 2017 (Customization)
Learning is More Personal
Arizona State U Launches Open, Adaptive Lessons on Space Exploration
Rhea Kelly, Campus Technology

February 16, 2017 (Customization)
Learning is More Communal
Building Global Community, Marc Zuckerberg, Facebook
May 20, 2016 (Customization)
Learning is More Massive
agMOOCs (India)
http://www.agmoocs.in/

April 20, 2015 (Customization)
Learning is More Massive
250 MOOCs and Counting: One Man’s Educational Journey, Chronicle of Higher Education
http://chronicle.com/article/250-MOOCs-Counting-One/229397/?cid=at

Jima Ngei: “I had this unrelenting fear that this miracle of free access might evaporate soon.”

December 25, 2016
By The Numbers: MOOCs in 2016
Dhawal Shah, Class Central

December 23, 2016
HarvardX and MITx: Four Years of Open Online Courses -- Fall 2012 - Summer 2016
Isaac Chung, MIT, and Andrew Dean Ho, Harvard

August 12, 2016 (Customization)
Class Central’s Top 50 MOOCs of All Time, Dhawal Shah, Class Central Blog
“Now there are close to 6,000 MOOCs from 600+ universities around the world.”
https://www.class-central.com/report/top-moocs/
August 12, 2016 (Customization)
A Life of Happiness and Fulfillment
Indian School of Business, Rajagopal Raghathan

August 30, 2016
Thousands sign up for free online wine course, John Elmes, Wine News

March 3, 2017 (Customization)
edX Expands MicroMasters Programs With Data Science (“nanodegrees”)

April 9, 2017 (Customization)
How Open E-Credentials Will Transform Higher Education

MOOCs and Open Education
Around the World


Type of MOOC | MOOC | MOOC | MOOC
--- | --- | --- | ---
Learner Role | Active | Passive | Active
Instructor Role | Co-instructor | Sage on stage | Guide on the side
Learning Theory | Constructivism | Behaviorism | Constructivism
Primary Pedagogy | Knowledge duplication | Knowledge production | Knowledge production
Metaphor | "We watch movies" | "We learn movies" | "We make movies"
Development Approach | Instructional design | Educational design research | Instructional design research
Primary Type of Assessment | Self Assessment | Self Assessment | Self Assessment
Funding Source | Seat of the pants funding | Large external funding | Moderate client provided funding

Figure 1. Differences among three types of MOOCs (Shen & Billing, 2010).

July 1, 2015 (Customization)
Chapter 14: Creating a Temporary Spontaneous Mini-Ecosystem through a MOOC
Paul Kim and Charlie Chung, Stanford University
Figure 2. Twitter thread announcing the MOOC

June 14, 2016 (Customization)
Chapter 15: Learning About MOOCs by Talking to Students
Charles Severance, Univ. of Michigan
Anuar Lequerica, Class Central

August 24, 2016
K-MOOCs (and ocMOOCs and hMOOCs) Revolutionizing online education
Professor creates courses tailored to cultural differences
Korea JoongAng Daily, Bong-Moon Kim
http://www.kmooc.kr/

30+ Ways Learning is Changing: Recapping the Three Mega Trends: Engagement, Access, and Customization

January 3, 2017
College is Over
Roger Schank, LinkedIn
**May 4, 2017**

**Prepare For Future Learning**
Dr. Marie Bountrogianni, Dean, The Chang School, Ryerson U, Huffington Post

http://www.huffingtonpost.ca/dr-marie-bountrogianni/prepare-for-future-learning_15465796.html

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**January 30, 2017**

1. **Professor Einstein PDA’s**

Professor Einstein, an educational Wi-Fi connected robot is on display at the Hanson Robot display during the opening day of Consumer Electronics Show 2017. (Photo: Robert Hanashiro, USA TODAY)

http://www.usatoday.com/story/tech/2017/01/30/robotic-barista-now-serving-really-fast/95888780/

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**February 27, 2017**

2. **World Knowledge Refreshment Stations**

http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

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**February 27, 2017**

3. **Robot Collaborators/Partners**

http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

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**May 19, 2016**

**Pepper the robot needs U.S. programmers, Marco della Carva, USA Today**

http://www.usatoday.com/story/tech/news/2016/05/18/google-calling-all-android-robot-programmers/84461778/

Usual internal link: http://trainingshare.com/usa2.html

New download link: https://www.dropbox.com/s/hxcuwqgvaj20oiv/pepper-the-robot2.mp4?dl=0

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**March 14, 2016**

**Artificial Intelligence and Robots**
Paul Basken, The Chronicle of Higher Education

http://chronicle.com/article/Behind-a-Computer’s-Surprise-Victory/Hints-of-Global-Economic-Upheaval/235687?cid=at&utm_source=at&utm_medium=en&elqTrackId=b050021f79e64d299f78b827af837b4a&elq=9ab0ff65a0e940caa0943c7774d346&elqaid=8231&elqat=1&elqCampaignId=2650
April 24, 2017
Brace yourselves: AI is set to explode in higher ed in the next 4 years
Laura Ascione, Campus Technology
http://www.ecampusnews.com/it-newsletter/ai-explode-next-4-years/

April 17, 2017
Facebook's future will blend physical and digital worlds
Jessica Guynn, USA Today

February 27, 2017
3. Three Part Resumes/CV’s
http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

May 10, 2017
3 overlooked LinkedIn features to find a better paying job
Steven Petrow, USA Today
https://www.usatoday.com/story/tech/columnist/stevenpetrow/2017/05/10/3-game-changing-linkedin-features/101032400/

July 28, 2016
Knod
(Per Dr. Michael Mayrath: work with employers to diagnose skills gaps, then provide a platform to deliver content to build those skills in a learn by doing experiences, real projects with employers)
http://www.knod.net/

February 27, 2017
4. Global Learning Partner or PBL Team Selection Walls
http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html
September 2, 2016
5. MOOC Graders and Tutors
Introduction to Philosophy: God, Knowledge and Consciousness
($300 USD for an identity-verified certificate)
Carl Straumsheim, Inside Higher Ed

May 4, 2016
6. MOOCs Social Justice and Spirituality
MOOC 4.0: The Next Revolution in Learning & Leadership, Otto Scharmer, Huffington Post

September 15, 2015 (Customization)
GROOCs are MOOCs for Social Impact
Social Learning for Social Impact, edx
Join the world's first GROOC – a MOOC for groups – to collaborate with others globally and create social change.
https://www.edx.org/course/social-learning-social-impact-mcgillx-groocx
https://www.youtube.com/watch?t=36&v=WNg-5LFAMdI

7. Rise of Super E-Mentors

8. Café Classroom and Café Connectedness

9. Instructional Designer Morphs into Learning Environment Engineer
10. The Age of Personalization

The new “Four Horsemen” of the Apocalypse:
Quality, Copyright, Plagiarism, and Assessment...

May 9, 2017
Online Exam Proctoring Catches Cheaters, Raises Concerns
Jean Dimeo, Inside Higher Ed

March 27, 2017
What will learning look like in 2025?
John Cavanaugh, eCampus News
11. Orientation through VR
12. Scheduling through AI
13. Fully-Immersive Course Content
14. AI Analytics

June 3, 2016
Virtual Reality Lets Med Students Experience What It’s Like To Be 74
Elyse Wanshel, Huffington Post
http://ht.ly/b6pe300XEP3

April 10, 2016
Virtual reality tested by NFL as tool to confront racism, sexism
Marco della Cava, USA Today
October 25, 2016
Osso VR Mixed Reality Promo
http://ossovr.com/
https://www.youtube.com/watch?v=yye_ST5uA6o

March 24, 2017
Artificial Intelligence Market in the US Education Sector 2017-2021
http://www.researchandmarkets.com/research/5lshzz/artificial
AI Market to Grow 47.5% Over Next Four Years
Richard Chang, Campus Technology

March 2017 (Customization)
Coolest tech from SXSW
(Robotic AI conversationalist AI developed by Osaka University)
https://www.cuteabled.com/tricks/

March 28, 2017
Elon Musk’s Neuralink wants to plug into your brain, Marco della Cava, USA Today
(includes 34 second video)
http://trainingshare.com/musk.html

Poll #5:
Who is now interested in Education 20/20…?
END OF COURSE EXAMS?
I SHALL PASS!

We are entering a jumping off point...
(South University of Science and Technology of China, Wednesday June 10, 2015)
Things are heating up for PBL!

Education 20/20 is coming within reach!

Remember for Education 20/20 to make an impact:
“I cannot do this alone.”
“I cannot do this alone.”
“I cannot do this alone.”

Any Questions or Comments?
Slides at: TrainingShare.com
Papers: PublicationShare.com
Free book: http://tec-variety.com/
Email: curt@worldisopen.com