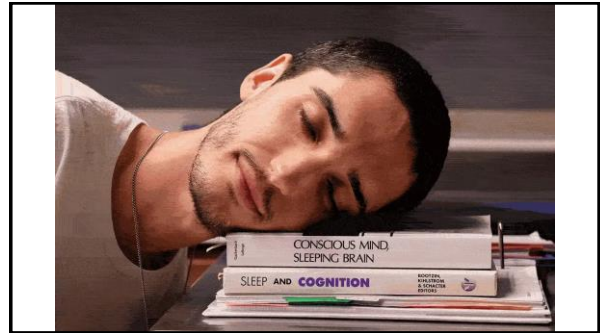


Smart Questions for Smarter Learning Environments

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



1

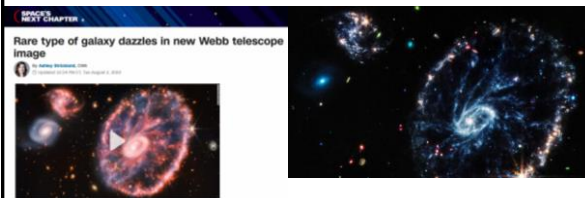


2

August 8, 2022

Rare type of galaxy dazzles in new Webb telescope image
 Ashley Strickland, CNN

<https://www.cnn.com/2022/08/08/world-webb-telescope-southwest-galaxy-image-sci/index.html>



3

January 15, 2021
Wikipedia is now 20+!

Simon Garfield, Esquire: What We Know And Can Agree On: Wikipedia At 20

https://en.wikipedia.org/wiki/Wikipedia:20th_anniversary

<https://www.esquire.com/uk/culture/a34512278/wikipedia-at-20/>

<https://wikipedia20.pubpub.org/>



4

April 4, 2021

MIT OpenCourseWare is now 20+!

<https://www.youtube.com/watch?v=0aA6amh2HUI>

<https://ocw.mit.edu/about/milestones/>

<https://news.mit.edu/2021/mit-courseware-educational-resource-to-millions-0406>



5

August 6, 2021

The Web is now 30+!

<http://info.cern.ch/> (First website)

<https://www.cern.com/2016/08/08/technology/world-wide-web-25-years-old.html?4=http-stack-40m>

<https://webfoundation.org/about/visions/history-of-the-web/>

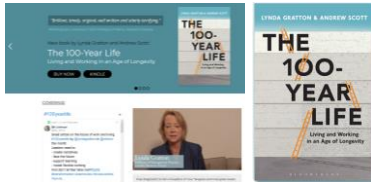
<https://thomas.cornell.edu/computing/birth-web/about-history-web>



6

July 24, 2018
The 100-Year Life: Living and Working
in an Age of Longevity
 Lynda Gratton and Andrew Scott

<https://www.amazon.com/100-Year-Life-Living-Working-Longevity/dp/1543624634>
<http://www.100yearlife.com/>



7

March 13, 2019
The Career Curriculum Continuum
 Andrew Hermalyn, Inside Higher Ed

<https://www.insidehighered.com/digital-learning/stories/2019/3/13/inside-highered-comparing-career-learning-flows-options>



8

February 25, 2020
The 60 Year Curriculum:
 Developing New Educational Models to Serve the Agile Labor Market

Chris Dede, Harvard University, The Evollution
<https://www.edutopia.org/news/developing-new-educational-models-to-serve-the-agile-labor-market>
 219: The 60-Year Curriculum with Rovy Branon
<https://teflonline.com/podcast/219>



9

October 27 and November 27, 2020
Robots on the rise as Americans experience record job losses amid pandemic
 Lauran Arantani, The Guardian

<https://www.theguardian.com/technology/2020/oct/27/robots-on-the-rise-as-americans-experience-record-job-losses-amid-pandemic>
 Jack Kelly, Forbes



10

Dreams of Smarter Learning...
 Center for the Advancement of Teaching
 Temple University, Paul Blaschko



11



12

Innovative Learning Dreams...

December 1, 2020

Catherine Offord, The Scientist

<https://www.the-scientist.com/infographics/infographic-the-technology-scientists-use-to-engineer-dreams-68171>



13

Two Dozen Questions for Smart Learning Environment Educators and Researchers...



14

Dreams of Smarter Learning...

1. In what ways will learning be more personalized during the coming decade? How will this impact you and your potential?



15

Dreams of Smarter Learning...

2. How effective will conversational agents become? What will learners commonly rely on them for?



16

Dreams of Smarter Learning...

3. Will robots be akin to adding a peer for activities in the classroom?



17

Dreams of Smarter Learning...

4. Will e-portfolios efficiently account for informal learning from open educational content and massive open online classes?



18

Dreams of Smarter Learning...

5. How will questions of learner engagement shift as learning becomes more immersive, massive, open, blended, visually-based, and online?



19

Dreams of Smarter Learning...

6. What are the qualities of effective teaching in a world dominated by digital forms of learning and free and open content?



20

Dreams of Smarter Learning...

7. How will this free and open content typically be updated?



21

Dreams of Smarter Learning...

8. What means of automatic translation will exist in a decade? How much will you rely on it each day to function with international collaborators and documents in other languages?



22

Dreams of Smarter Learning...

9. How can educational agents and chatbots, OER, robots, immersive worlds, etc., effectively be embedded in society to continue to foster learning as people increasingly live to age 80 or 90 or 100 or beyond?



23

Dreams of Smarter Learning...

10. What will the definition of "smart" be in 5 or 10 years? How about 20 years? 50 years? 100 years? Beyond?



24

Dreams of Smarter Learning...

11. How much data is too much data? Will instructors have information filtering and restriction devices embedded in their learner information dashboards? And, if so, will they be allowed to use them?



25

Dreams of Smarter Learning...

12. Various mobile and intelligent technologies might enable smart learning environments with features such as tracking the learning process and prediction the learner's next moves; however, will that tracking and those predictions hinder creativity and innovation among humans on the higher end of the creativity continuum?



26

Dreams of Smarter Learning...

13. Smart learning environments (SLEs) might monitor, track, and guide the learners in highly effective ways using knowledge maps and guides; but what happens when one or more learners feel the intrusive nature of that and purposively make decisions that run counter to personalized learner models?



27

Dreams of Smarter Learning...

14. Worse, what happens when learners fail to feel the intrusiveness or fail to feel disrupted by the learning pathways presented or the decisions or next moves that were made, at least in part, by the SLE?



28

Dreams of Smarter Learning...

15. Can you effectively interpret key student learning characteristics such as emotions, overall volition, state of wellbeing and happiness, and other processes through big data?



29

Dreams of Smarter Learning...

16. How has the notion of the smart learning environment evolved over the past decade? How will it continue to evolve over the next decade? How will we know when we get there?



30

Dreams of Smarter Learning...

17. How will we know or recognize when we have arrived at a smarter stage in the evolution of learning environments? What will each signal tell us and what will be the signals at each stage?



31

Dreams of Smarter Learning...

18. Is machine centered pedagogy now being cloaked under the disguise of personalizing learning?



32

Dreams of Smarter Learning...

19. How will digital archeologists and anthropologists and educational historians in 100, 200, 500, or 1,000 years come to view the coming era of SLE?



33

Dreams of Smarter Learning...

20. Will teacher training programs need to be revamped to teach teachers how to adjust their strategies and approaches based on vast as well as minute individual differences?



34

Dreams of Smarter Learning...

21. How smart must a learner be to take advantage of SLEs? Is there a threshold level of metacognitive skill required? Who will research and fashion SLEs for learners at different developmental levels or stages?



35

Dreams of Smarter Learning...

22. Are Smart Learning Environments still smart after everyone leaves the room at the end of the day?



36

Dreams of Smarter Learning...

23. Might the best forms of Smart Learning Environment allow equal or shared time to be a DLE (i.e., "Dumb Learning Environments")?



37

Dreams of Smarter Learning...

24. What will this conference look like and emphasize in 5, 10, 20, or 50 years? i.e., Where will this field of SLEs make the greatest contributions to society?



38

Are we getting smarter...?

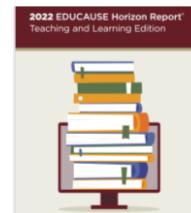


39

2022

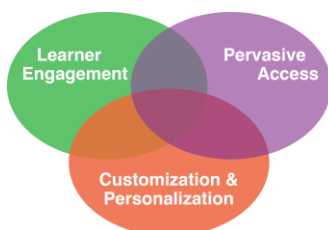
2022 EDUCAUSE Horizon Report Teaching and Learning Edition

<https://library.edspace.org/edspace/horizon-report-2022-teaching-and-learning-edition>



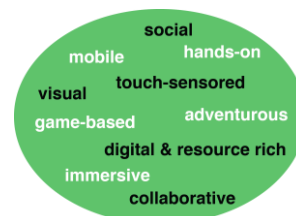
40

30+ Ways Learning is Changing: The Mega Trends



41

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



42

May 20, 2022

Yes, Students Are Disengaged. What Else Is New? Robert Zaretsky, The Chronicle of Higher Education

<https://www.chronicle.com/article/yes-students-are-disengaged-what-else-is-new>
<https://www.chronicle.com/article/a-stunning-level-of-student-disconnection>
<https://www.chronicle.com/article/how-to-solve-the-student-disengagement-crisis>



43

June 13, 2022

Educators Report Highest Level of Burnout Among All Other Industries, Lauren Camera, US News

<https://www.usnews.com/news/education-news/articles/2022-06-13/educators-report-highest-level-of-burnout-among-all-other-industries>
 A new Gallup poll shows that 64% of K-12 employees say they "always" or "very often" feel burned out at work, including 52% of teachers who report the same. Moreover, 39% of college and university workers say they "always" or "very often" feel burned out at work — making K-12 and higher education the two industries with the highest rate of burnout, [according to the new poll](#).

Educators Report Highest Level of Burnout Among All Other Industries

The new Gallup study shows that K-12 employees are the most burned out among all other industries in the nation, a source of frustration for educators and school leaders.

By Lauren Camera June 13, 2022 at 10:00 a.m.

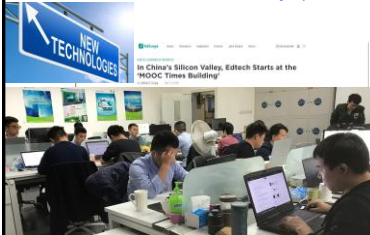


44

November 11, 2020

Educational technology is coming of age during the pandemic: Nowhere more so than in India

<https://www.economist.com/international/2020/11/11/educational-technology-is-coming-of-age-during-the-pandemic>



Digital classrooms Educational technology is coming of age during the pandemic

Nowhere more so than in India



BY NICHOLAS DOLAN
 EDUCATIONAL TECHNOLOGY IS COMING OF AGE DURING THE PANDEMIC, NOWHERE MORE SO THAN IN INDIA. IN THE PAST FEW MONTHS, THE USE OF DIGITAL TOOLS IN CLASSROOMS HAS GROWN RAPIDLY. IN INDIA, THE GROWTH HAS BEEN PARTICULARLY STRIKING. IN THE PAST FEW MONTHS, THE USE OF DIGITAL TOOLS IN CLASSROOMS HAS GROWN RAPIDLY. IN INDIA, THE GROWTH HAS BEEN PARTICULARLY STRIKING.

45

March 2021

Learning is More Mobile

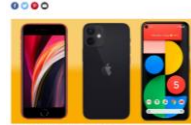
Best small phone 2021: The top tiny, compact smartphone choices James Rogerson, TechRadar

<https://www.techradar.com/best/best-small-phone>

compact smartphone choices

By James Rogerson March 1, 2021

The best small phones don't have to have lesser specs



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



46

July 1, 2021

Online or in-person? Gen Z and millennials find digital life more memorable, study shows Kate Mabus, USA Today

<https://www.usatoday.com/story/tech/2021/07/01/gen-z-millennials-digital-life-more-memorable-study-shows/778882002/>

Online or in-person? Gen Z and millennials find digital life more memorable, study shows

By Kate Mabus July 1, 2021



What happens when digital learning surpasses in-person learning?

Numerous studies of technology, which happen every year, show that digital learning is becoming a challenge with such high levels of connectivity, digital learning will be a challenge.

If there is one thing the pandemic is teaching us, it's that deep human connections are essential for student and instructor wellbeing and for impactful education. As we move into a hybrid future, technology should not (and cannot!) replace human relationships and communications—it should enhance, enable, and enrich them.

47

June 6, 2022

Learning is More Game-based How teachers use Wordle—and other games—for next-level engagement

Laura Ascione, eSchool News

<https://www.eschoolnews.com/2022/06/06/how-teachers-use-wordle-for-next-level-engagement/>



How teachers use Wordle—and other games—for next-level engagement

By Laura Ascione

June 6, 2022

Wordle has gone viral, and such games are proving useful in the classroom as teachers

leverage their popularity for student engagement.



48

June 24, 2022**How Georgia State engages students in every part of esports, Lucas Bailey, Georgia State, eCampus News**

<https://www.ecampusnews.com/2022/06/24/how-georgia-state-engages-students-in-every-part-of-esports/>

**How Georgia State engages students in every part of esports**

Lucas Bailey, Esports Program Coordinator, Georgia State University
June 24, 2022

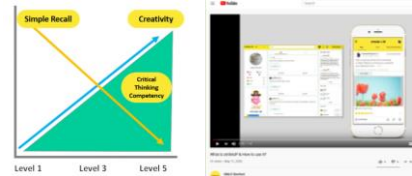
Colleges and universities have a critical opportunity to give students skills training and practical experience in the esports industry

49

May 11, 2020**Learning is More Game-based
What is smileUP & How to use it?**

SMILE, Paul Kim at Stanford

<https://www.youtube.com/watch?v=phU8sSALWo>



50

March 21, 2021**Learning is More Digitally Rich**

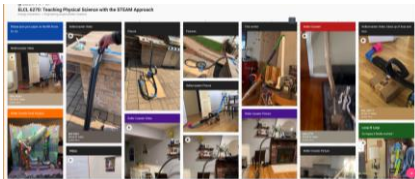
ELCL 6270: Teaching Physical Science with the STEAM Approach

Heejung An, William Paterson University

Hands-on, Minds-on, Hearts-on, Social-on: A Collaborative Maker Project Integrating Arts in a Synchronous Online Environment for Teachers

<https://link.springer.com/article/10.1007/s11528-022-00740-x>

Based on the Thinking, Making, Sharing, and Reflecting (TMSR) model



51

November 23, 2020**Learning is More Immersive**

Can AR be the antidote to virtual classroom shortcomings?

Parker McDonnough, eSchool News

<https://www.eschoolnews.com/2020/11/23/can-ar-be-the-antidote-to-virtual-classroom-shortcomings/2/>

<https://www.ahd.com/articles/view-pyramids-of-ancient-egypt-the-360-degree-vr-capture/>

AR brings learning to life and allows students to experience education during distance learning. With AR, students can walk through Stonehenge, tour the Egyptian pyramids, go on a virtual field trip of the Louvre Museum, or explore the cavities of the human heart – all from the comfort of their homes. Students can even take a journey to outer space or visit UNESCO world heritage sites...explore Mount Rushmore or the muscular system in AR.



52

January/February 2022**Virtual Reality Comes of Age in K-12**

<https://districtadministration.com/digital-ed/issue-46/digital-edition-2022-01-01.pdf#page=10>



53

June 24, 2021**Learning is More Immersive**

This Week In XR: VR Ad Excitement, Tencent Invests \$50M In

Ultraleap, The LinkedIn Of VR

Charlie Fink, Forbes

<https://apple.news/ABdVCTuPiQsu0VdrQcchb6A>

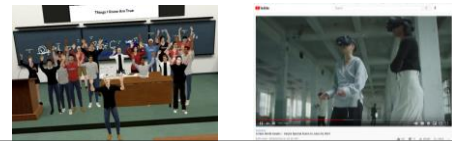
A New World Awaits – Varjo's Special Event on June 24, 2021

Metaverse explained (22:50): <https://www.youtube.com/watch?v=MHDFN0MNeK>

<http://curtbonk.com/vr3.html>

Mixed Reality Hand Tracking with Varjo XR-1 and Ultraleap (solar system/Earth):

Video (1:20): <http://curtbonk.com/vr1.html>



54

August 20, 2021**Learning is More Immersive**

How virtual reality can help to recruit and train staff

By Bernd Debusmann Jr, BBC
<https://www.bbc.com/news/business-57805093>

How virtual reality can help to recruit and train staff



Companies with workers in remote locations can benefit from VR says Tom Symonds



55

June 1, 2022**Learning is More Immersive****Meet the Metaverse**

Michael B. Horn, Education Next

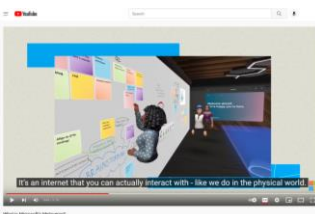
<https://www.educationnext.org/meet-the-metaverse-new-frontier-virtual-learning/>

56

November 3, 2021**What is Microsoft's Metaverse?**

The metaverse is here, and in our increasingly digital world, we continue to focus on bringing humanity to every digital interaction. That's why we announced Mesh for Microsoft Teams at Ignite 2021, our gateway to the metaverse and a way to make online meetings more personal, engaging and fun. You can think of the metaverse as a new version – or a new vision – of the internet, one where people gather to communicate, collaborate, and share with a personal virtual presence on any device.

Read the article here: <https://news.microsoft.com/microsoft/> Learn more: <https://www.microsoft.com/en-us/mesh> Video (2:10): <https://www.microsoft.com/en-us/mesh>



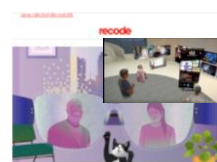
57

September 15, 2020We're closer to holographic meetings than you think
Adam Clark Estes, Recode/VOX

<https://www.vox.com/2020/9/15/21914541/recode-meets-the-founders-of-spatial-in-vr> (Sept. 13, 2020: 49 seconds)
<http://curtbank.com/recode1.html>

Spatial - Collaborate with lifelike avatars in VR/AR/Web (May 12, 2020: 37 seconds)
<http://curtbank.com/spatial1.html>

Hyper Reality (May 19, 2016: 6:15):
https://www.youtube.com/watch?v=TJq02ivY2ss&feature=emb_logo



We're closer to holographic meetings than you think

58

September 15, 2020**Holographic teaching presence:**

Participant experiences of interactive synchronous seminars delivered via holographic videoconferencing

Nai Li* and David Lefevre, *Imperial College Business School, Imperial College London*
Research in Learning Technology, Vol. 28, 2020
<https://journal.alt.ac.uk/index.php/rli/article/view/2265>



Figure 1. The community of inquiry framework, from Garrison, Anderson, and Archer (2000)



Figure 3. An example of a display studio.

59

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

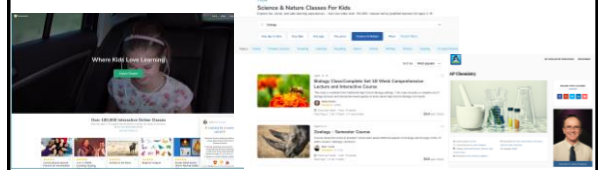
60

September 10, 2019
The Future of Learning, Transforming Access
 Simon Nelson, CEO, FutureLearn, PCF9 Conference, Edinburgh, Scotland



61

June 17, 2021
Outschool (low cost online)
 Learning is More Online...
<https://outschool.com/>



62

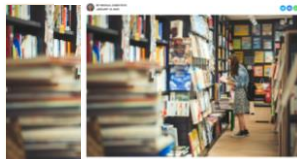
February 4, 2022
California 2-Year Colleges to Begin \$115M OER Experiment
 Suzanne Smalley, Inside Higher Ed (results in better grades, lower costs)

<https://www.insidehighered.com/digital-learning/article/2022/02/04/california-colleges-oer-experiment>
<https://www.insidehighered.com/digital-learning/article/2022/02/04/california-colleges-oer-experiment>
<https://www.insidehighered.com/digital-learning/article/2022/02/04/california-colleges-oer-experiment>
 The grant program concluded in 2019 and it is anticipated that the 23 community colleges produced 34 Zero Textbook Cost degrees or certificates, saving 21,373 students approximately \$42,812,828 in textbook costs resulting in an **85% ROI** (return on investment) from the original \$5 million invested by the CA Community College Chancellor's Office.

California 2-Year Colleges to Begin \$115M OER Experiment



Newsom calls textbooks "racket," proposes money to create free ones



63

Learning is More Free and Open
Introducing the TEC-VARIETY Model

<http://tec-variety.com/>
<http://tec-variety.com/TEC-VARIETY-Chinese.pdf>



64

November 10, 2020
Learning is More Synchronous

'Telepresence' robots are making virtual school feel a little more like real school
 Jennifer Davis, The Washington Post

<https://www.economist.com/international/2020/11/11/educational-technology-is-coming-of-age-during-the-pandemic>



65

June 18, 2021

Learning is More Synchronous

I am writing to send a screenshot of the synchronous hybrid English class for rural Chinese students. I also have a short video clip (though not in high quality), if you are interested.



66

June 15, 2020 Learning is More Globally Collaborative

Lewis F. Cole Middle School Virtual Band Concert
9:13: https://www.youtube.com/watch?v=vqP1Szau_C4



67

April 11, 2020 Learning is More Video-based...

(e.g., Flipgrid)

Ed Tech with Adam: <https://www.youtube.com/watch?v=hysv0PwqfS>
<https://techcrunch.com/2018/04/18/flipgrid-flipping-the-classroom-flipgrid/>

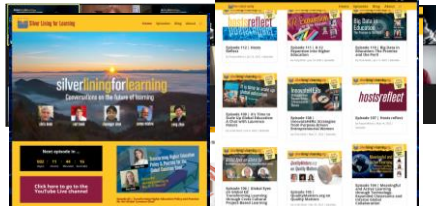


68

June 25, 2021 Learning is More Video-based...

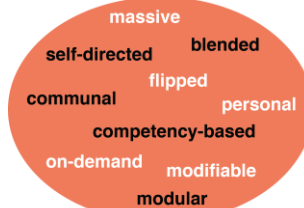
Silver Lining for Learning

<https://silverliningforlearning.org/>
<https://www.youtube.com/channel/UC9XEsh89qrlpmVYpQZ--aA/live>



69

How Learning is Changing: Mega Trend #3. Customization



70

June 2, 2021 A Pandemic Silver Lining? More People Are Talking About Teaching

Beckie Supiano, The Chronicle of Higher Education
<https://www.chronicle.com/article/a-pandemic-silver-lining-more-people-are-talking-about-teaching>



71

June 17, 2021 Learning is More Blended Free Book: Hybrid-Flexible Course Design

<https://edtechbooks.org/hyflex>

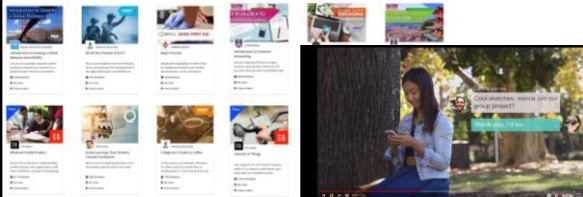
Planning for a Blended Future:
A Research-Driven Guide for Educators

<https://www.chronicle.com/article/how-to-prepare-for-the-next-phase-of-hybrid-teaching>



72

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



73

March 20, 2021
Learning is More Self-Directed
These online classes can help you earn money from home: Digital marketing, video production, coding
 Jennifer Jolly, USA Today
<https://www.usatoday.com/story/tech/2021/03/20/online-classes-earn-money-digital-marketing-video-production-coding/743244801/>



74

Learning is More Self-Directed
Language Lessons Online
 e.g., BBC Learning English, Duolingo, Babbel, SpanishPod, etc.
 (Zixi Li & Curt Bonk, June 2022, Duolingo Research)
<http://www.bbc.co.uk/learningenglish>



75

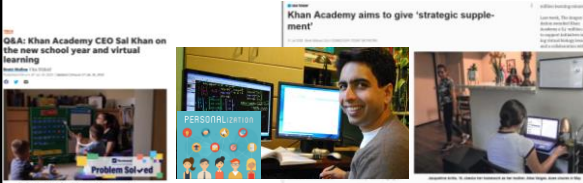
February 1, 2021
Learning is More Massive
Yale is offering its highly popular 'happiness' course to high school students for free
 By Marika Gerken, CNN
<https://www.cnn.com/2021/02/01/us/yale-good-life-class-trnd-wellness/index.html>
 (3.4 million enrolled, 28,500 reviews)

Yale is offering its highly popular 'happiness' course to high school students for free



76

July 31, 2020
Learning is More Personal
Khan Academy aims to give 'strategic supplement'
 Brett Molina, USA Today
<https://www.usatoday.com/story/tech/2020/07/30/khan-academy-sep-will-khan-pegging-fall-virtual-learning/553548092/>




77

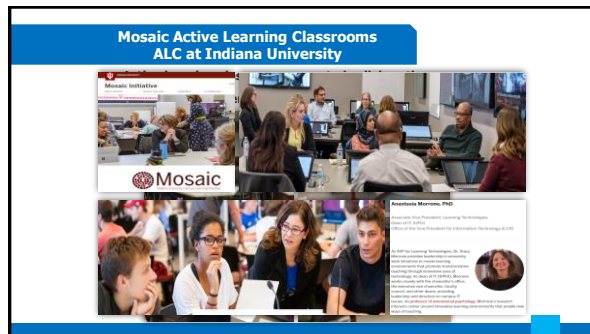
June 13, 2022 (Khan World School)
Behind Khan Academy And Arizona State University's Khan World School Launch, Michael B. Horn, Forbes
<https://www.forbes.com/sites/michaelhorn/2022/05/31/behind-khan-academy-and-arizona-state-universitys-khan-world-school-launch/>

At present, the Khan World School is drawing students from districts around the nation. The school will be free for students to access by taking advantage of ASD's charter school. But for those students where it isn't a public option, there will be a fee to be able to attend the school for less than \$2,500.

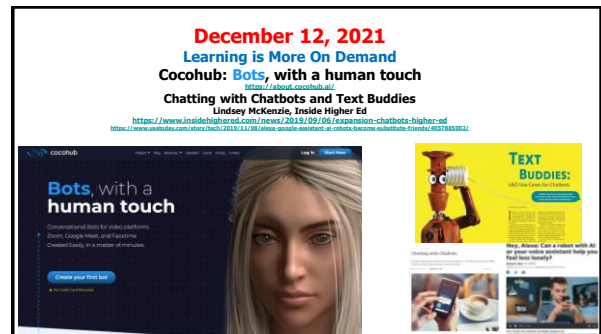
The Khan World School is aiming to tackle that stereotype with a daily, synchronous seminar where students debate topics that often aren't discussed in schools—things like "Will the Fed be able to control inflation?"



78



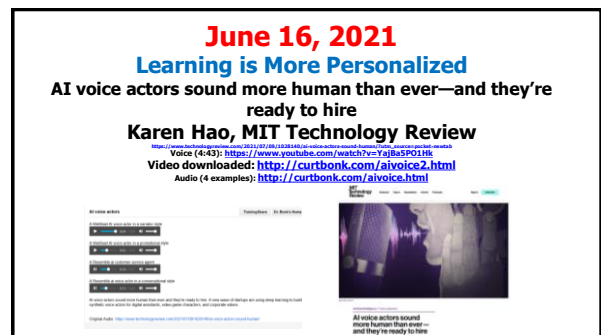
79



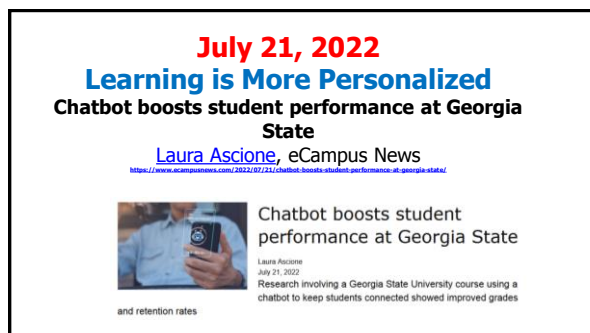
80



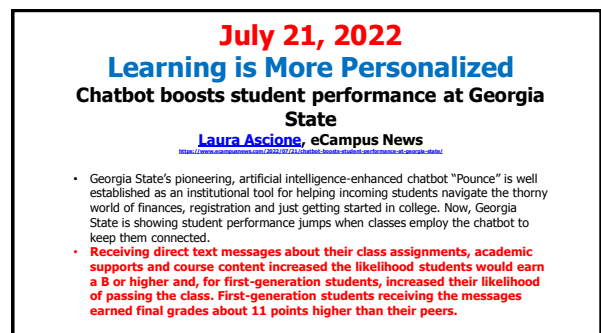
81



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84

July 21, 2022

Learning is More Personalized Chatbot boosts student performance at Georgia State

Laura Ascione, eCampus News

<https://www.ecampusnews.com/2022/07/21/ai-education-is-key-to-an-equitable-tomorrow/>

- According to Page's study results, **students who received the PalsPounce messages earned grades of B or above at a rate 16 percent higher than those not on the chatbot.**
- The average final grade in the class for first-generation students in the control group was 64, while similar students receiving the messages earned a final grade an average of 11 points higher.

85

July 20, 2022

Inside a radical new project to democratize AI

A group of over 1,000 AI researchers has created a multilingual large language model bigger than GPT-3—and they're giving it out for free.
Sameer Maskey, Adjunct Associate Professor, Columbia University & Founder & CEO, Fusemachines. eSchool News

<https://www.eschoolnews.com/2022/07/20/ai-education-is-key-to-an-equitable-tomorrow/>



AI education is critical for an equitable tomorrow

Sameer Maskey, Adjunct Associate Professor, Columbia University & Founder & CEO, Fusemachines

July 20, 2022

A game-changing tool for intervention, AI education is primed to revitalize economies and

uplift learning and earning potential

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July 20, 2022

Inside a radical new project to democratize AI Sameer Maskey, Adjunct Associate Professor, Columbia University & Founder & CEO, Fusemachines

<https://www.eschoolnews.com/2022/07/20/ai-education-is-key-to-an-equitable-tomorrow/>

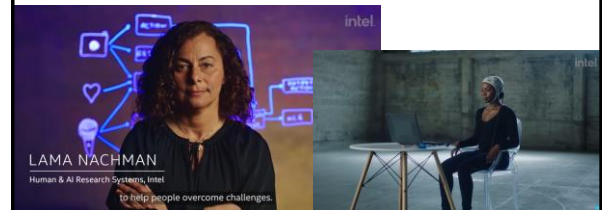
- According to a 2020 [report](#), only 47 percent of high schools in America teach Computer Science courses. **In non-urban areas only 43 percent of high schools in rural areas and 41 percent high schools in towns teaching computer science. In suburban and city areas, this number is 57 percent and 44 percent respectively.**
- These disparities are even wider while comparing some states. Only 19 percent of high schools in Louisiana [offered](#) CS courses – of which more were located in the cities – compared to 89 percent in Rhode Island. However, only an adept STEM student is most suited to pick up advanced AI skills. Therefore, it's important to kindle interest from a child's early years all the way to K-12, no matter where they live.

87

June 21, 2020

Learning is More Personalized

Video #1 (1:55) (June 21, 2021): Meet the Brains Behind Intel Lab: Lama Nachma, <https://www.youtube.com/watch?v=vDnigAbrbXk>



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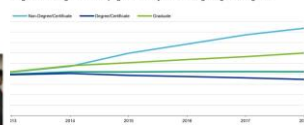
August 27, 2020

Alternative Credentials on the Rise Paul Fain, Inside Higher Ed

<https://www.insidehighered.com/news/2020/08/27/internet-s-puller-what-learn-online-credentials-will-it-be-sustained>

Google IT Professional Certificates

Integrate nondegree certificate programs will likely remain a fast-growing market segment



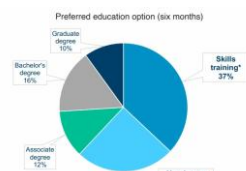
Sources: Moody's, U.S. Department of Education

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August 27, 2020

Alternative Credentials on the Rise Paul Fain, Inside Higher Ed

<https://www.insidehighered.com/news/2020/08/27/internet-s-puller-what-learn-online-credentials-will-it-be-sustained>



Brook Center for Governance Integrity Public Interest Survey, April 10-Aug. 6. Base: adults ages 18 and older, n=1,075. *Rounded for clarity; may not sum to 100 percent.

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July 22, 2021
Shifting Paradigms: Understanding Institutional Perspectives on Microcredentialing
<https://modern.collegeupcea.org/shifting-paradigms-understanding-institutional-perspectives-on-microcredentialing.pdf>

91

February 6, 2021
Microlearning: A Pathway to Effective Training Retention and Behavioral Change
Jiani Wu, Venngeage
<https://www.tycktarget.com/articles/definition/microlearning>

92

June 30, 2022
Introducing the first-ever experiential, mobilemicro-learning courses (MLCs)
Gnowbe
<https://learn.gnowbe.com/about>

93

June 6 and 27, 2022
Learning is More Personalized
The macro impact of microcredentials
Susan Manning, Ed.D, Director of Customer Education, Credly, eSchool News
<https://www.eschoolnews.com/2022/06/06/the-macro-impact-of-microcredentials/>

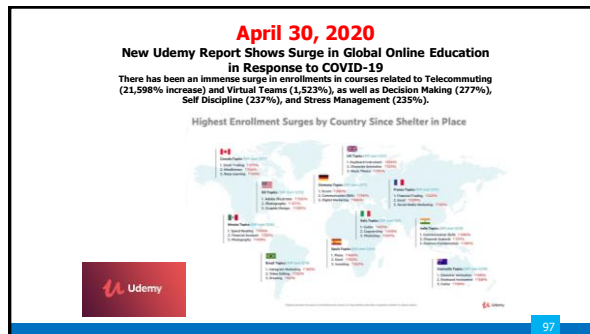
94

August 20, 2019
ASU develops world's first adaptive-learning biology degree, ASU News
<https://www.asu.edu/news/2019/08/27/adaptive-learning-worlds-first-adaptive-credentials-will-be-confirmed>

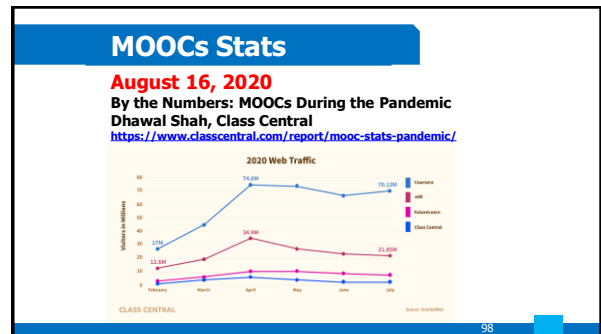
95

Courseware By Discipline:
Over 20 disciplines adopting courseware (52% STEM and 48% Humanities & Social Sciences) (Vignare & Tesene, October 24, 2020).
<https://vimeo.com/showcase/7515148/video/458694115>

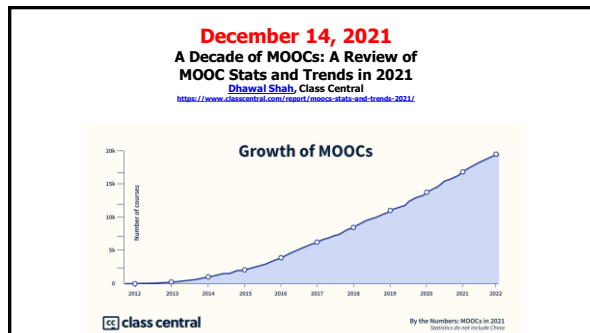
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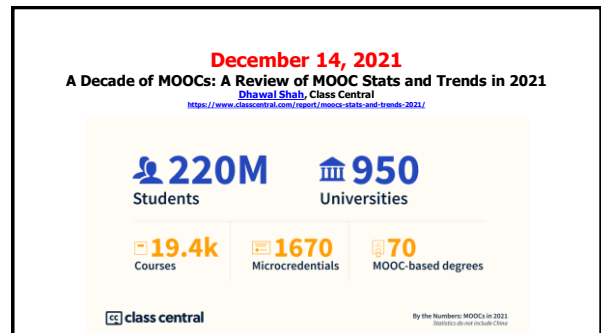
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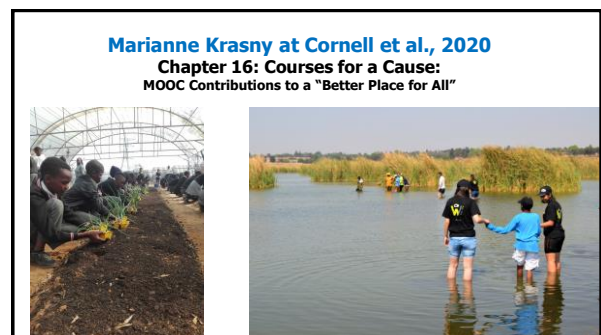
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Balaji Venkataraman and Tadinada V. Prabhakar, 2020
Chapter 25. Responsive Innovations in MOOCs for Development: A Case Study of AgMOOCs in India and Africa
<http://www.agmoocs.in/>





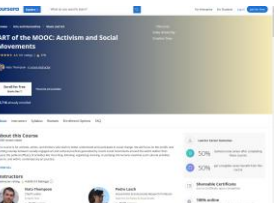


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March 22, 2021
Famous Stanford coding course seeks to repeat success of novel model of online learning
(10,000 students, 120 countries, 900 volunteer teachers)
<https://news.stanford.edu/2021/03/22/famous-stanford-coding-course-free-online/>




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December 7, 2020
ART of the MOOC: Activism and Social Movements
Nato Thompson, Pedro Lasch, Duke, Coursera
<https://www.coursera.org/learn/activism-social-movements>
<https://www.vox.com/culture/23082796/monoliths-utah-california-romania>

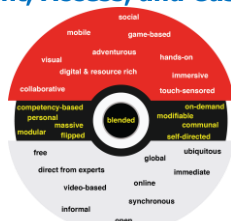
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January 20, 2022
Arizona State University Announces Effort To Educate 100 Million Students Worldwide
Michael T. Nietzel, Forbes
<https://www.forbes.com/sites/michaelnietzel/2022/01/20/asu-100-million-students-worldwide/>
https://vimeo.com/66788747?embedded=true&source=vimeo_logo&owner=13433234
<https://thunderbird.asu.edu/lifelong-learning/100-million-learners>



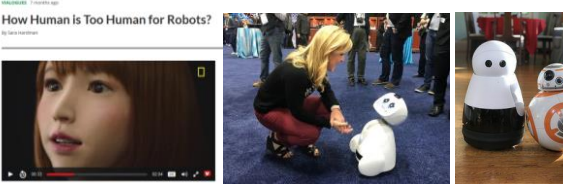
106

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



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Tech Trends of Tomorrow
http://www.huffpost.com.ca/d-malic-boutros@huffpost.com/prepare-for-future-learn_b_16407756.html



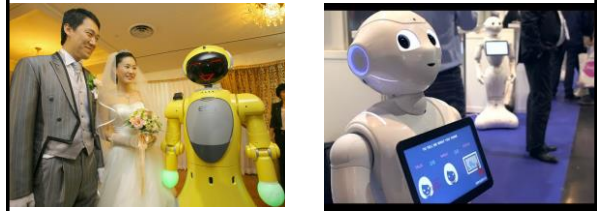
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1. Robot Collaborators/Partners for Teamwork

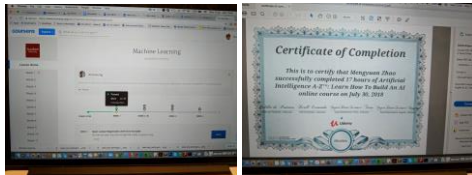
http://www.thefuturemoon.com/52scents/02file/Library_Alexandria.html



110

2. Independent Studies, Certificates, and Degrees Via MOOCs, OERs, and Informal Learning are Common and Expected

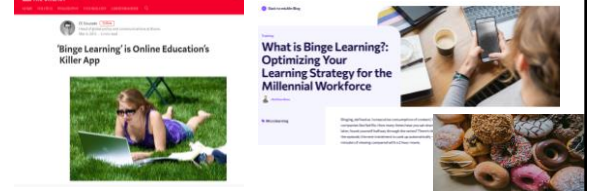
<https://www.udemy.com/artificial-intelligence-az/>
<https://www.coursera.org/learn/machine-learning>



111

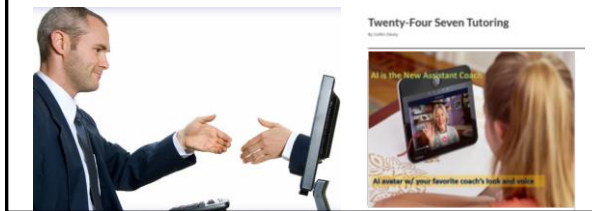
3. Binge Learning Experiences What Online Education Can Learn from Netflix

Henry Kronk, E-learning Inside News
<https://theumbeat.com/binge-learning-is-online-education-s-killer-app-34da18f8ae76>



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4. Rise of Super E-Mentors and AI Coaches



113

5. Interactive Agents and Tutors Pushing the Boundaries of Learning With AI

Lindsay McKenzie, Inside Higher Ed
<https://www.insidehighered.com/digital-learning/article/2018/09/14/interactive-agent-tutor-ai-higher-ed-teaching-and-learning>
<https://www.ibm.com/blogs/research/2018/08/mandarin-language-ai/>
https://www.youtube.com/watch?v=im_omh1ae=8&list=PLx27Kx212R2A117
<http://curtbook.com/mandarin.html>



114

6. Professor Einstein Personal Digital Assistants (PDA's)

<http://www.usatoday.com/story/tech/2017/01/30/robotic-bacata-show-serving-sally-fest/25888786/>



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-bacata-show-serving-sally-fest/25888786/>

115

7. University of the Third Age, London, UK

<https://www.u3a.org.uk/>

U3A (The University of the Third Age) is a UK-wide movement which brings together people in their 'third age' to develop their interests and continue their learning in a friendly and informal environment.

If you're wondering what we mean by the third age - it is a time after you have finished working full-time or raising your family and have time to pursue your interests or just try something new.



116

8. Duplicate Selves in Virtual Worlds

From Minecraft to Zoom calls, we've all spent much of the pandemic on our screens. But are we ready for the metaverse?

Mike Snider, USA Today

<http://curtboon.com/metaverse.html>

<https://www.usatoday.com/story/tech/2021/06/24/minecraft-online-avatars-off-screening-metaverse/2000381502/>



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9. World Knowledge Refreshment Stations

http://www.thalvingmoon.com/43ancients/22fina/Library_Alexandria.html



118

10. AI Generated Teachers, Tutors, and Students

Tom Bartlett, The Chronicle of Higher Education

<https://www.futureme.org/>

Dead Man Teaching

What's in store for dead men whose former selves professor has been dead for almost two years? For a world, varied.

By Tom Bartlett / January 18, 2021



François-Marc Gagnon

COOPÉRATION NATIONALE DU QUÉBEC

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Bonus: Fitness Training

May 17, 2022

These fitness apps put a tiny personal trainer in your pocket – that holds you accountable, Jennifer Jolly, USA Today

<https://www.usatoday.com/story/tech/2022/05/17/fitness-apps-coach-on-technique/97529700027ant-dfci1>

June 30, 2021

Turn Your Phone Into a Fitness Coach, J. D. Biersdorfer, NY Times

<https://www.nytimes.com/2021/06/30/technology/personaltech/turn-your-phone-into-a-fitness-coach.html>



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Any Questions or Comments?

Slides at: TrainingShare.com
 Papers: PublicationShare.com
 Free book: <http://tec-variety.com/>
 Email: cjbonk@indiana.edu

 Below the text is a collage of five images: a book cover with Chinese text, a book titled 'MOOCs and Open Education', a book titled 'Transformative Technologies Around the World', a book titled 'Adding Some Tec-Variety', and a person standing at a podium with a large '200' on the background.

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