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 IV, 2015:  THE AGE OF PERSONALIZATION.

Other prior significant e-learning dates:
1985: FIRST ONLINE COURSE, LINDA HARMAN, 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 Ac., 1853,
      Vocational Training dedicated to Agriculture,
      and later Home Economics and Typing

Mimeograph machine.
Intelligence Augmentation and Amplification
Douglas Engelbart’s “The Mother of All Inventions” (1968)

Engelbart’s prototype of a computer mouse, as designed by Bill English from Engelbart’s sketches.

The World of Open Education

September 19, 2014
A Distance Learning Story
Bob Clasen, University of Wisconsin

September 26, 2018
Remember Education 2.0?
Abigail Cain, The Outline

The rise and fall of the company behind 'Reader Rabbit' and all your favorite educational games

Project YES ( Earl Rein): https://youtu.be/bZD5mQH4Ups
Rocky’s Boots: https://www.youtube.com/watch?v=AFNLh58bIIk
Knowledge Navigator (1987)
Apple Computer

Knowledge Navigator (1987)
Apple Computer

The Creation of Effective Learning Environments

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 constrain. 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.

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

THE WORLD WIDE WEB BEGINS ON MARCH 12, 1989

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/

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 constrain. 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.

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 constrain. 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.
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)

January 14, 2016
The Fourth Industrial Revolution: What it means, how to respond
Ghosn Ghosn, President and CEO of Renault-Nissan-Mitsubishi Alliance, World Economic Forum
http://www.time.com/4455085/elon-musk-tesla-elon-musk/
April 13, 2016
The Fourth Industrial Revolution:
What it means, how to respond
Klaus Schwab, Founder and Executive Chairman, World Economic Forum
http://www.tubechop.com/watch/8280981

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.”

July 11, 2017
The Rise of the Phigital Learner
Going 'phigital'? 4 things schools need to know about Generation Z, Todd Kominiak, TrustEd

Clearly...
Learning is Changing!

Education 20/20

20 New Roles of the Instructor
Captain
Course Ambassador
Curator
Consumer Advocate
Concierge
Change Catalyst
Conductor
Cook
Comedian
Consultant
Camping Trip Guide
Coach
Community Organizer
Course Expedition Leader
Collaborator
Cultivator
Care Giver
Colleague
Chemist

Bonk's 20 "Last" Principles of Instruction
(LAST = Learning Activation System Template)

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

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)

October 21, 2018
Virtually Inspired (from Drexel University)
Building a Go-to Resource on Innovation in Online Learning
Meg Lloyd, Campus Technology
https://virtuallyinspired.org/
30+ Ways Learning is Changing: The Mega Trends

Learner Engagement

Pervasive Access

Customization & Personalization

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

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

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

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/

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_5b5e3b8b5f9b5c2322cfa83f

April 22, 2018
Learning is More Visual
Microsoft AI Commercial ft. Common
Video 1:00: Microsoft AI Commercial ft. Common
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 (April 22, 2018)
Video 1:00: Microsoft AI: Empowering Innovators ft. Common:
https://www.youtube.com/watch?v=Z5OWdqfAYfw (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)
May 14, 2018 (Engagement)
Learning is More Adventurous
Aaron Doering, Chasing Seals, TEDx
http://chasingseals.com/
https://twitter.com/chasingseals

July 29, 2018
Learning is More Collaborative
Why Silicon Valley is teaming up with San Quentin to train young people to code
Jessica Guynn and Megan Diskin, USA TODAY

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

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/

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

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=38M5a_qI9cA
27 seconds http://curtbonk.com/thejournal27.html
38 Seconds http://curtbonk.com/thejournal38.html
1: 10: http://curtbonk.com/thejournal.html
April 8, 2018
Learning is More Immersive
Pros and Cons of Virtual Reality in the Classroom

Pros:
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.

Cons:
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?

Pro:

Con:

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

May 7, 2014 (Access)
Learning is More Global
CNA - Speaking Exchange (video chats)

Shindig, Future Trends Forum, Bryan Alexander

Anant Agarwal, CEO and founder of edX

July 11, 2018
Learning is More Immediate...
Fossil of first giant dinosaur, dubbed Ingentia prima, found in Argentina

Brett Molina, USA Today

October 4, 2018 (Engagement)
Learning is More Synchronous

Shindig, Future Trends Forum, Bryan Alexander

Anant Agarwal
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

October 30, 2018
Learning is More Online
Can a Huge Online College Solve California’s Work-Force Problems?
Karin Fischer, The Chronicle of Higher Education
http://curtbonk.com/link

September 17, 2018
Talk to Books
https://books.google.com/talktobooks/

September 17, 2018
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

March 27, 2017 (Access)
Learning is More Free and Open
OpenStax Infographic

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/
May 3, 2017
Learning is More Free and Open
4 out of 5 Companies Have Hired a Coding Bootcamp Graduate
Sri Ravipati, Campus Technology

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

The World is Open:
How Web Technology Is Revolutionizing Education

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.
Interview with VIPKid 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. This technology combines scheduling, payments and live virtual sessions that can connect on any device, allowing access to thousands of teachers to teach their own unique lessons, with some earning over $100,000 last year. In addition, schools and companies around the world are using TeachMeNow’s software to develop their own branded online learning communities.
https://teachmenow.com/
How Learning is Changing: Mega Trend #3. Customization

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

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

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
(e.g., Augmented hearing)
March 14, 2016
Learning is More Personal
Artificial Intelligence and Robots
Paul Basken, The Chronicle of Higher Education

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

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

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

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

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
Donald Clark Plan B
http://donaldclarkplanb.blogspot.ca/2018/05/google-just-announced-ai-bot-that-could.html?m=1
Some Weird Things Are Going On…

Weirdness #1: Never Stop Learning!

MOOC Trends and Recent Data

Weirdness #2: MOOCs are not dead

Weirdness #3: Your Friends are doing MOOCs

Weirdness #4: Summer MOOC Discounts

INDIANA UNIVERSITY BLOOMINGTON
Weirdness #5: Master’s of Accountancy MOOCs?  
Email inbox: June 11, 2018  
Coursera  
https://www.coursera.org/

Weirdness #6: MOOC Info in Engagement Announcements  
September 26, 2018  
The Future of Professional Credentialing ... in an Engagement Announcement  
Joshua Kim, Inside Higher Ed  

Weirdness #7: From MOOC to bootcamp to MIT  
May 19, 2016  
MIT News, Office of Digital Learning  
(Jin Wu—from MITx to MIT Global Entrepreneurship Bootcamp to master’s student)  

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-MOOCs-Counting-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.”

Weirdness #9: We All Teach the World  
October, 2018  
Teaching the World, Sarah Fister Gale, CLO  
Chapter 19: Harnessing the Power of Open Learning to Share Global Prosperity and Eradicate Poverty  
Sheila Jagannathan, World Bank, Washington DC  

May 20, 2016  
Chapter 18: Changing the Tune: MOOCs for Human Development? A Case Study  
(aCMOOCs in India)  
Balaji Venkataraman and Asha Kanwar (COL)  
http://www.agmoocs.in/
Weirdness #10: MOOC Wave #2 is here!
May 21, 2018
The Second Wave of MOOC Hype Is Here, and It’s Online Degrees
Dhawal Shah, Class Central

Weirdness #11: Mega Millions of MOOC Users
January 22, 2018
A Review of MOOCs Stats and Trends in 2017, Dhawal Shah, Class Central

Here is a list of the top five MOOC providers by registered users:
1. Coursera — 30 million users.
2. edX — 14 million users.
3. XuetangX — 9.3 million users.
4. FutureLearn — 7.1 million users.
5. Udacity — 5.5 million users.

Weirdness #12: Discounted MOOC-based MBAs
August 7, 2017
FutureLearn and Coventry University to Roll Out 50 Online Degrees (Last year Deakin University announced a similar partnership with FutureLearn)
Class Central, Dhawal Shah

Weirdness #13: Microcredentials and Nanodegrees
Learning is More on Modular
edX Expands MicroMasters Programs With Data Science (“nanodegrees”) Digital Leadership and More, Sri Ravipati, Campus Technology

Lindsey McKenzie, Inside Higher Ed

Weirdness #14: MOOCs ramp up new fields
October 30, 2017
Report: 59% of employed data scientists learned skills on their own or via a MOOC
Alison DeNisco Rayome
MOOCs and Open Education Around the World

http://routledge-ny.com/books/details/9781138807419/

Tired of MOOCs...?

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

Part III. Technology Tomorrow

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


Saving money with open education 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.
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

4. Rise of Super E-Mentors and AI Coaches
(Paul Kim, 2018)

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

6. Interactive Agents and Tutors
Pushing the Boundaries of Learning With AI
Lindsay McKenzie, Inside Higher Ed
https://www.youtube.com/watch?time_continue=4&v=7EuSTu1iR2A

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

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
Video (57 seconds): http://curtbonk.com/robots1.html

March 29, 2017
Every industrial robot takes up to 6 jobs, study finds
Steve Goldstein, MarketWatch
Video: .49 to 1:12: http://curtbonk.com/futureandroids2.html
Video: .01 to .49: http://curtbonk.com/futureandroids3.html
Video.01

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

March 28, 2017
12. Brain-based Learning
Elon Musk’s Neuralink wants to plug into your brain, Marco della Cava, USA Today
(includes 34 second video)
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."

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