Future Trends in Technology and Education
September 2017

A monthly futures report
for higher education,
compiled by Bryan Alexander.

Table of Contents:

Editorial notes: this is the biggest FTTE report to date. It's the longest by word count and has more end notes (120) than any other. I hope it's not too much.

August was a surprisingly intense and even manic month. On the plus side, a sudden rush of last-minute business came in, which is good for my consulting work. On the negative side, a major family injury knocked us all for a loop. As a result, we're scrambling to recover, to heal, to catch up.

Travel: I will be on the road within the United States for the next two months…
        September 14-15: Indianapolis area
        September 17-18: Chicago
        September 20: Manchester, New Hampshire
        October 30 – November 3: Philadelphia for EDUCAUSE and related events
I would be delighted to meet with readers, contributors, and collaborators at those times and locations. Just drop me a line.

If you would like to support my work with FTTE and related projects, please contribute to my Patreon. Producing FTTE is a continuous and time-consuming effort, and I can't do it without your help:

https://www.patreon.com/bryanalexander

Alternatively, you could grab a copy or three of the new and expanded version of my *The New Digital Storytelling*, either in print or ebook versions:

http://tinyurl.com/y9qkr3wq

Or both!

Thank you all for your feedback and recommendations. You could find shout-outs in the end notes. As ever, contact me with more thoughts at bryan.alexander@gmail.com.

The FTTE Report Trends Map:

| The Higher Education Crisis		
Student debt		
Campus mergers and closures		
Graduate school shrinkage		
Partisan and bipartisan political pressure		
Education and Contexts	**Education and Technology**	**Technology**
International education	The LMS world	Internet of things
Racial inequality	More MOOCs and online learning	New forms of creativity
Sexual assault	Gaming in education	Digitization
Athletics	Badges	Augmented reality
K-12 and higher education	Flipped classroom/blended learning	The limits of the Web
Macroeconomic indicators	Educational entrepreneurship	Cloud computing
Library changes	Open education possibilities	Moore's Law
Alternative degrees	Crowdsourcing in academia	Open source
Shared academic services	Digital humanities develops	Office versus Web office
Remedial classes	Faculty criticizing deployment of technology	Shopping online
Challenges to internships	Big data and data analytics	Copyright battles
Adjunctification		New interfaces
Green sustainability		Fragmented internet
Demographics		Onshoring hardware
Executive compensation	Automation in education	Automation's promise
Enrollment changes	Blockchain in education	Blockchain
Alternative certification	Campus digital threats	Digital security threats
Intergenerational tension	Crowdfunding in academia	Crowdfunding
Responses to Trump	Ebooks in higher education	Ebooks
	Mobile devices in education	Device ecosystem
	Social media in education	Social media
	3d printing in curricula	3d printing
	Video and education	Digital video
	Virtual reality in education	Virtual reality
	Maker movement	
	Shared academics	
	Rise of the net.generation	

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I.   Education and contexts

Changes in international education. The University of Miami's leaders decided, after pressure from that city's Cuban community, to not collaborate with Cuban academia.[1]

Cambridge University Press complied with a Chinese government request to remove 300 articles from its journals, then, under pressure from academics, reversed course.[2] A new report finds British higher education's financial standing to be uneven and possibly fragile, depending on student demand.[3]

The Philippines and Chile each proposed free tuition plans.[4] The Indian government stepped back from a plan to create twenty new, world-class academic institutions.[5] Private universities outranked public institutions in a recent ranking of Latin American higher education.[6]

Racial inequality in/and education. Latino and black populations are underrepresented at one hundred elite institutions, while whites and Asian-Americans are overrepresented, according to a New York Times analysis looking at the past 35 years:
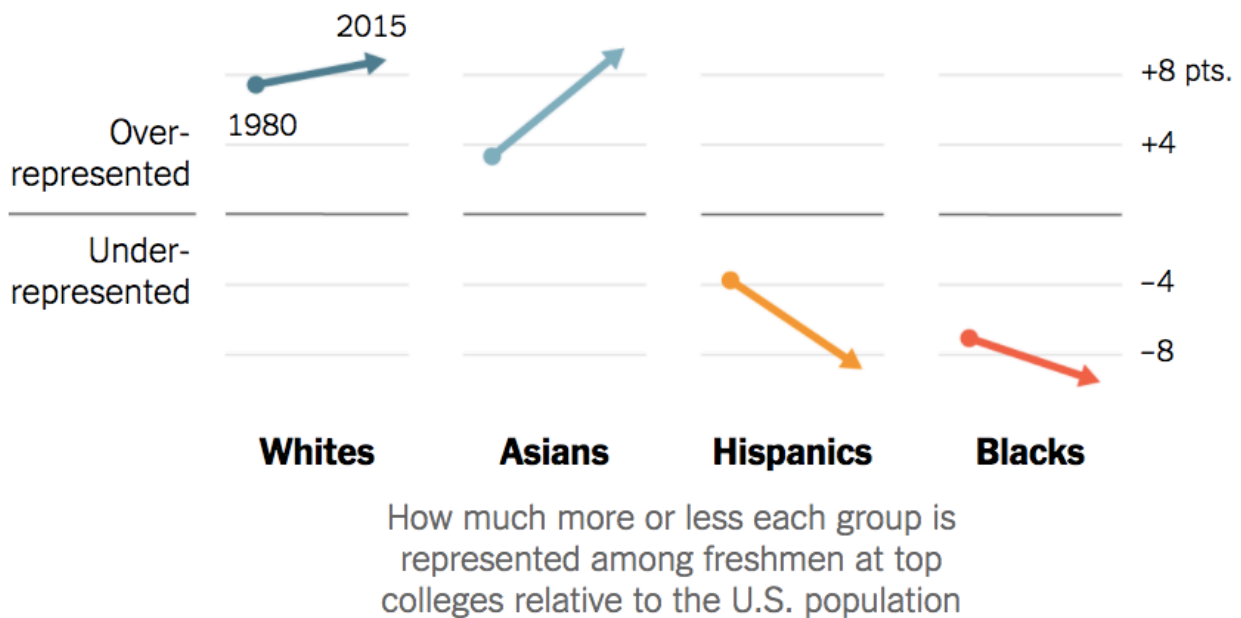
[7]

Another study found, similarly, black and Latino populations underrepresented in faculty numbers, while whites and Asian-Americans show the opposite, although gaps are decreasing, except for blacks in STEM fields.[8]

he majority of Harvard's new first-year class is racially nonwhite.[9] Another group sued Harvard and several other universities, charging discrimination against Asian-Americans.[10]

Campuses and sexual assault controversy. A series of high-profile faculty dismissals for sexual harassment or assault suggests the rise of a zero tolerance campus strategy.[11]

Macroeconomic indicators. Average business markups expanded enormously over the past generation, from 18% to 67%, according to new research.[12]

Library changes. Support for libraries is increasingly found among younger and nonwhite Americans, according to a new Pew study.

Views on the usefulness of libraries vary by race and ethnicity

% of adults who say public libraries help them ...
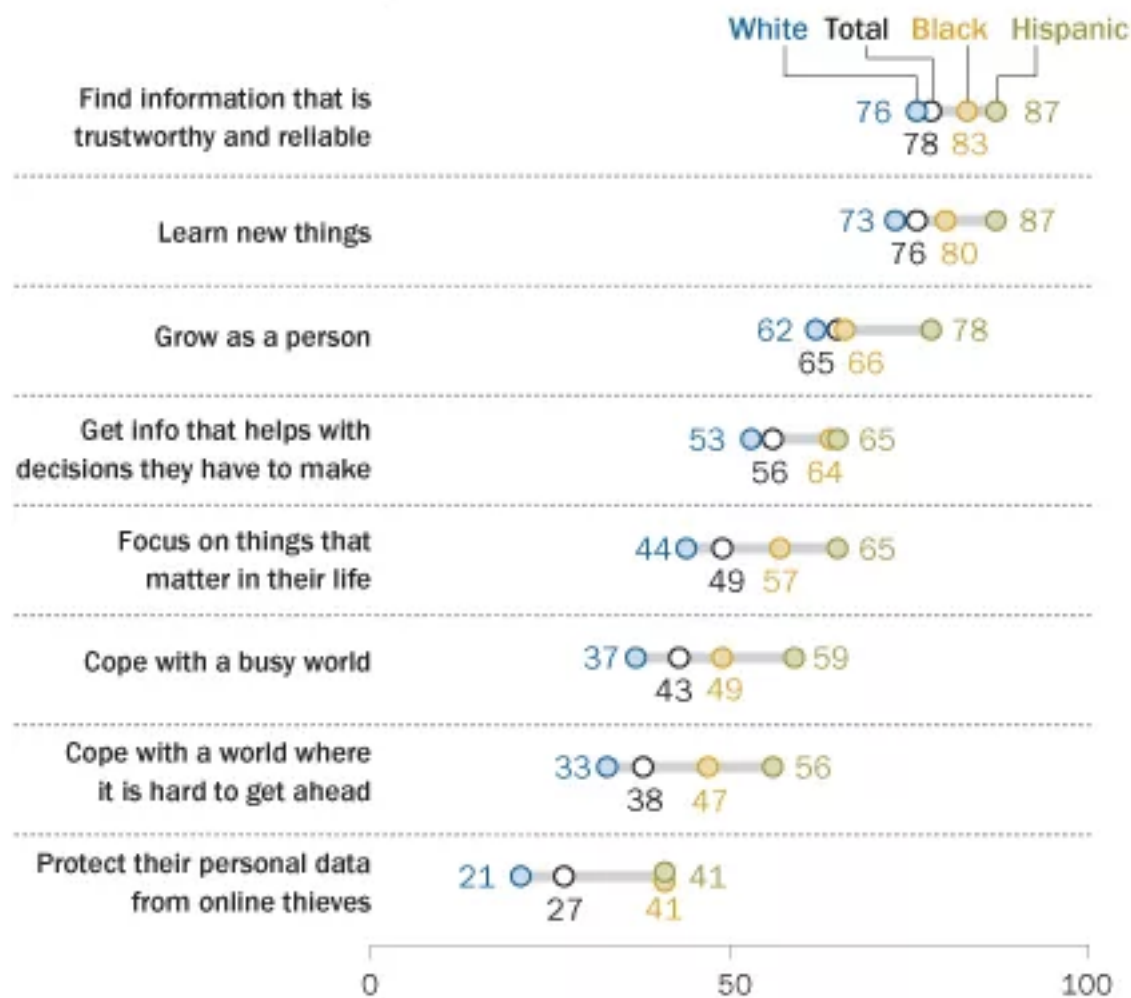
Note: Whites and blacks are single race, not Hispanic. Hispanics are of any race.
Source: Survey conducted Sept. 29-Nov. 6, 2016.

PEW RESEARCH CENTER

Shared academic services. Sixteen southern liberal arts colleges will share legal services.[14]

Remedial classes. The California State University system will drop placement exams for incoming students.[15]

Adjunctification. The number of jobs in the academic humanities continues to decline, while PhD production continues to grow, leading inescapably to further adjunctification of the professoriate.

Humanities Indicators, 2017 · American Academy of Arts & Sciences
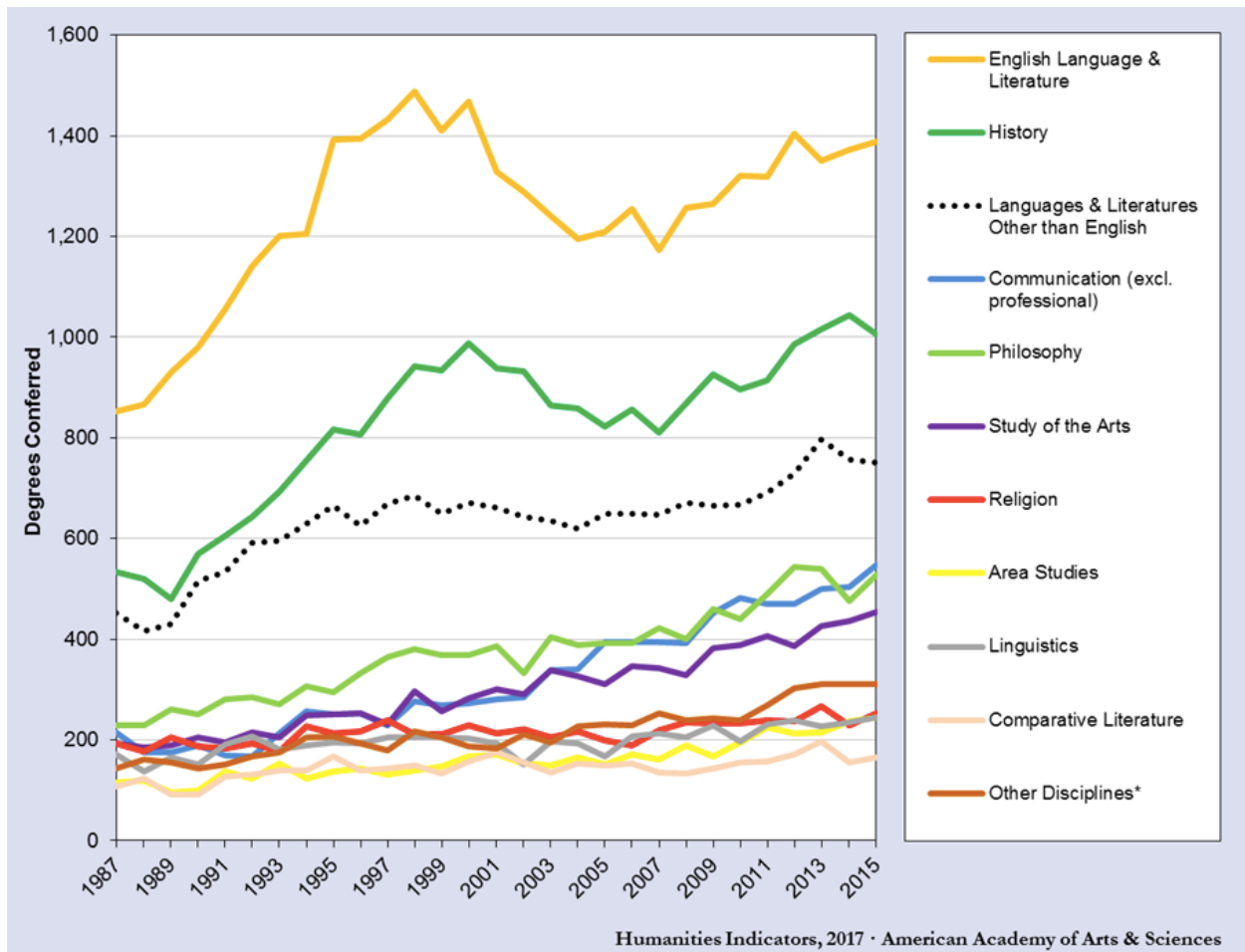
[16]

Demographics. A dwindling K-12 population has started shrinking high school football team sizes in key American regions:

Who's playing football?

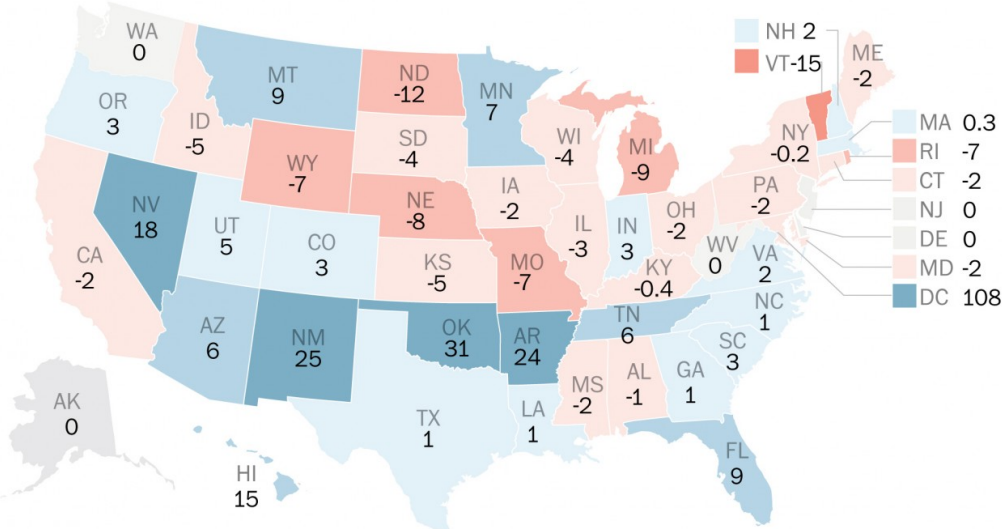As youth and high school football participation dips, coaches and administrators are increasingly forced to decide whether to continue their varsity programs.

Percent change of HS football teams over the past five years

-15%   -5%   0   5%   15%

WA 0 · OR 3 · MT 9 · ND -12 · MN 7 · ID -5 · SD -4 · WI -4 · MI -9 · WY -7 · NV 18 · UT 5 · CO 3 · NE -8 · IA -2 · IL -3 · IN 3 · OH -2 · CA -2 · AZ 6 · NM 25 · KS -5 · MO -7 · KY -0.4 · WV 0 · TN 6 · AK 0 · OK 31 · AR 24 · MS -2 · AL -1 · GA 1 · SC 3 · TX 1 · LA 1 · FL 9 · HI 15 · VA 2 · NC 1 · PA -2

NH 2
VT -15
ME -2
NY -0.2
MA 0.3
RI -7
CT -2
NJ 0
DE 0
MD -2
DC 108
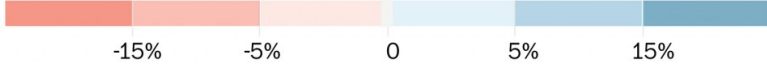
Source: National Federation of State High School Associations   THE WASHINGTON POST [17]

Regional shifts in higher school graduation continue, with the Midwest and Northeast shrinking, while parts of the south and west grow:
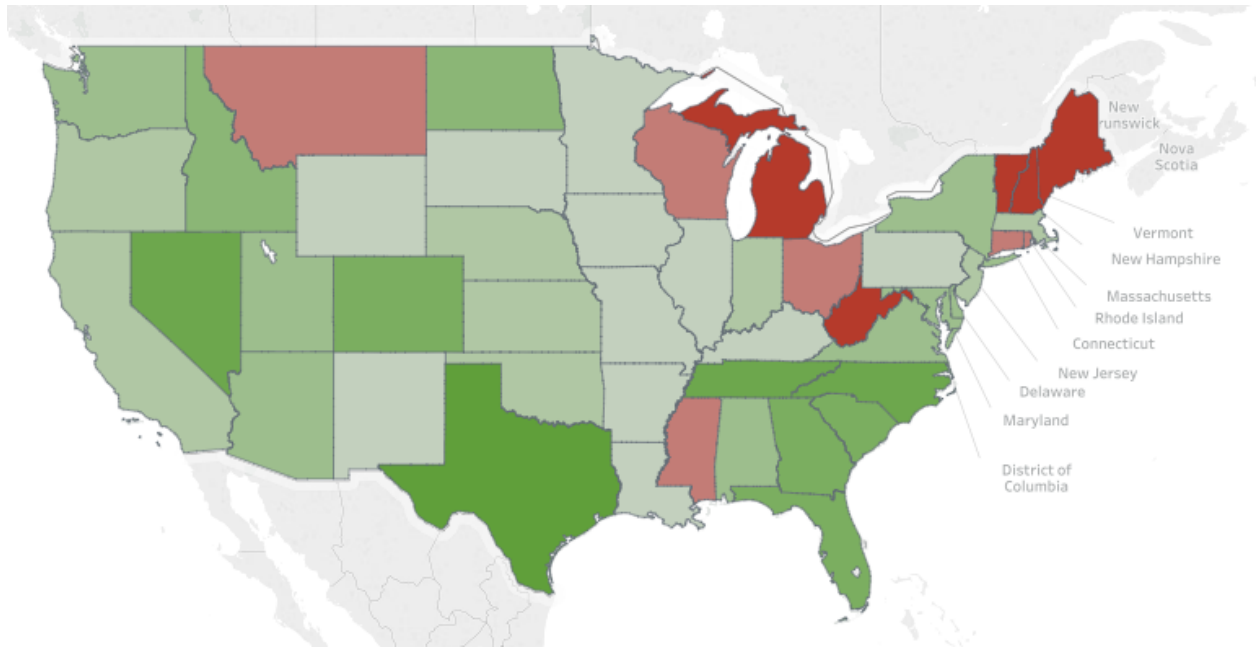
(the more green, the greater the number of HS grads; the more red, the fewer) [18]

Enrollment changes. Women continue to outnumber men among undergraduates.[19] One technical university successfully boosted female enrollment by increasing financial aid to targeted prospective students.[20]

Students at elite campuses are less likely to take professionally-oriented major than students elsewhere, according to new research.

Most popular majors at ...

Less selective colleges

	MAJOR	SHARE OF DEGREES
1	Business, management, marketing and related support services	19.3%
2	Health professions and related programs	11.9
3	Psychology	6.5
4	Social sciences	6.3
5	Education	5.7
6	Biological and biomedical sciences	5.5
7	Engineering	5.2
8	Communication, journalism and related programs	5.1
9	Visual and performing arts	4.8
10	Homeland security, law enforcement, firefighting and related protective service	3.5

More selective colleges

	MAJOR	SHARE OF DEGREES
1	Social sciences	19.4%
2	Biological and biomedical sciences	10.1
3	Engineering	10.1
4	Business, management, marketing and related support services	9.8
5	Psychology	6.3
6	Visual and performing arts	5.6
7	Health professions and related programs	3.8
8	Computer and information sciences and support services	3.6
9	Physical sciences	3.6
10	English language and literature/letters	3.5

Selectivity is based on Barron's selectivity index.

[21]

The number of homeless students may be increasing.[22]

Nurses are increasingly likely to have post-secondary qualifications, according to new research.[23]

Academic responses to the Trump administration. The President's Committee on the Arts and the Humanities condemned the president's response to the Charlottesville incident.[24] Members of some campus communities have sought to identify peers who participated in that rally, and to ask them to recant.[25] A Dartmouth lecturer's media statements about antifa protestors elicited controversy on that campus.[26]

Academic leaders actively called on the administration to retain DACA.[27]

II.   Technology

Digital security threats expanding. A University of Washington team managed to get code into a machine from a biological, not digital source.[28] 300 Android apps were used to convey a distributed denial of service (DDoS) attack.[29]

Device ecosystem keeps growing.

- Mobile devices outflanked paid tv broadcasting of the major boxing bout by livestreaming the event.[30]
- Face++, the world's most widely used facial recognition technology, is increasingly used in China.[31]
- A new company is developing circuity-rich lenses for implanting within the human eye.[32]
- Many of the world's new internet users are likely to prefer accessing digital content through visual and video, not textual, interfaces.[33]
- Virtual reality headsets: Microsoft's VR/mixed reality headsets hit the market.[34]
- A new robotics project makes an artificial assistant mobile.[35]

Social media. CNN launched a show on Snapchat.[36] Google and ProPublica launched a social media hate speech index.[37] Facebook announced it would cease running ads on Pages it deems to be sharing fake news.[38] Macedonia fined a resident for insulting Turkey's president on Facebook.[39] Medium launched a new way of rewarding authors with micropayments.[40]

Venture capitalists have increased investment in podcasting.[41]

A shift in Moore's Law? Columbia University researchers built a molecular-level transistor.[42] Open source.

Onshoring hardware production. Apple announced it was building a data center in Iowa.[43]

Digital video rising. A group of high profile publishers have made shifts into video production, sometimes by reducing non-video production operations.

When Words Fail

The average time spent watching digital video is expected to keep growing

2017-2019 are projections
Source: eMarketer

Bloomberg [44]

Facebook launched a service whereby users can watch video and comment on it simultaneously.[45]

Shopping continues to migrate online. Facebook and Google launched efforts to support publishers on their respective platforms.[46] However, publishers also fear a Chrome web browser with ad blocking built in.[47] The Village Voice ended a print edition.[48]

Copyright battles continue. The Georgia State University e-reserves case, first filed *in 2008*, continued with another appeals court hearing.[49]
(See also "Fragmented internet" below)

Fragmented internet. The Internet Archive has become inaccessible to much of India, possibly at Bollywood's behest.[50] GoDaddy and CloudFlare disconnected several right-wing websites.[51] In response, a group of right-wing political activists started setting up their own internet segment.[52]

There is rising interest in seeing major digital companies as having too much power, possibly to be mitigated through antitrust.[53]

Automation's promise. A great deal of American robotic deployment is associated with industry, and located still in manufacturing areas:

Where the robots work

Concentration of industrial robots in metro areas, 2015

Robots per 1,000 workers

2   6   10   25

Number of robots

130   1.5k   6k   15k
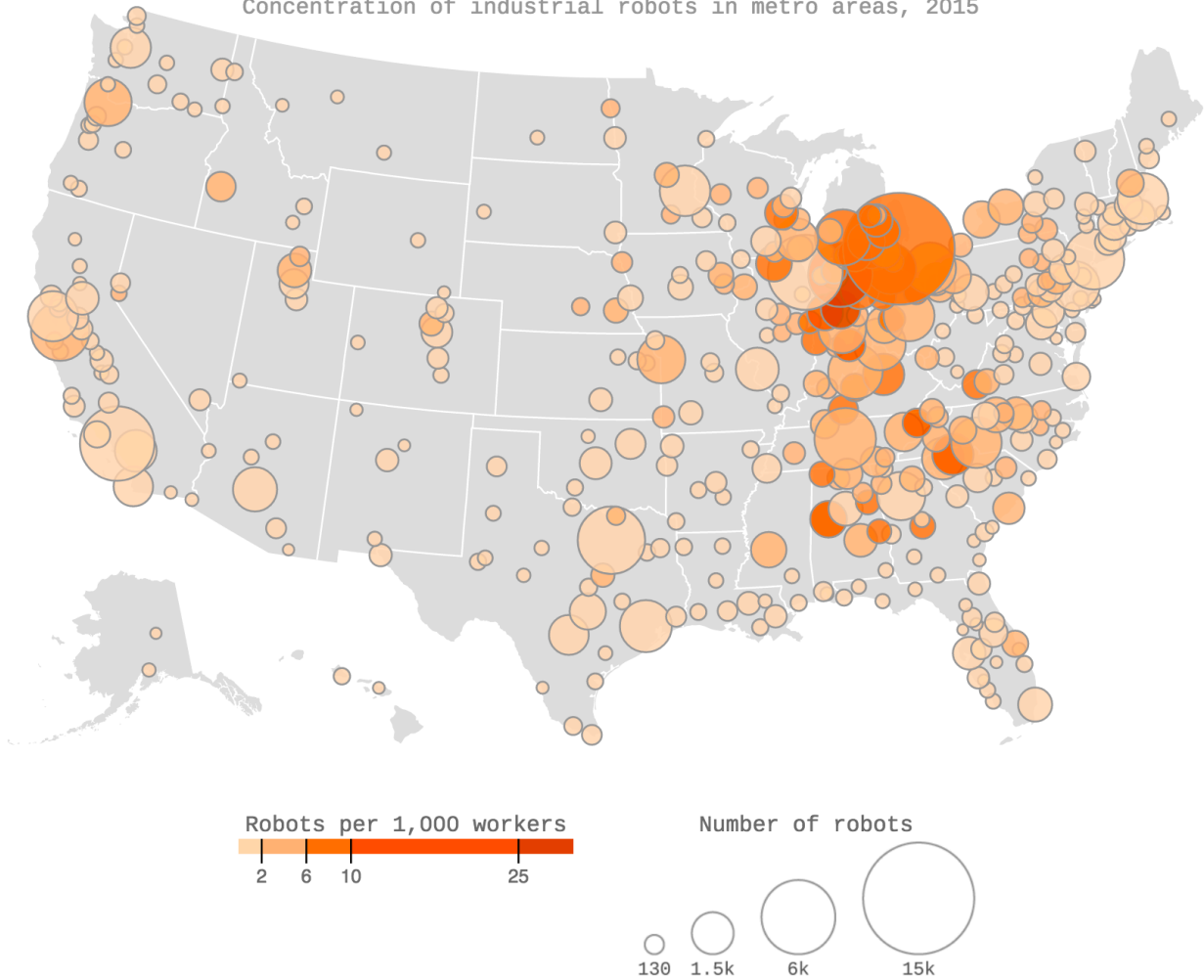
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Microsoft decided that artificial intelligence is one of its leading priorities.[55] Facebook's translation service is entirely AI-powered, apparently.[56] A Japanese financial firm is trialing IBM's Watson to detect banking fraud.[57] AI use for surveillance is rising.[58]

An OpenAI program beat one of the world's eSports leaders.[59] An AI created acceptable street scenes, a la Google StreetView.[60] A research team used AI to improve development of chemical syntheses.[61] Another team used neural networks to immensely speed up their astronomical work.[62]

Countervailing: some AIs have difficulty understanding minority dialects and voices, including those of black Americans.[63] Several open source projects aim to counter that.[64]

Blockchain. Bitcoin forked, spinning off a secondary currency, Bitcoin Cash.[65]

The LMS world.   A major American Moodle meeting showcased that community's dreams for new features.[66] Blackboard announced a new project to let ads play in K-12 LMS instances.[67]

More MOOCs and online learning.   Interest in online education is rising, based on Google searches, while interest in face-to-face education wanes, according to a consultancy.[68] Harvard partnered with 2U to offer a new online program in business analytics.[69] An open education MOOC directed by two leaders in the field was announced for October.[70]

New projects seek to add telepresence to online learning via robotics, video, or holography.[71] A new service, CourseTune, helps instructors design curricula and courses in a new way.[72]

Social media in education.   People used social media to identify Texans in need help coordinate relief in response to Hurricane Harvey.[73]

A California State University campus will fire a non-tenure-track lecturer because of a threatening Twitter post.[74] Similarly, the University of Tampa fired a visiting assistant professor for an obnoxious tweet.[75]

Mobile devices in education. Apple reported increased sales of iPads in education.[76] Apple also partnered with a number of community colleges to create iOS mobile device app development curricula.[77] Arizona State University placed Amazon Echo dots in engineering students' dormitories.[78]

Gaming in education. Dickinson College is using the game Civilization V to teach Roman history.[79]

(See "Educational entrepreneurship" below)

Big data and data analytics.   Academic advisors are already changing their work to respond to new forms of gathering and presenting student data.[80] The European Union is examining new regulations for educational technology data.[81]

Flipped classroom/blended learning. The University of Vermont's medical school ended lectures in favor of active learning.[82]

Automation in education.   A Carnegie-Mellon research team received $1 million to explore machine learning for the social good.[83]

Duolingo now claims more than 200 million users.[84] Duolingo also partnered with Pearson to create new content for higher education students.[85] TenMarks, owned by Amazon, launched an automated writing support service.[86] LexisNexis is trialing chatbots as a new interface option for their search service.[87]

(See "Educational entrepreneurship" below)

Campus digital security threats growing. Technology security threats are the most important issue facing academic IT departments, according to a new EDUCAUSE ECAR survey.[88]

Educational entrepreneurship. Investors gave AI- and gamification-based language learning app Duolingo $20 million.[89] A growing number of companies, online program managers (OPMs), are helping campuses offer distance learning programs.[90] Barnes and Noble bought a business that teaches colleges students writing online.[91] Zeal, a startup intended to lower tutoring prices, launched.[92]

Countervailing: another coding academy, Galvanize, ran into financial problems, laying off staff.[93]

Open education possibilities. The amount of open access content has grown, most especially through the "Gold OA" method.[94] An open access repository for chemistry scholarship, chemRxiv, launched.[95] A new bill designed to encourage open access in federally funded research, FASTR, was introduced into both houses of Congress.[96] Six new open preprint archives launched for the fields of library and information science; mind and contemplative practices; nutrition; paleontology; sports and exercise-related research, in addition to one for Indonesian scholarship in general.

> *These new services join AgriXiv (agriculture), BITSS (research methodology), engrXiv (Engineering), LawArXiv (law), PsyArXiv (psychology), SocArXiv (social sciences), Thesis Commons (theses and dissertations), and OSF Preprints (any discipline) in using the free, open-source Open Science Framework (OSF).[97]*

The Borough of Manhattan Community College will spend up to $4 million of New York state funding to create open education resources.[98]

Leading academic publisher Elsevier purchased academic repository service bepress.[99]

Video and education. A number of colleges and universities now maintain video walls, large interactive displays for a variety of uses.[100]

Ebooks in higher education. Pearson conducted another round of layoffs, arguing that it was necessary in the firm's shift from print to digital materials, as demand for the former declines.[101]

Blockchain in education. Sony is looking to commercialize its newly-completed educational record blockchain technology in 2018.[102]

IV. The higher education bubble, continued.

"We're in the early stages of the stratification of public research universities... The good ones will remain competitive. The rest may decline."

- Daniel A. Reed,
Vice President for Research and Economic Development,
University of Iowa[103]

This concept, which we began to track in early 2012, continues to build across multiple fronts. It holds that colleges are overpriced, that student demand is questionable, and both could drop together:

- Boston University is considering absorbing financially flailing and nearby Wheelock College.[104] Marygrove College will end its entire undergraduate program.[105] Evergreen State University saw enrollment drop, leading to announcements of upcoming hiring freezes.[106] Pacific Lutheran University is considering cutting faculty and staff positions.[107]
- The state of Oregon was not able to fund more than 80% of students under its new tuition support program.[108]
- Student loan debt: the proportion of borrowers owing more than $20,000 has doubled in the past decade, according to the Consumer Financial Protection Bureau. Additionally, "The Bureau also found that more borrowers are taking out student loans later in life, and fewer borrowers are paying down their student debt in five years."[109]
- A group of religious colleges and universities are experimenting with offering two-year technical degrees.[110]
- Rhode Island will offer residents free community college tuition.[111] A Seattle mayoral candidate is calling for free college tuition for that city's high school graduates.[112]
- A for-profit law school, the Charlotte School of Law in North Carolina, closed.[113]
- Several universities are reducing or ending their executive MBA programs.[114]
- A Koch-founded University of Utah department elicited charges that the billionaires were interfering in academia.[115]
- The state of California is now urging some people to study for trades, rather than attending four-year undergraduate programs.[116]
- Politics, partisan: the Trump administration picked a former for-profit university executive to run a key Department of Education office focused on fraud.[117]
- Politics, bipartisan: Congress passed a new GI Bill expanding tuition and expenses benefits for veterans, including support for technology programs.[118]
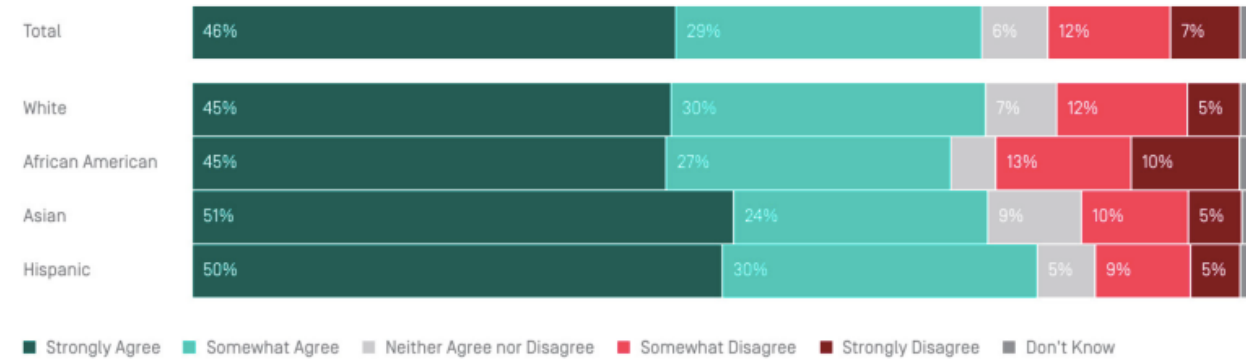
Countervailing trends:

- A coalition of eleven public universities announced a grant program to help keep financially stressed students from dropping out.[119]

- The majority of Americans still value higher education, especially for career success and for the public good, according to a New America report.

Agree or disagree: It is easier to be successful with a college degree than without. [n=1258]

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
Total	46%	29%	6%	12%	7%
White	45%	30%	7%	12%	5%
African American	45%	27%		13%	10%
Asian	51%	24%	9%	10%	5%
Hispanic	50%	30%	5%	9%	5%

■ Strongly Agree ■ Somewhat Agree ▨ Neither Agree nor Disagree ■ Somewhat Disagree ■ Strongly Disagree ■ Don't Know

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V. Other trends

We have been tracking the following additional trends since early 2012, but found no new developments during this month. Possible explanations: one or more are fading as future trends; some may be building slowly over time; some stories were underreported.

Those trends include:

Education and contexts: athletic budgets doing well; K-12 and higher education; alternative degrees; challenges to internships; campuses and sustainability; executive compensation controversy; alternative certification; possible intergenerational tension.

Technology: 3d printing continues to innovate and grow; Ebooks; digitization shifts from physical media to streaming; augmented reality's steady march; the limits of the Web; cloud computing; crowdfunding growing; Office versus Web office; new interfaces; internet of things; new forms of creativity.

Education and technology: rise of the net.generation; badges; crowdfunding in academia; virtual reality in education; shared academics; 3d printing across the curriculum; crowdsourcing in academia; digital humanities develops; faculty criticizing deployment of technology; maker movement.

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About Future Trends in Technology and Education

Future Trends in Technology and Education (FTTE) is a monthly report. It surveys recent developments in how education is changing, primarily under the impact of digital technologies. Its purpose is to help educators, policy-makers, and the public think about the future of teaching, learning, research, and institutions.

Every month FTTE aggregates recent developments, checking them against previously-identified trend lines. As certain trends build in support and significance, the report recommends watching them for future impact. FTTE also notes trends which appear to be declining in significance. Every single item is backed up by footnoted research, often accessible through the open Web. Trends are also aired for feedback and development via the author's Twitter (https://twitter.com/bryanalexander) and blog (http://bryanalexander.org/).

Subscriptions are available for whatever price readers would like to pay, including free, and are open to any interested person or institution.

For more information, see http://ftte.us/.

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Endnotes

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