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

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

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 MARSH, UNI OF TORONTO
1987: HYPERCARD FIRST SHIPPED.
Winky Dink and ... Bill Gates?, Bob Greene, March 31, 2013, CNN

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

June 3, 2017
How PLATO changed the World...in 1960
Cait Etherington, ElearningInside News

PLATO was the first generalized computer-assisted instruction system. Starting in 1960, it ran on the University of Illinois' ILIAC 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.

Artificial Intelligence
John McCarthy, Stanford AI Lab

Intelligence Augmentation and Amplification
Douglas Engelbart’s “The Mother of All Inventions” (1968)
Augmentation Research Center (ARC)

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?
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.

"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)

"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)
April 25, 2018
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

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
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/

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
May 15, 2017
3 must know’s about the rising “phigital” student-and why their impact is enormous,
Meris Stansbury, eCampus News
https://www.ecampusnews.com/campus-administration/education-gen-z-phigital-student/

Clearly...
Learning is Changing!

Education 20/20

20 New Roles of the Instructor

- Captain
- Course Ambassador
- Counselor
- Curator
- Conductor
- Concierge
- Camping Trip Guide
- Consumer Advocate
- Change Catalyst
- Coach
- Course Expedition Leader
- Chemist
- Collaborator
- Care Giver
- Community Organizer
- Colleague
- Cultivator
Merrill’s First Principles of Teaching/Instruction

http://travelinedman.blogspot.com/2011/05/bonks-first-principles-of-instruction.html

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/

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

http://travelinedman.blogspot.com/2011/05/bonks-last-principles-of-instruction.html

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/

90+ Ed Tech Companies Writing the Future of Education


Convenience
Cheerfulness and Optimism
Support and Feedback
Spontaneity
Nontraditional Learning
Relevance and Meaningfulness
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)
30+ Ways Learning is Changing: The Mega Trends

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

January 3, 2018
Learning is More Mobile
CES 2018: Your guide to the biggest consumer electronics show
USA Today

August 4, 2017
Learning is More Mobile
When our smartphones leave us out of touch
Brett Molina, USA Today

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

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
May 1, 2018

Learning is More Hands-on
3 ways districts can use AR and AI
Justin Anglio, eSchool News

When a teacher glances around her classroom, Luminio 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.

September 5, 2017

Learning is More Immersive
Get ready for thousands of augmented reality Apple apps
Jefferson Graham, The USA Today

The Food Network’s app will be updated for AR in the new version of iOS11. (Photo: Food Network)

May 30, 2017

Learning is More Immersive
HoloLens Assists in Live Surgery
Tommy Palladino, Next Reality

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.

July 19, 2017

Learning is More Immersive
HoloLens Assists in Live Surgery
Sri Ravipati, THE Journal

Google Expeditions Adds Augmented Reality for Classrooms

Video #1: 27 seconds http://curtbonk.com/thejournal27.html
38 Seconds http://curtbonk.com/thejournal38.html
1:10: http://curtbonk.com/thejournal.html
Pros and Cons of Virtual Reality in the Classroom

April 8, 2018
Adam Evans, The Chronicle of Higher Education
https://www.chronicle.com/article/ProsCons-of-Virtual-/243016?cid=cp197

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?

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

April 8, 2018

Learning is More Ubiquitous
August 1, 2016
363 by Idea Group; Study Café Meeting Place; Idea Space (Seoul, Korea)
http://363.co.kr/wp/?page_id=244
http://363.co.kr/wp/?bw_gallery=study-cafe_11

Learning is More Informal
April 16, 2018
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

Learning is More Immediate...
May 7, 2014
CNA - Speaking Exchange (video chats)
FCA 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.

July 11, 2018
Learning is More Immediate...
Fossil of first giant dinosaur, dubbed Ingentia prima, found in Argentina
Brett Molina, USA Today
15 second: http://curtbonk.com/ghostbusters15.html
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/
https://www.shindig.com/
http://events.shindig.com/event/ftf-anniversary
https://shindig.com/client/client/?event=ftf-agarwal

February 19, 2018
Learning is More Online (Access)
Grade Increase: Tracking Distance Education in the United States
Joshua Kim, Inside Higher Ed
http://onlinelearningsurvey.com/reports/gradeincrease.pdf
http://www.onlinelearningsurvey.com/highered.html

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

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
http://curtbonk.com/link

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

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
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.
Most Innovative Companies, Fast Company
Interview with VIPKid CEO Cindy Mi
https://www.fastcompany.com/company/vipkid

March 21, 2018
Learning is More Direct from Experts
TeachMeNow is a gig-economy platform for teachers. This marketplace connects teachers, experts, and mentors to students. The technology includes scheduling, payments, and live virtual sessions that can connect at any scale. Lessons are facilitated by teachers or created with online instructions, with some tuition over $100,000 per year. In addition, schools and companies including Microsoft use TeachMeNow software to create their own branded online learning communities.
https://teachmenow.com/

September 25, 2017
Learning is More Direct from Experts
Professors Have Taken Over the MOOCs: How open online learning is changing
Joshua Kim, Inside Higher Ed
https://www.insidehighered.com/blogs/technology-and-learning/professors-have-taken-over-moocs

How Learning is Changing: Mega Trend #3. Customization
massive self-directed flipped
blended communal 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

May 12, 2017 (Customization)
Learning is More Modifiable
The Future of Collaboration Spaces Encompasses Video Interactive, Mobile, Julie Johnston, IU, Campus Technology

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/

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)
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

November 15, 2018
Learning is More Personalized
TutorIT SAT Prep
Joseph M. Scandura; scandura0@gmail.com
Students can now practice on actual SATs at www.TutorT.org.
They also will get individualized help on items they miss, as long as they wish or until they get them all right.

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.

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

August 2, 2018
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

April 8, 2018
Learning is More On Demand
What I Learned When My Students Used Google Translate
Diane Loyet, The Chronicle of Higher Education

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 cobraría 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

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.

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.html?m=1

Some Weird Things Are Going On…
Weirdness #1: Never Stop Learning!

July 28, 2016
Learning is More Massive
Udemy: “Get cozy with a class”
https://www.udemy.com/
**MOOC Trends and Recent Data**

**Weirdness #2: MOOCs are not dead**
*August 19, 2018*
Cumulative Growth in Number of MOOCs, 2011–18
Almanac 2018, Chronicle of Higher Education

**Weirdness #3: Your Friends are doing MOOCs**
*June 15, 2017*
Massive List of MOOC Providers Around The World, Class Central

**Weirdness #4: Summer MOOC Discounts**
*Email inbox: June 10, 2018*
edX (Summer discounts)
[https://www.edx.org/course](https://www.edx.org/course)

**Weirdness #5: Master’s of Accountancy MOOCs?**
*Email inbox: June 11, 2018*
Coursera
[https://www.coursera.org/](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  
(Jie 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/

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  
(Balaji Venkataraman and Asha Kanwar, COL)  
http://www.agmoocs.in/

July 1, 2015 (Customization)  
Chapter 14: Creating a Temporary Spontaneous Mini-Ecosystem through a MOOC  
Paul Kim and Charlie Chung, Stanford University  
Figure 2. Twitter thread announcing the MOOC
June 14, 2016 (Customization)
Chapter 15: Learning About MOOCs by Talking to Students
Charles Severance, Univ. of Michigan
Anuar Lequerica, Class Central

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

September 12, 2018
Coursera’s CEO on the Evolving Meaning of ‘MOOC’
Dan Schaffhauser, Campus Technology

Jeff Maggioncalda, Coursera CEO

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

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
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

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

Prepare For Future Learning
http://www.huffingtonpost.ca/dr-marie-bountrogianni/prepare-for-future-learning_b_16407756.html

How Human Is Too Human for Robots?

What Online Education Can Learn from Netflix
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
https://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.usatoday.com/story/tech/2017/01/30/robotic-barista-now-serving-really-fast/95888780/

January 30, 2017
7. 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
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/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
Video: 4:5-1:14: http://curtbonk.com/futureandroids2.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

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

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