Technology Today, Technology Tomorrow: Might Learning Evolutions lead to Learning Revolutions?

Curtis J. Bonk, Professor, Indiana University
cjbonk@indiana.edu
http://curtbonk.com/

How will you engage the digital learners in the content and process of learning?

Talk Overview

1. Technology Yesterday
2. Technology Today
   30 ways learning is changing...
Megatrends of Learning:
   a. Engagement
   b. Access, and
   c. Customization
3. Technology Tomorrow and Future Trends

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: 1985: FIRST ONLINE COURSE, LINDA HARASIM, UNIV. OF TORONTO
1987: HYPERCARD FIRST SHIPPED.

Part 1: Technology Yesterday

Poll: 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

Fall 2014, On Wisconsin
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

MOOC, Meet MORC

Mimeograph machine.

June 3, 2017
How PLATO changed the World...in 1960
Cait Etherington, ElearningInside News
https://news.elearninginside.com/how-plato-changed-the-world-in-1960/
PLATO was the first generalized computer-assisted instruction system. Starting in 1960, it ran on the University of Illinois' ILLIAC I computer. By the late 1970s, it supported several thousand graphics terminals distributed worldwide, running on nearly a dozen different networked mainframe computers. Many modern concepts in multi-user computing were originally developed on PLATO, including forums, message boards, online testing, e-mail, chat rooms, picture languages, instant messaging, remote screen sharing, and multiplayer games.

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, bootstrapping, and a collaborative real-time editor.")
http://www.amazon.com/Machines-Loving-Grace-Common-Between/dp/0062266683
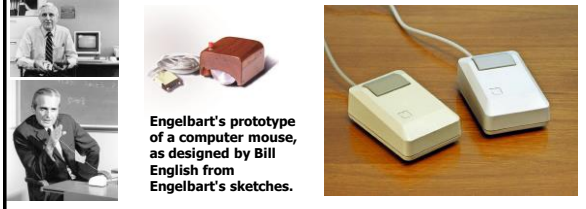
Engelbart's prototype
of a computer mouse,
as designed by Bill
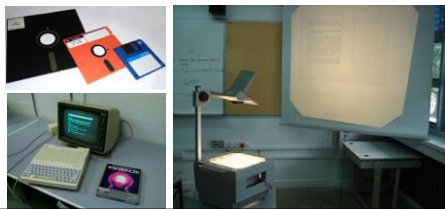English from
Engelbart's sketches.

The World of Open Education

Poll: Anyone remember these technologies?

May 10, 2013
10 ed-tech tools of the 70s, 80s, and 90s
eSchool News, Meris Stansbury
http://www.eschoolnews.com/2013/05/10/10-ed-tech-tools-of-the-70s-80s-and-90s/print/

September 19, 2014
A Distance Learning Story
Bob Clasen, University of Wisconsin
https://www.youtube.com/watch?v=kCm1_MGagec&feature=youtu.be
February 27, 1934-March 17, 2018
https://www.cressfuneralservice.com/obituary/249139/Robert-Clasen/

2

September 26, 2018
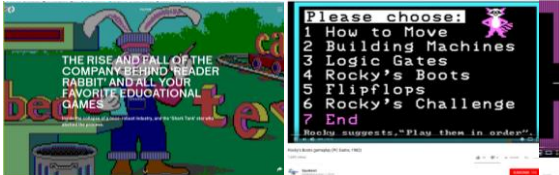### Remember Education 2.0?
**The rise and fall of the company behind 'Reader Rabbit'
and all your favorite educational games**
Abigail Cain, The Outline
https://theoutline.com/post/6293/reader-rabbit-history-the-learning-company-zoombinis-carmen-sandiego?zd=1&zi=qmbuobh7
Rocky's Boots: https://www.youtube.com/watch?v=a-NLh58bIIk
Project YES (Curt Bonk): https://youtu.be/bZD5mQH4Ups


```
Please choose:
1 How to Move
2 Building Machines
3 Logic Gates
4 Rocky's Boots
5 Flipflops
6 Rocky's Challenge
7 End
Rocky suggests,"Play them in order".
```

Knowledge Navigator (1987)
Apple Computer
http://www.youtube.com/watch?v=hb4AzF6wEoc
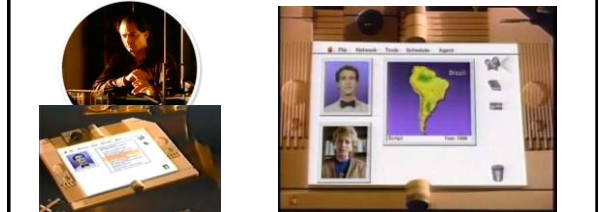
February 18, 2019
Is Email Making Professors Stupid?
Cal Newport, The Chronicle of Higher Education
https://www.chronicle.com/interactives/is-email-making-professors-stupid

Is Email Making
Professors Stupid?
It used to simplify crucial tasks.
Now it's strangling ◆
scholars' ability to think
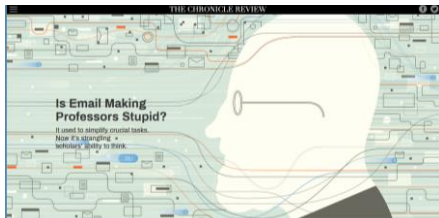
August 6, 2016
The Web is 25!
Happy (sort of) birthday, World Wide Web!,
Erica Fink and Jonathan Tortora, CNN Money (Tech)
http://info.cern.ch/ (First website)
http://info.cern.ch/hypertext/WWW/TheProject.html
http://money.cnn.com/2016/08/06/technology/world-wide-web-25-years-old/index.html?iid=hp-stack-dom

THE WORLD WIDE WEB
BEGINS ON MARCH 12, 1989

January 15, 2016
Wikipedia is 15!
Scott McLemee, Inside Higher Ed
https://www.insidehighered.com/views/2016/01/15/essay-wikipedias-fifteenth-anniversary?utm_source=Inside+Higher+Ed&utm_campaign=4a0a240988-DNU20160115&utm_medium=email&utm_term=0_1fcbc04421-4a0a240988-c07362401

April 4, 2016
MIT OpenCourseWare is 15!
http://ocw.mit.edu/about/15-years/

3

The Creation of Effective Learning Environments
http://study.com/academy/lesson/learning-environment-in-the-classroom-definition-impact-importance.html

July 29, 2016
Reimagine Your Learning Space: Starbucks Your Classroom!
Oskar Cymerman, Teaching Channel
https://www.teachingchannel.org/blog/2016/07/29/starbucks-your-classroom/

Sterile, industrial-era rows aren't very attractive or motivating. Even more, I've become convinced that traditional educational settings dull the senses...I believe the "Starbucks" environment will promote that freedom and movement.
Freedom is the key ingredient to social-emotional well-being and deeper learning. Rows and columns constrict. They hold and stifle. That is the truth. That is the reality in many U.S. classrooms today. But no longer in mine. Never again.
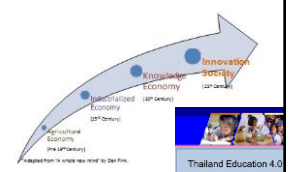
Education 3.0...Education 20/20

"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

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-40/41755
https://thinc.in.th/engadmission/education4.html (Chula Engineering)

November 8, 2018
Learning is More Personalized
AI Question Asking
(Paul Kim keynote in Taiwan; **Education 4.0 Conference**)
https://www.facebook.com/digitalschema
https://www.facebook.com/digitalschema/videos/10217854957270186/

Question Answering: Level 1 – Level 5

(Paul Kim, Taiwan, November 2018)

Slide 1:

Level 1	• When did Elon successfully launch the SpaceX program? • Who admitted that launching the car into space was "kind of silly and fun?
Level 2	• What are the things Tesla designed? • What were the things Tesla couldn't determine the cause of?
Level 3	• How do you compare Elon Musk and Nicolas Tesla? • How is Mars different from Jupiter?
Level 4	• Why did Tesla built a plant in Colorado, not in New York? • Why did Tesla at first consider whether they were "electrical disturbances as are produced by the sun?
Level 5	• If he did not devise ever-more sensitive receivers to detect these waves, what could have been the consequence? • If he did not introduce the AC motor in the late 1880, what would have been the consequence?

(Paul Kim, Taiwan, November 2018)

Slide 2:

January 14, 2016
The Fourth Industrial Revolution:
What it means, how to respond
Klaus Schwab, Founder and Executive Chairman, World Economic Forum
https://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, neuro-technological brain enhancements, genetic editing, etc.)
http://www.trainingshare.com/fourth-industrial-evolution-video-clip-short.php

The Fourth Industrial Revolution
Klaus Schwab

Navigating the next industrial revolution

Revolution	Year	Information
1	1784	Steam, water, mechanical production equipment
2	1870	Division of labour, electricity, mass production
3	1969	Electronics, IT, automated production
4	?	Cyber-physical systems

Slide 3:

April 13, 2016
The Fourth Industrial Revolution:
What it means, how to respond
Klaus Schwab, Founder and Executive Chairman, World Economic Forum
https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/
http://trainingshare.com/fourth-industrial-evolution-video-clip.php
http://www.tubechop.com/watch/8280981

The world is really open to learning.

Slide 4:

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."

CHINA & INDIA | ASEAN | TECHNOLOGY | EDUCATION | SINGA

Slide 5:

July 11, 2017
The Rise of the Phigital Learner
Going 'phigital?' 4 things schools need to know about
Generation Z, Todd Kominiak, TrustEd
http://trustedk12.com/phigital-digital-learning/
May 15, 2017
3 must know's about the rising "phigital" student and why their impact
is enormous, Meris Stansbury, eCamous News
https://www.ecampusnews.com/campus-administration/education-gen-z-phigital-student/

eCAMPUS NEWS

3 must know's about the rising "phigital" student-and why their impact is enormous

Going 'phigital?' 4 things schools need to know about Generation Z

Slide 6:

Clearly…
Learning is Changing!

How Online Learning is Changing Classroom Design

Education 20/20

20 New Roles of the Instructor

Captain
Course Ambassador
Consumer Advocate
Curator
Counselor
Cook
Change Catalyst
Concierge
Conductor
Comedian
Camping Trip Guide
Coach
Consultant
Course Expedition Leader
Collaborator
Community Organizer
Chemist
Care Giver
Cultivator
Colleague
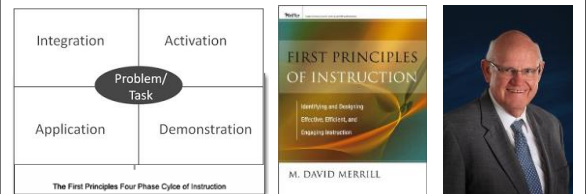

Merrill's First Principles of Teaching/Instruction
http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html

Integration	Activation
	Problem/Task
Application	Demonstration

The First Principles Four Phase Cylce of Instruction

FIRST PRINCIPLES OF INSTRUCTION

Identifying and Designing Effective, Efficient, and Engaging Instruction

M. DAVID MERRILL

Bonk's Last Principles of Teaching/Instruction (Education 4.0?)
http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html
http://www.applicadthai.com/articles/education-4-0/

20 Principles of Life

Education 4.0

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

Flexibility
Support and Feedback
Choice and Options
Nontraditional Learning
Convenience
Spontaneity
Passion and Inspiration
Organization
Relevance and Meaningfulness
Collegiality
Sharing
Trial and Error (i.e., it is ok to fail)
Cheerfulness and Optimism
High Expectations
Purpose and Vision
Expanded Resources
Human Connectedness
#20 ???
Empowerment and Autonomy
Cognitive Apprenticeship

90+ ED TECH COMPANIES WRITING THE FUTURE OF EDUCATION

30+ Ways Learning is Changing:
The Mega Trends

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

ARKit lets you create immersive augmented reality experiences on iOS devices. (Photo: Wareable)

How Learning is Changing:
Mega Trend #1. Learner Engagement

social
mobile   hands-on
visual   touch-sensored
game-based   adventurous
digital & resource rich
immersive
collaborative

January 3, 2018
Learning is More Mobile
CES 2018: Your guide to the biggest consumer electronics show
USA Today
https://www.usatoday.com/story/tech/news/2018/01/03/ces-2018-your-guide-biggest-consumer-electronics-show/1006778061/

The Octopus watch from Joy, an icon-based watch for kids to have good habits is on display during CES.

July 24, 2018
Learning is More Digital and Resource Rich
This Physicist Wants Female Scientists To Get Noticed. So She Wrote 270 Wikipedia Profiles.
Jenna Amatulli, Huffington Post
https://www.huffingtonpost.com/entry/scientist-pens-270-wikipedia-pages-in-a-year-so-female-scientists-get-noticed_us_5b574eeee4b0b15aba92c0d5

October 8, 2018
Learning is More Social
First look: Facebook unveils Portal video calling devices for the home with Alexa
Edward C. Baig, The USA Today
https://www.theatlantic.com/science/archive/2018/12/what-happened-after-people-first-arrived-americas/573335/
Video (1 minute): **http://curtbonk.com/facebook-portal.html**
http://www.usatoday.com/story/tech/2017/02/07/youtube-takes-facebook-mobile-live/97566592/

Learning is More Collaborative
(e.g., PiratePad: http://meetingwords.com/)
http://blogs.elon.edu/technology/6-collaborative-writing-applications-for-group-projects-or-papers/
MeetingWords, Google Docs, NowComment, MixedInk

July 1, 2015
Learning is More Collaborative
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

April 22, 2018
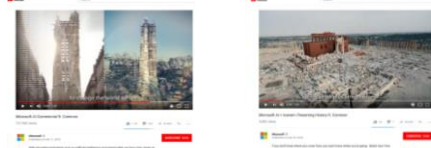### Learning is More Visual
Microsoft AI Commercial ft. Common
Video 1:00: Microsoft AI Commercial ft: https://www.youtube.com/watch?v=9tucY7Jhhs4_ (Feb 11, 2018)
Video 1:48: Microsoft AI: Amplifying Human Ingenuity: https://www.youtube.com/watch?v=NDmu7ZSNPXo
Video 1:00: Microsoft AI: Empowering Innovators ft. Common: https://www.youtube.com/watch?v=25OWdqfAYhw (April 22, 2018)
Video: 1:00 Microsoft AI + Iconem: Preserving History ft. Common:
https://www.youtube.com/watch?v=ZDZjaIhzMSM (April 22, 2018)
Video: 0:44: Microsoft AI + The Yield: Taking the guesswork out of farming ft. Common:
https://www.youtube.com/watch?v=7rzufxlGH4o (April 22, 2018)

April 17, 2017
Learning is More Adventurous...
1st woman to officially run Boston Marathon does it again, 50 years later
Emanuella Grinberg, CNN, USA Today
http://www.cnn.com/2017/04/17/us/boston-marathon-kathrine-switzer-trnd/index.html
July 16, 2017
Julia Hawkins Sets 100-Meter Dash Record for Women 100 Years or Older, Joseph Zucker, CNN
http://bleacherreport.com/articles/2723595-julia-hawkins-sets-100-meter-dash-record-for-women-100-years-or-older?utm_source=cnn.com&utm_medium=referral&utm_campaign=editorial

August 8, 2017
Learning is More Game-like
ShortSims
http://www.shortsims.com/
Clark Aldrich clark@clarkaldrichdesigns.com

March 21, 2018 (Engagement)
Learning is More Collaborative
Chatterbox
The overall winner in the competition was Chatterbox, an online language school powered by refugees
https://wearechatterbox.org/

September 4, 2017
Virtual Reality and AR Explodes
VR Lets Med Students Experience What It's Like To Be 74
Elyse Wanshel, Huffington Post
http://ht.ly/bSpe300XEPJ
https://www.usatoday.com/story/tech/columnist/baig/2017/09/04/virtual-reality-next-2-d-tv-like-or-hyped-pricey-and-consumers-didnt-care/616961001/

Facebook Spaces is a new social VR hang out area that allows owners of Oculus Rift and Touch to interact in virtual reality. (Photo: Facebook)

May 1, 2018
Learning is More Hands-on
3 ways districts can use AR and AI
Justin Anglio, eSchool News
https://www.eschoolnews.com/2018/05/01/3-amazing-ways-our-district-is-using-ar-and-vr/

EarthShake, the first educational game for the NoRILLA system, teaches early physics principles through hands-on learning.

May 1, 2018
Learning is More Immersive
3 ways districts can use AR and AI
Justin Anglio, eSchool News
https://www.eschoolnews.com/2018/05/01/3-amazing-ways-our-district-is-using-ar-and-vr/

When a teacher glances around her classroom, Lumilo allows her to see real-time analytics (in the form of icons) floating directly above each student's head. The teacher can glance directly at a student or "click" on a student's icon to see more detailed information about where and how that student might be struggling.

July 19, 2017
Learning is More Immersive
HoloLens Assists in Live Surgery
Tommy Palladino, Next Reality
https://hololens.reality.news/news/hololens-assists-live-surgery-0178887/
Video #1: 1:09: http://curtbonk.com/hololens.html
Video #2: 1:37: http://curtbonk.com/hololens2.html
07/19/2017
HoloLens Assists in Live Surgery
Numerous examples exist of doctors and surgeons using HoloLens to plan surgeries. The device has even been used to view reference images during a procedure and stream it to a remote audience. Until recently, it has not been used to augment the surgeon's view of the patient during a live surgery.
Original Video: https://hololens.reality.news/news/hololens-assists-live-surgery-0178887/

July 17, 2017
Learning is More Immersive
Learning Chemistry in Virtual Reality,
Sarah Hardman, New Learning Times
https://newlearningtimes.com/cms/article/4519/learning-chemistry-in-virtual-reality
1:38 video: https://vialogues.com/vialogues/play/38337/
All: http://curtbonk.com/chemistry-vr.html
01...41: http://curtbonk.com/chemistry-vr-1.html
41-1:16: http://curtbonk.com/chemistry-vr-2.html
1:16-1:36: http://curtbonk.com/chemistry-vr-3.html

Learning Chemistry in Virtual Reality

3/7/2019

May 18, 2017
Learning is More Immersive
Google Expeditions Adds Augmented Reality for Classrooms, Sri Ravipati, THE Journal
https://thejournal.com/articles/2017/05/18/google-expeditions-adds-augmented-reality-for-classrooms.aspx
https://www.youtube.com/watch?v=-DYqIaMWTVg
27 Seconds http://curtbonk.com/thejournal27.html
38 Seconds http://curtbonk.com/thejournal38.html
1: 10: http://curtbonk.com/thejournal.html

How Learning is Changing:
Mega Trend #2. Pervasive Access

April 16, 2018
Learning is More Informal
World of active learning in higher ed
Formal and informal learning spaces transforming campuses internationally
Sherrie Negrea, University Business, May 2018
https://www.universitybusiness.com/article/world-active-learning-higher-ed

May 7, 2014 (Access)
Learning is More Global
CNA - Speaking Exchange (video chats)
https://www.youtube.com/watch?v=-S-SEfwpFOk
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.

January 5, 2017
Learning is More Immediate...
Move over T. rex, new dinosaur unveiled, Amanda Jackson, CNN
http://www.cnn.com/2016/01/14/living/titanosaur-new-dinosaur-on-display-new-york-irpt/
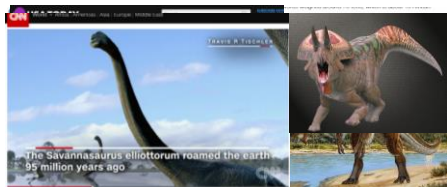
July 11, 2018
Learning is More Immediate...
Fossil of first giant dinosaur, dubbed Ingentia prima, found in Argentina
Brett Molina, USA Today
https://www.usatoday.com/story/news/nation-now/2018/07/11/fossil-first-giant-dinosaur-discovered-argentina/774463002/
https://www.usatoday.com/story/news/2017/05/09/new-species-dinosaur-zuul-ghostbusters/101475468/
15 second: http://curtbonk.com/ghostbusters15.html

10

3/7/2019

November 19, 2015 (Access)
Learning is More Immediate...
New daddy longlegs named after 'Lord of the Rings'
character Smeagol, Mary Bowerman, USA Today
http://www.usatoday.com/story/tech/nation-now/2015/11/19/new-daddy-longlegs-named-after-lord-ring-character-smeagol/76037286/
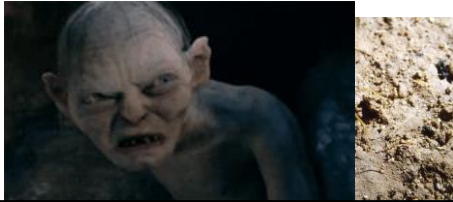
November 28, 2018
Learning is More Immediate...
'Siberian unicorn' once walked among
early humans
Tara John, CNN
https://edition.cnn.com/2018/11/27/europe/siberian-unicorn-humans-scli-intl/index.html

November 20, 2018 (Access)
Learning is More Video-based...
The Mantis Cam Gives Us a Peek into a Whole
New Ocean World
Melanie Hering, New Learning Times
https://newlearningtimes.com/cms/article/5741/the-mantis-cam-gives-us-a-peek-into-a-whole-new
https://vialogues.com/vialogues/play/44732/

June 18, 2018
Learning is More Video-based...
(e.g., Flipgrid)
Microsoft acquires social learning platform Flipgrid,
Brian Heater, TechCrunch
https://techcrunch.com/2018/06/18/microsoft-acquires-social-learning-platform-flipgrid/

October 4, 2018 (Engagement)
Learning is More Synchronous
Shindig, Future Trends Forum, Bryan Alexander
Anant Agarwal, CEO and founder of edX
https://bryanalexander.org/the-future-trends-forum/
http://www.shindig.com/
http://events.shindig.com/event/ftf-anniversary
https://shindig.com/client/client/?event=ftf-agarwal

July 29, 2018
Learning is More Synchronous
Why Silicon Valley is teaming up with San
Quentin to train young people to code
Jessica Guynn and Megan Diskin, USA TODAY
https://www.usatoday.com/story/tech/2018/07/25/california-youth-learning-code-prison-help-san-quentin-inmates/810122002/
Video (1:46): http://curtbonk.com/san-quentin.html

11

November 1, 2017
Learning is More Online (Access)
Indiana University, Office of Online Education

November 11, 2018
Meet the New Mega-University:
Can the fast-growing Southern New Hampshire U. transform higher education?
Goldie Blumenstyk, The Chronicle of Higher Education
https://www.chronicle.com/article/Meet-the-New-Mega-University/245049

February 18, 2019
The Rise of the Mega-University
Lee Garner, The Chronicle of Higher Education
https://www.chronicle.com/interactives/Trend19-MegaU-Main

March 5, 2019
UMass System Aims to Join the Mega-University Club
Lee Gardner, The Chronicle of Higher Education
https://www.chronicle.com/article/UMass-System-Aims-to-Join-the/245825
Another State Plans Online College
Mark Lieberman, Inside Higher Ed
https://www.insidehighered.com/digital-learning/article/2019/03/06/university-massachusetts-launch-online-college-adults-state-and

July 29, 2018
Learning is More Online
Can a Huge Online College Solve California's Work-Force Problems?
Karin Fischer, The Chronicle of Higher Education
https://www.chronicle.com/article/Can-a-Online-College/244054
http://curtbonk.com/link

The new college is being created to help California's adults improve their job prospects in growing fields like IT support.

September 17, 2018
Talk to Books
https://books.google.com/talktobooks/
https://qz.com/1252664/talk-to-books-at-ted-2018-ray-kurzweil-unveils-googles-astounding-new-search-tool-will-answer-any-question-by-reading-thousands-of-books/

March 27, 2017 (Access)
Learning is More Free and Open
Beyond Free: Harnessing the resonant value in open and collaborative practices for the public good
David Porter, CEO, eCampus Ontario,
Open Education Ontario Summit
https://www.slideshare.net/David_Porter
https://www.ocls.ca/events/open-education-ontario-summit

August 2, 2018
Learning is More Free and Open
OpenStax Infographic
https://cpb-us-e1.wpmucdn.com/news-network.rice.edu/dist/c/2/files/2018/07/infographic-2018_final-21jjdwm.pdf

March 19, 2018
Learning is More Free and Open
Open Textbook Network
Center for Open Education, University of Minnesota
http://research.cehd.umn.edu/otn/

December 19, 2017 and April 24, 2018
Learning is More Free and Open
eTexts 101: A Practical Guide
https://iu.pb.unizin.org/iuetexts101/front-matter/introduction/
https://iu.pb.unizin.org/iuetexts101/

May 3, 2017
Learning is More Free and Open
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

August 9, 2017
Learning is More Free and Open
Modern State Education Alliance
https://modernstates.org/

The World is Open:
How Web Technology Is Revolutioning Education

世界是开放的
网络技术如何变革教育
The World Is Open
How Web Technology Is Revolutionizing Education

CURTIS J. BONK
The World is Open
How Web Technology Is Revolutionizing Education
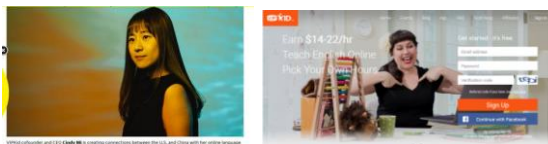
TEN OPENERS: (WE-ALL-LEARN)

1. Web Searching in the World of E-Books
2. E-Learning and Blended Learning
3. Availability of Open Source and Free Software
4. Leveraged Resources and OpenCourseWare
5. Learning Object Repositories and Portals
6. Learner Participation in Open Information Communities
7. Electronic Collaboration
8. Alternate Reality Learning
9. Real-Time Mobility and Portability
10. Networks of Personalized Learning

March 6, 2018
Learning is More Direct from Experts
By connecting Chinese pupils with North American teachers, Beijing-based platform is building cultural bridges, one online English class at a time.
Most Innovative Companies, Fast Company
Interview with VIPKid CEO CEO Cindy Mi
https://www.fastcompany.com/company/vipkid

March 21, 2018
Learning is More Direct from Experts
TeachMeNow
TeachMeNow is a gig-economy platform for teachers. This marketplace connects teachers, experts, and mentors to students. The technology combines scheduling, payments and live virtual sessions that can connect on any device allows tens of thousands of teachers to create their own online businesses, with some earning over $100,000 last year. In addition, schools and companies including Microsoft use TeachMeNow software to create their own-branded online learning communities.
https://teachmenow.com/

February 14, 2019
Could On-Demand Online Tutoring Be The Gateway To Personalizing Learning For Colleges?
Michael Horn, Forbes
https://www.forbes.com/sites/michaelhorn/2019/02/14/could-on-demand-online-tutoring-be-the-gateway-to-personalizing-learning-for-colleges/#2d0f66c4b4db
https://www.givingcompass.org/article/could-on-demand-online-tutoring-be-the-gateway-to-personalizing-learning-for-colleges/

Could On-Demand Online Tutoring Be The Gateway To Personalizing Learning For Colleges?

Michael Horn Contributor

A few years ago, the ReWired Groupand Bob Moesta, my coauthor on my next book, Choosing College, undertook a project for the tutoring marketplace company, Wyzant.

How Learning is Changing:
Mega Trend #3. Customization

massive
blended
self-directed
flipped
communal
personal
competency-based
on-demand
modifiable
modular

January 14, 2018
Learning is More Communal
Facebook invites you to live in a bubble where you're always right
Callum Borchers, The Washington Post
https://www.thestar.com/news/world/2018/01/14/facebook-invites-you-to-live-in-a-bubble-where-youre-always-right.html

---

March 2, 2018
Learning is More Modifiable
The Architecture of Ideal Learning Environments
Emelina Minero, Edutopia
https://www.edutopia.org/article/architecture-ideal-learning-environments

---

January 20, 2016
Learning is More Blended
Universities tap growth of craft beer, offer classes, Chicago Tribune
http://www.chicagotribune.com/business/ct-college-craft-beer-offer-classes-20160120-story.html

---

February 27, 2017
Learning is More Self-Directed
The LMS Market is Quickly Losing Ground
Carol Leaman, CLO
https://www.openlearning.com/
https://www.openlearning.com/

January 2, 2018
Learning is More Personal
5G to AR: Here are 7 technologies to watch in 2018, Edward C. Baig, USA Today
https://www.usatoday.com/story/tech/news/2018/01/02/artificial-intelligence-and-world-overblown-fears/985813001/
(e.g., Augmented hearing)

March 14, 2016
Learning is More Personal
Artificial Intelligence and Robots
Paul Basken, The Chronicle of Higher Education
https://www.chronicle.com/article/Behind-a-Computer-s-Surprise/235687
http://www.usatoday.com/story/tech/2016/03/13/robots-androids-geminoids-sxsw/81735092

Behind a Computer's Surprise Victory,
Hints of Global Economic Upheaval

Forget the robots — here come the geminoids!

October 14, 2017
Learning is More Personalized
**China wants to bring artificial intelligence to
its classrooms to boost its education system**
**How the take off of AI-enabled education will affect the interaction between
China's 14 million teachers and 188 million pupils**
Meng Jing, South China Morning Post
https://www.scmp.com/tech/science-research/article/2115271/china-wants-bring-artificial-intelligence-its-classrooms-boost
Video 1:33: http://curtbonk.com/chinese-ai.html

Size of internet-enabled education market (billion yuan)

Year	Value
2013	92.4
2014	122
2015	161
2016	212.5
2017*	280.5

The system can also analyse the learning pattern of a whole class and point out the main problems

---

April 8, 2018
Learning is More Personal
Can Artificial Intelligence Make Teaching More Personal?
Goldie Blumenstyk, The Chronicle of Higher Education
https://www.chronicle.com/article/Can-Artificial-Intelligence/243023

Can Artificial Intelligence Make
Teaching More Personal?

**A new grading tool called Gradescope — powered by AI and now being used
for more than 175,000 students at 550 colleges — offers one window on the
possibilities.**
**The tool helps automate the grading process without requiring instructors to
rely on multiple-choice tests. Several professors who use it say the automation
has actually made it easier for them to personalize their teaching.**
**At the University of Michigan at Ann Arbor, students in a statistics class last
fall had their writing assignments evaluated by an automated text-analysis
tool.**

August 2, 2018
Learning is More On Demand (PDAs)
**Hey, Alexa, Should We Bring Virtual Assistants to
Campus? These Colleges Gave Them a Shot**
Lindsey Ellis, The Chronicle of Higher Education
https://www.chronicle.com/article/Hey-Alexa-Should-We-Bring/244129
24 seconds: http://curtbonk.com/jetsons24.html
44 Seconds: http://curtbonk.com/jetsons44.html

Alexa goes to college: Echo Dots move into dorms on campus

Hey, Alexa, Should We Bring Virtual
Assistants to Campus? These Colleges
Gave Them a Shot

January 9, 2017
Learning is More On Demand
**Jill Watson, Round Three, Georgia Tech course prepares for third semester with virtual teaching
assistants, Jason Maderer, Georgia Tech News Center**
http://www.news.gatech.edu/2017/01/09/jill-watson-round-three
The Terribly Thin Conception of Ethics in Digital Technology, David Golumbia, Uncomputing
http://www.uncomputing.org/
Bot teacher that impressed and fooled everyone, Donald Clark, Plan B
http://donaldclarkplanb.blogspot.co.uk/2016/10/bot-teacher-that-impressed-and-fooled.html

NEWS CENTER

ROBOT TEACHER FOOLED
STUDENTS FOR MONTHS

April 8, 2018
Learning is More On Demand
**What I Learned When My Students Used
Google Translate**
Diane Loyet, The Chronicle of Higher Education
https://www.chronicle.com/article/What-I-Learned-When-My/243017

- I was very surprised by the results. They sent me examples of translations into English from Albanian, Chinese, Kazakh, Russian, and Spanish. **The translations from Albanian, Kazakh, Russian, and Spanish were good. They were not perfect, but the mistakes were such that, had I encountered the sentences in a student paper, I would have attributed them to grammatical errors on the part of the non-native speaker of English.** Here is one of the Spanish examples:
- **Original Spanish:** *Si yo fuera tú, le cobrara hasta por respirar.*
- **Google Translate's English translation:** *If I were you, I'll even charge you for breathing.*
- **Accurate translation:** *If I were you, I would even charge him for breathing*

16

April 8, 2018
Learning is More On Demand
What I Learned When My Students Used Google Translate
Diane Loyet, The Chronicle of Higher Education
https://www.chronicle.com/article/What-I-Learned-When-My/243017
- **In contrast, Google Translate's English version of a Chinese passage was unintelligible:**
  - *But the second language acquisition is a steady process, if you take a cure to do, that is, chronic diseases and even health care, unlike acute disease, once the recipe to treatment, the consequences will soon be reflected.*

November 29, 2018
Learning is More "On Demand"
What is your phone number?
Google Translate
Google Translate Chinese translation is weird/wrong C-English translation is right -ChineseBay
https://www.youtube.com/watch?v=Thpd61UREUY

May 9, 2018
Learning is More On Demand
Google Duplex Demo from Google IO 2018
Video (4:11): https://www.youtube.com/watch?v=bd1mEm2Fy08
Video (2:05): http://curtbonk.com/google40-245.html
Entire video (4:11): http://curtbonk.com/google2018.html
Donald Clark Plan B
http://donaldclarkplanb.blogspot.ca/2018/05/google-just-announced-ai-bot-that-could.html?m=1

May 19, 2016
Weirdness #7: From MOOC to bootcamp to MIT
MIT News, Office of Digital Learning
(Jin Wu—from MITx to MIT Global Entrepreneurship Bootcamp to master's student)
http://news.mit.edu/2016/mooc-bootcamp-mit-0519

Weirdness #8: Hundred+ MOOC Clubs
April 20, 2015
250 MOOCs and Counting: One Man's Educational Journey, Chronicle of Higher Education
http://chronicle.com/article/250-MOOCsCounting-One/229397/?cid=at
If the MOOC movement has faded, nobody told Jima Ngei. Mr. Ngei, who lives in Port Harcourt, Nigeria, has completed and passed 250.

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

May 20, 2016
Chapter 18: Changing the Tune:
MOOCs for Human Development? A Case Study
(agMOOCs in India)
Balaji Venkataraman and Asha Kanwar (COL)
http://www.agmoocs.in/

MOOCs and Open Education Around the World
http://routledge-ny.com/books/details/9781138807419/

WHAT'S NEXT?

Dr. Marie Bountrogianni
Prepare For Future Learning

Looking to 2040: Anticipating the Future of Higher Education

Part III. Technology Tomorrow
http://www.huffingtonpost.ca/dr-marie-bountrogianni/prepare-for-future-learni_b_16407756.html
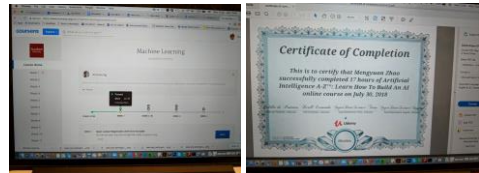
How Human is Too Human for Robots?
By Sara Harrison

August 1, 2018
1. Independent Studies Via MOOCs
MOOC: AI A-Z: Learning How to Build an AI Online Course and Machine Learning
Mengyuan Zhao
https://www.udemy.com/artificial-intelligence-az/
https://www.coursera.org/learn/machine-learning

October 12, 2018
2. OER-Based Courses and Programs
The Chronicle of Higher Education
Launching OER Degree Pathways:
An Early Snapshot of Achieving the Dream's OER Degree Initiative and Emerging Lessons
https://www.achievingthedream.org/sites/default/files/initiatives/launching_oer_degree_pathways.pdf
Griffiths, R., Gardner, S., Lundh, P., Shear, L., Ball, A., Mislevy, J., Wang, S., Desrochers, D., Staisloff, R. (2018). *Participant Experiences and Financial Impacts: Findings from Year 2 of Achieving the Dream's OER Degree Initiative.* Menlo Park, CA: SRI International.

Saving money with open-ed resources.
- A large-scale effort to encourage the use of open-education resources has helped students save money and bolstered their learning, according to a report, released today, on the findings from the second year of Achieving the Dream's OER Degree Initiative. The study found that:
- Students saved between $66 and $121 per course.
- Over 60 percent of students reported that the overall quality of their learning experience in an OER course was higher in comparison to a typical, non-OER course.
- The number of OER courses at participating institutions jumped from 13 in 2016 to 385 in the spring of 2018; the number of students enrolled in OER courses went from 3,404 in 2016 to 37,398 in 2017.

September 22, 2017
3. Binge Learning Experiences
What Online Education Can Learn from Netflix
Henry Kronk, E-learning Inside News
https://theumlaut.com/binge-learning-is-online-education-s-killer-app-84da18f8ae76

ELEARNING INSIDE NEWS
Binge Learning: What Online Education Can Learn from Netflix

'Binge Learning' is Online Education's Killer App
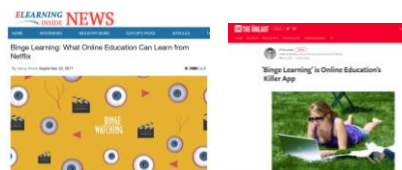
June 11, 2017 (New Learning Times)
4. Rise of Super E-Mentors and AI Coaches
(Paul Kim, 2018)

February 27, 2017
5. Web Conferencing Walls
Global Learning Partner or PBL Team Selection Walls
http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

September 26, 2018
6. Interactive Agents and Tutors
Pushing the Boundaries of Learning With AI
Lindsay McKenzie, Inside Higher Ed
https://www.insidehighered.com/digital-learning/article/2018/09/26/academics-push-expand-use-ai-higher-ed-teaching-and-learning
https://www.ibm.com/blogs/research/2018/08/mandarin-language-ai/
https://www.youtube.com/watch?time_continue=48v=7EuSTu1iR2A
1:17: http://curtbonk.com/mandarin.html

January 30, 2017
7. Professor Einstein PDA's
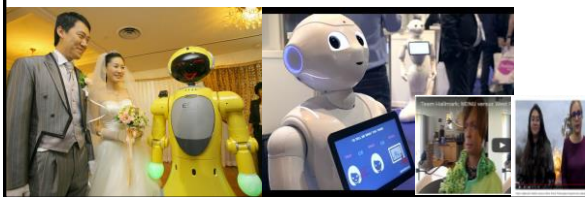http://www.usatoday.com/story/tech/2017/01/30/robotic-barista-now-serving-really-fast/95888780/

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/

February 27, 2017
8. Robot Collaborators/Partners
http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

January 16, 2018
**Robots are better at reading than humans**
Brett Molina, The USA Today
https://www.usatoday.com/story/tech/news/2018/01/16/robots-better-reading-than-humans/1036420001/
Video (57 seconds): http://curtbonk.com/robots1.html

March 29, 2017
Every industrial robot takes up to 6 jobs, study finds
Steve Goldstein, MarketWatch
http://www.marketwatch.com/story/over-6-million-jobs-at-risk-from-robots-new-study-finds-2017-03-29
Video: 1:46 http://curtbonk.com/futureandroids.html
Video: .49-1:12: http://curtbonk.com/futureandroids2.html
Video: .01 to .49: http://curtbonk.com/futureandroids3.html
Video:01-.25: http://curtbonk.com/futureandroids4.html

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
https://campustechnology.com/articles/2017/02/23/arizona-state-u-launches-open-adaptive-lessons-on-space-exploration.aspx

9. Café Classroom and Café Connectedness
Starbucks Your Classroom!
Oskar Cymerman, Teaching Channel
https://www.teachingchannel.org/blog/2016/07/29/starbucks-your-classroom/

Sterile, industrial-era rows aren't very attractive or motivating. ...I believe the "Starbucks" environment will promote that freedom and movement...Freedom is the key ingredient to social-emotional well-being and deeper learning. Rows and columns constrict. They hold and stifle.

10. Instructional Designer Morphs into Learning Environment Engineer

February 27, 2017
11. World Knowledge Refreshment Stations
http://www.thelivingmoon.com/43ancients/02files/Library_Alexandria.html

February 21, 2019
12. Improving Student Outcomes with Adaptive Courseware: The *Every Learner Everywhere* Network Initiative
by Karen Vignare, Ryan Kelsey, and Stacey VanderHeiden Guney, EDUCAUSE Review
https://er.educause.edu/blogs/2019/2/improving-student-outcomes-with-adaptive-courseware-the-every-learner-everywhere-network-initiative
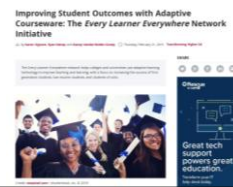
Poll:
Evolution or Revolution?

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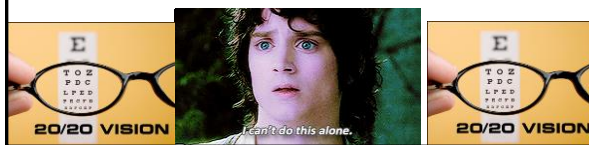
Things are heating up!

The Learning Revolution is coming within reach!

Remember...
"I cannot do this alone."
"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: cjbonk@indiana.edu