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

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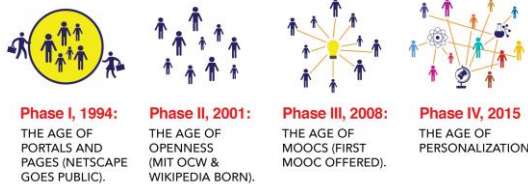cjbonk@indiana.edu
http://curtbonk.com/

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.

April 23, 2015
Are We Living In An eLearning Revolution?
Beth Wisch eLearning Industry
https://elearningindustry.com/living-elearning-revolution

April 30, 2017
'Those Jobs Are Gone'
Steve Kolowich, The Chronicle of Higher Education
http://www.chronicle.com/article/Who-s-UpWho-s-Down-in/239964

November 28, 2017
Automation could kill 73 million U.S. jobs by 2030
Paul Davidson, USA Today
https://www.usatoday.com/story/money/2017/11/29/automation-could-kill-73-million-u-s-jobs-2030/899878001/
Video (1:20): http://curtbonk.com/automation.html
Video (1:20): http://curtbonk.com/automation2.html

Automation could kill 73 million U.S. jobs by 2030

Slide 1

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

Every industrial robot takes up to 6 jobs, study finds

Hiroshi Ishiguro
PROFESSOR OF OSAKA UNIVERSITY

Slide 2

90+ ED TECH COMPANIES WRITING THE FUTURE OF EDUCATION

CBINSIGHTS

Slide 3

Part 1: Technology Yesterday

Slide 4

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

Slide 5

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.

Slide 6

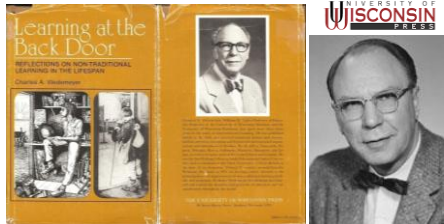**Winky Dink and … Bill Gates?,**
Bob Greene, March 31, 2013, CNN
http://www.cnn.com/2013/03/31/opinion/greene-winky-dink-bill-gates/index.html?hpt=hp_t3

A girls uses her "Winky Dink" drawing kit to draw on a TV screen as they watch the 1950s kids program.

Correspondence, Mail, Satellite, Radio, and TV Courses
Charles Wedemeyer, University of Wisconsin

How Might Video Games Be Good for Us?
Jane McGonigal, October 15, 2012, BQO
https://www.bigquestionsonline.com/content/how-might-video-games-be-good-us

Artificial Intelligence
John McCarthy, Stanford AI Lab
http://www.amazon.com/Machines-Loving-Grace-Common-Between/dp/0062266683

John McCarthy
- 1955: Develop the phrase "Artificial Intelligence"
- **1959: Programs with Common Sense**
- 1960: First LISP implementation
- 1971: 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, bootstrapping, and a collaborative real-time editor.")
http://www.amazon.com/Machines-Loving-Grace-Common-Between/dp/0062266683
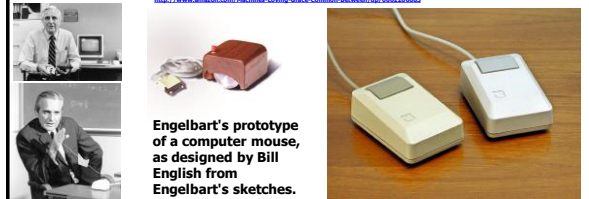
Engelbart's prototype of a computer mouse, as designed by Bill English from Engelbart's sketches.

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/

June 3, 2017 and November 13, 2017
How PLATO changed the World...in 1960
Cait Etherington, ElearningInside News
PLATO—an acronym for **Programmed Logic for Automatic Teaching Operations**.
https://news.elearninginside.com/how-plato-changed-the-world-in-1960/
https://motherboard.vice.com/en_us/article/pa3vvg/the-greatest-computer-network-youve-never-heard-of

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/

Knowledge Navigator (1987)
Apple Computer
http://www.youtube.com/watch?v=hb4AzF6wEoc
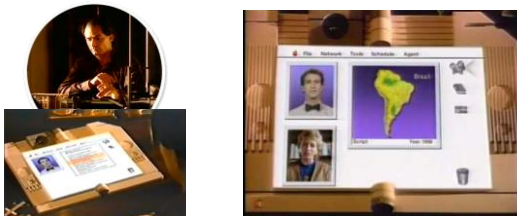
August 6, 2016
The Web is 25!
Happy (sort of) birthday, World Wide Web!,
Erica Fink and Jonathan Tortora, CNN Money (Tech)
http://info.cern.ch/ (First website)
http://info.cern.ch/hypertext/WWW/TheProject.html
http://money.cnn.com/2016/08/06/technology/world-wide-web-25-years-old/index.html?iid=hp-stack-dom

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

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

4

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

SKILLSHARE

Learn anything from anyone, anywhere.

July 11, 2017
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

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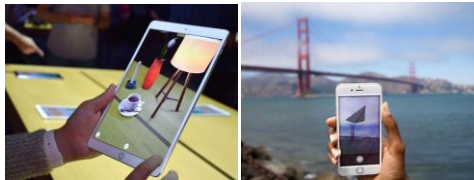
ARKit lets you create immersive augmented reality experiences on iOS devices. (Photo: Wareable)

30+ Ways Learning is Changing:
The Mega Trends

Learner Engagement

Pervasive Access

Customization & Personalization

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

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

August 31, 2016
Learning is More Mobile
Samsung ticks forward with new Gear S3 smartwatch
Edward C. Baig and Eli Blumenthal, USA TODAY
http://www.usatoday.com/story/tech/2016/08/31/samsung-ticks-forward-new-gear-s3-smartwatches/89644266/

Samsung Pay on the Gear S3. (Photo: Eli Blumenthal, USA TODAY)

Samsung is hoping to have 10,000 apps by the time the Gear S3 launches this fall.

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/1000778001/

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

May 15, 2018
Learning is More Mobile
Sony Digital Paper
https://www.sony.com/electronics/digital-paper-notepads/dpt-rp1

September 27, 2016
Learning is More Visual
Snapchat's Spectacles expected to be big hit, Jefferson Graham, USA Today
http://www.usatoday.com/story/tech/2016/09/24/snapchat-introduces-video-glasses-new-name---report/91004936/

The company announced a rebrand along with new sunglasses that can record footage. Video provided by Newsy Newslook

January 2, 2018
Learning is More Visual
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-end-world-overblown-fears/985813001/
Face ID takes less than a minute to set-up. In practice, it works better than expected, but it's not perfect

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=NDmu7Z5NPXo
Video 1:00: Microsoft AI: Empowering Innovators ft. Common: https://www.youtube.com/watch?v=250WdqfAYfw (April 22, 2018)
Video: 1:00 Microsoft AI + Iconem: Preserving History ft. Common:
https://www.youtube.com/watch?v=ZDZja1hzMSM (April 22, 2018)
Video: 0:44: Microsoft AI + The Yield: Taking the guesswork out of farming ft. Common:
https://www.youtube.com/watch?v=7rzufxIGH4o (April 22, 2018)

March 24, 2012
Learning is More Digital and Resource Rich
In South Korean classrooms, digital textbook revolution meets some resistance,
Washington Post
http://www.washingtonpost.com/world/asia_pacific/in-south-korean-classrooms-digital-textbook-revolution-meets-some-resistance/2012/03/21/gIQAxiNGYS_story.html?wprss=emailtoafriend

April 17, 2018
Learning is More Ubiquitous
Massive work of 'sentient art' unveiled at Luddy Hall is also a learning tool for students
Indiana University

July 28, 2016
Knod
Learning is More Hands-on
(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/

September 5, 2017
Learning is More Immersive
Get ready for thousands of augmented reality Apple apps
Jefferson Graham, The USA Today
AI Pets (.34): http://curtbonk.com/arkit.html
Meal (30 seconds): http://curtbonk.com/arkit2.html

The Food Network's app will be updated for AR in the new version of IOS11. (Photo: Food Network)

May 1, 2018
Learning is More Immersive
3 ways districts can use AR and AI
Justin Anglio, eSchool News

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.

May 1, 2018
Learning is More Immersive
3 ways districts can use AR and AI
Justin Anglio, eSchool News
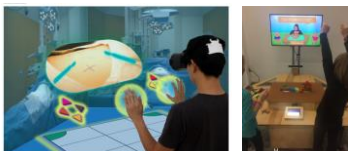
EarthShake, the first educational game for the NoRILLA system, teaches early physics principles through hands-on learning.

July 19, 2017
Learning is More Immersive
HoloLens Assists in Live Surgery
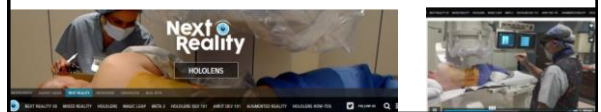Tommy Palladino, Next Reality
Video #1: 1:09: http://curtbonk.com/hololens.html
Video #2: 1:37: http://curtbonk.com/hololens2.html
07/19/2017
HoloLens Assists in Live Surgery

7

May 30, 2017
Learning is More Immersive
Fly above the water with Oracle Team USA in 360
https://www.usatoday.com/story/tech/columnist/baig/2017/04/26/major-league-baseball-broadcast-live-vr-game-week/100378634/
https://curtbonk.com/sailing
The first 17 seconds: http://curtbonk.com/sailing-17.html
1:14 to 1:54: http://curtbonk.com/sailing-40.html
Whole video: http://curtbonk.com/sailing.html
1:01: http://curtbonk.com/sailing-101.html
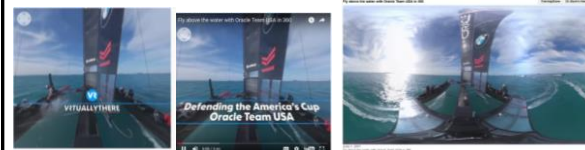
July 19, 2017
Learning is More Immersive
Modern medicine breathes new life into virtual training
https://www.usatoday.com/videos/tech/2017/07/28/modern-medicine-breathes-new-life-into-virtual-training/104073696/
Videos
2:34 (entire video): http://curtbonk.com/vr-medicine4b.html
.01–.21: http://curtbonk.com/vr-medicine.html
.37–.56: http://curtbonk.com/vr-medicine2.html
.57–1.29: http://curtbonk.com/vr-medicine3.html
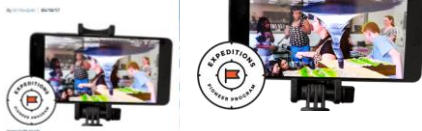1:30–2:27: http://curtbonk.com/vr-medicine4.html

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

informal
free   global
video-based
open
synchronous   ubiquitous
direct from experts
online
immediate

March 21, 2018
Chatterbox
Learning is More Global
The overall winner in the competition was Chatterbox, an online language school powered by refugees
https://wearechatterbox.org/
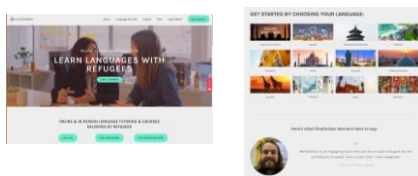
July 21, 2016
Learning is More Pervasive
Facebook's Aquila drone completes first test flight
Jessica Guynn, USA Today

An aerial view of Aquila, a autonomous aircraft Facebook is designing to deliver mobile broadband networks to isolated people (mission to fly 60,000 above Earth for up to 3 months at a time; current record for solar-powered unmanned flight is 2 weeks). (Photo: Facebook)

8

May 10, 2017
Learning is More Online (Access)
50-year-old Bible college in Colorado Springs to sell campus, switch to online-only instruction, Debbie Kelley, The Gazette
http://gazette.com/50-year-old-bible-college-in-colorado-springs-to-sell-campus-switch-to-online-only-instruction/article/1602879

50-year-old Bible college in Colorado Springs to sell campus, switch to online-only instruction

By Debbie Kelley · May 10, 2017 · Updated May 12, 2017 at 6:07 am

INTERACTIVE FAITH
AN ONLINE BIBLE STUDY SERIES

September 21 and November 12, 2017
Learning is More Immediate...
Scientists just discovered the first brainless animal that sleeps
Sara Kaplan, Washington Post
https://www.washingtonpost.com/news/speaking-of-science/wp/2017/09/21/scientists-just-discovered-the-first-animal-without-a-brain-that-sleeps/?utm_term=.43c110a1acc3
This ancient shark with a snake head and 300 teeth is why we should just say nope to the ocean
Cleve R. Woodson, Jr., Washington Post
https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/12/this-ancient-shark-with-a-snake-head-and-300-teeth-is-why-we-should-just-say-nope-to-the-ocean/?utm_term=.9ba3667853cc

This ancient shark with a snake head and 300 teeth is why we should just say nope to the ocean

A *Cassiopea* jellyfish rests upside-down on black sand and pulses, rhythmically contracting and relaxing its bell. At night, *Cassiopea* jellies pulse less frequently — a clue that they're sleeping, researchers report. (Photo by JanEaster.com)

June 14, 2016
Learning is More Video-based
**Microsoft to Acquire LinkedIn for $26.2 Billion, Jay Greene, CNN Money**
http://www.wsj.com/articles/microsoft-to-acquire-linkedin-in-deal-valued-at-26-2-billion-1465821523

Microsoft to Acquire LinkedIn for $26.2 Billion
Deal is for $196 per LinkedIn share, a 50% premium to Friday's close

Learn a New Skill Online, on Your Time

Remember: "The world is really open to learning"
Learning is More Open
The Fourth Industrial Revolution

The world is really open to learning.
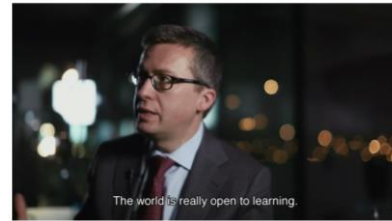
June 20, 2016
Learning is More Free and Open
Coursera on a Mission to Help Refugees
Lauren Camera, US News and World Report
http://www.usnews.com/news/articles/2016-06-20/coursera-on-a-mission-to-help-refugees
June 7, 2016
Teaching refugees how to code, CNN Money
http://money.cnn.com/video/technology/2016/06/07/ecoded-fbtion-refugee-code.cnnmoney/index.html

Coursera Blog

Coursera and the U.S. Department of State Launch Coursera for Refugees

Coursera For Refugees

Teaching refugees how to code

REFUGEES TRAINED TO BECOME SOFTWARE DEVELOPERS

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/

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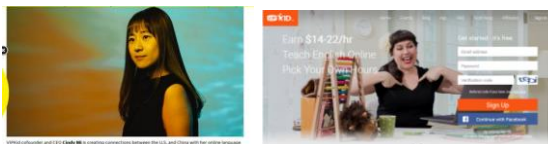https://www.openlearning.com/

January 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/2016/12/bot-teacher-that-impressed-and-fooled.html

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

How Learning is Changing:
Mega Trend #3. Customization

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

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-end-world-overblown-fears/985813001/
(e.g., Augmented hearing)

July 11, 2016 (Engagement)
Learning is More Personal
Smart Sparrow, Learning Design Studio
https://www.smartsparrow.com/case-studies/habworlds/
Virtual Patients: This suite of applications were developed at UNSW in exercise physiology that simulate real life medical procedures and tests including the taking of blood pressure and the monitoring of a patient's heart rate. These applications have interactive and engaging graphics as well as adaptive feedback.
https://www.smartsparrow.com/case-studies/virtual-patients/

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

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.

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

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. And in 2016, some of the students in a computer-science class at the Georgia Institute of Technology were surprised to learn that one of the TAs answering their questions remotely all semester was actually a chatbot powered by artificial intelligence.

May 9, 2017 (Customization)
Learning is More On Demand (PDAs)
Amazon Echo Show brings chatty Alexa to a two-way, video touchscreen
Edward C. Baig and Elizabeth Weise, USA Today
https://www.usatoday.com/story/tech/reviews/2017/05/09/amazon-echo-show-touchscreen-video-alexa/101448844/
24 seconds: http://curtbonk.com/jetsons24.html
44 Seconds: http://curtbonk.com/jetsons44.html

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*

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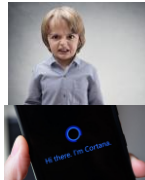**What I Learned When My Students Used Google Translate**
Diane Loyet, The Chronicle of Higher Education
https://www.chronicle.com/article/What-I-Learned-When-My/243017

- **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*

June 7, 2017
Learning is On Demand
Personal Digital Assistants (PDA)
Questions: How will PDA's work in education? Who builds them?
And who decides the functions?

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

April 17, 2017
Learning is More Blended
**Facebook's future will blend physical
and digital worlds**
Jessica Guynn, USA Today
https://www.usatoday.com/story/tech/news/2017/04/18/facebook-f8-2017-augmented-reality-mark-zuckerberg-camera/100816696/

February 16, 2017 (Customization)
Learning is More Communal
Building Global Community, Marc Zuckerberg, Facebook
https://www.facebook.com/notes/mark-zuckerberg/building-global-community/10103508221158471/

March 6, 2018
Learning is More Competency-Based
**Degreed gets $42M to help build a tool to help
employees learn the right skills**
Matthew Lynley, TechCrunch
https://techcrunch.com/2018/03/06/degreed-gets-42m-to-help-build-a-tool-to-help-employees-learn-the-right-skills/

March 21, 2018
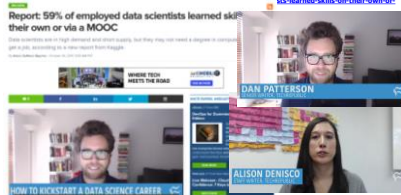**Learning is More Massive**
Biz Nation
EdTech startup focused on empowering youth with technology skills, soft skills,
entrepreneurship and financial intelligence through a methodology that improves user's
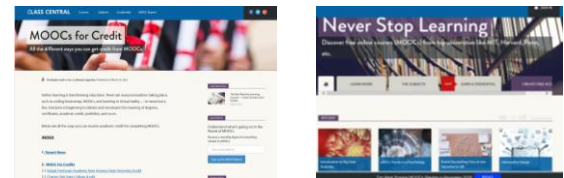learning about creating a business.
https://www.thebiznation.com/

October 30, 2017
Learning is More Massive
Report: 59% of employed data scientists learned skills on their own or via a MOOC
Alison DeNisco Rayome

June 15, 2017
Learning is More Massive
MOOCs for Credit
Class Central
https://www.class-central.com/report/moocs-for-credit/

May 11, 2018
Learning is More Massive
MOOCs Are Not the Social Mobility Tool We Hoped For
Sara Hardman, New Learning Times
https://newlearningtimes.com/cms/article/5284/moocs-are-not-the-social-mobility-tool-we-hoped

July 28, 2016 (Customization)
Learning is More Massive
Udemy: "Get cozy with a class"
https://www.udemy.com/

December 17, 2017
Learning is More Massive
Woz U Has Made Some Big Promises. Can It Deliver?
Henry Kronk, ElearningInside News
https://news.elearninginside.com/woz-u-made-big-promises-can-deliver/
https://news.elearninginside.com/woz-u-new-chapter-steve-wozniak/

**September 21, 2016**
Learning is More Modular
Udacity Unveils Nanodegree Program for Self-Driving Car Engineers
Sri Ravipati, Campus Technology
https://campustechnology.com/articles/2016/09/21/udacity-unveils-nanodegree-program-for-selfdriving-car-engineers.aspx

30+ Ways Learning is Changing:
Recapping the Three Mega Trends:
Engagement, Access, and Customization
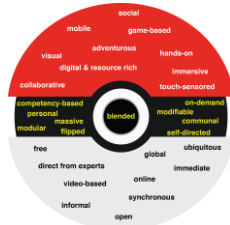
Question:
What are the consequences for education and e-learning?

The Future of Learning Plague
The new "Four Horsemen" of the Apocalypse:
Quality, Copyright, Plagiarism, and Assessment…

Online Exam Proctoring Catches Cheaters, Raises Concerns

April 8, 2018
Pros and Cons of Virtual Reality in the Classroom
Adam Evans, The Chronicle of Higher Education
https://www.chronicle.com/article/ProsCons-of-Virtual/243016?cid=cp197

Pros and Cons of Virtual Reality in the Classroom

Pro:
An art professor might virtually guide students in his rural-Kentucky classroom through an exhibit happening in Paris, allowing them not only to explore works of art but also to virtually hold and examine them up close. A biology class might virtually travel down DNA strands previously visible only through a microscope.

Con:
We need to be having conversations about the ethics of using virtual reality in the classroom. Just because we have the ability to virtually transport a student to a war-torn country or a historical moment in time does not mean we should do so without thinking of possible consequences. What ethical obligations might faculty members owe our students during these experiences?

April 8, 2018
How Ed Tech Is Exploiting Students
Chris Gilliard, The Chronicle of Higher Education
https://www.chronicle.com/article/How-Ed-Tech-Is-Exploiting/243020?cid=cp197

How Ed Tech Is Exploiting Students

- Eric Tornoe, a professor at St. Thomas University, in Minnesota, and his team members saw a Microsoft demonstration of technology that could guess, with reasonable accuracy, ages and genders of people in the room. Thinking about other applications of the technology Tornoe quickly landed on the potential information hidden within students' emotions. He envisioned professors' using that information to ensure that a greater percentage of their lecture material engaged students and stuck in their minds. Microsoft lent Tornoe's team the facial-recognition and emotion interfaces, free of charge, as well as the necessary software.
- Ashok K. Goel, a professor at the Georgia Institute of Technology, used IBM's "Watson" technology to test a chatbot teaching assistant on his students for a semester. He told them to email "Jill" with any questions but did not tell them that Jill was a bot.

August 4, 2017
When our smartphones leave us out of touch
Brett Molina, USA Today
https://www.usatoday.com/story/tech/news/2017/08/04/smartphones-distracted-walking-iphone-while-parenting-we-out-touch/519452001/

half of parents admit tech addiction interrupted parent-child time

COUPLE PLUNGES TO DEATH WHILE TAKING SELFIE ON CLIFF

January 14, 2018
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

May 17, 2018
Will Google Duplex Evolve Into a Virtual Teaching Assistant?
Joshua Kim, Inside Higher Ed
https://www.insidehighered.com/blogs/technology-and-learning/will-google-duplex-evolve-virtual-teaching-assistant

Part III. Technology Tomorrow
http://www.huffingtonpost.ca/dr-marie-bountrogianni/prepare-for-future-learni_b_16407756.html

May 14, 2018
"Superior Intelligence."
How Frightened Should We Be of A.I.?
Tad Friend, The New Yorker
https://www.newyorker.com/magazine/2018/05/14/how-frightened-should-we-be-of-ai

June 2018
How the Enlightenment Ends
Henry A. Kissinger, The Atlantic
https://www.theatlantic.com/magazine/archive/2018/06/henry-kissinger-ai-could-mean-the-end-of-human-history/559124/

May 11, 2018
Humanoid robot runs through the park by itself
Lisa Fischer, CNN Tech
http://money.cnn.com/video/technology/2018/05/11/boston-dynamics-atlas-spotmini-run-navigate-orio.cnnmoney/index.html
Video (1:22): http://curtbonk.com/boston-dynamics.html

Boston Dynamics' robots keep getting upgraded

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/

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

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

December 21, 2017
A Robot Goes to College
Lindsay McKenzie, Inside Higher Ed
https://www.insidehighered.com/news/2017/12/21/robot-goes-college

January 3, 3018
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/1006778001/

A robot developed by Taiwan engineers moves chess pieces on a board against an opponent at the 2017 Consumer Electronic Show (CES) in Las Vegas, Nevada.(Photo: Rob Lever, AFP/Getty Images)

Chatbots & Artificial Intelligence (AI) transform Human Resources & Hiring

June 15, 2017
A New Class Of Robots Could Actually Help Identify Training And Employment Opportunities
Gordon Freedman, Forbes
https://www.forbes.com/sites/gradsoflife/2017/06/15/a-new-class-of-robots-could-actually-help-identify-training-and-employment-opportunities/#6dac90f514d8
Usual internal link: http://trainingshare.com/usa2.html
New download link: https://www.dropbox.com/s/hxcuwqgvaj20oiv/pepper-the-robot2.mp4?dl=0

January 2, 2018
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-end-world-overblown-fears/985813001/
Rise of robotic companions
The robotic home companion Kuri.

June 13, 2017
How Human is Too Human for Robots?
Sara Hardman, New Learning Times
https://newlearningtimes.com/cms/article/4429/how-human-is-too-human-for-robots

March 14, 2016
Artificial Intelligence and Robots
Paul Basken, The Chronicle of Higher Education
http://www.usatoday.com/story/tech/2016/03/13/robots-androids-geminoids-ssssw/81731092

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 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/2017/03/23/arizona-state-u-launches-open-adaptive-lessons-on-space-exploration.aspx

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June 3, 2016
4. Explosion of Virtual Reality
**VR Lets Med Students Experience What
It's Like To Be 74**
Elyse Wanshel, Huffington Post
http://ht.lv/bSpe300XEPJ

September 4, 2017
**Is virtual reality the next 3D TV? Like VR, it was
hyped, pricey and consumers didn't care**
Edward C. Baig, The USA Today

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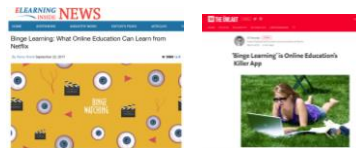Facebook)

February 27, 2017
5. Web Conferencing
Global Learning Partner or PBL Team Selection Walls

September 22, 2017
**6. Binge Learning: What Online
Education Can Learn from Netflix**
Henry Kronk, E-learning Inside News

June 11, 2017 (New Learning Times)
7. Rise of Super E-Mentors

**8. Café Classroom and
Café Connectedness**

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9. Instructional Designer Morphs into Learning Environment Engineer

10. The Age of Personalization

March 28, 2017
11. Elon Musk's Neuralink wants to plug into your brain, Marco della Cava, USA Today (includes 34 second video)
https://www.usatoday.com/story/tech/talkingtech/2017/03/27/teslas-musk-may-now-want-plug-into-your-brain/99711510/
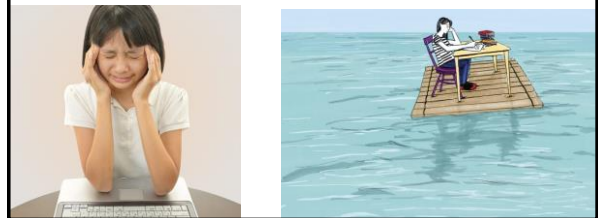http://trainingshare.com/musk.html

April 25, 2018
12. Deliberate Innovation, Lifetime Education
Commission on Creative the Next in Education
Georgia Tech University, Office of the Provost
http://www.provost.gatech.edu/cne-home

Poll:
Evolution or Revolution?

Poll: Or does all this give you a headache?

**Not Me...I am happy!
and...
My minions are happy!**

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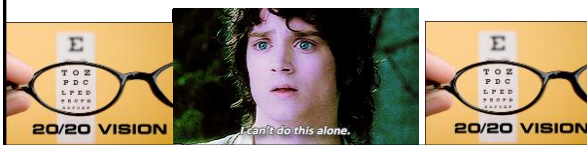
Things are heating up!

**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