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This FTTE report is generously sponsored by TurnItIn, NYSERNet, and supporters on Patreon.
Editorial note: greetings from Washington, DC, where I’ve been stranded thanks to American Airlines’ incompetence. I can work from anywhere, though, given electricity and broadband for my laptops; that’s the life of a 21st-century independent futurist.
Speaking of travel, my voyaging schedule is slowing down for a month after a frantic few months. Once I return from DC I’ll remain at home in Vermont for August, unless we sell the house. In September I only have one trip scheduled: Austin, Texas, from September 12-14 (tentatively); I’d be delighted to meet any FTTE readers in the area. I might return to the DC area for a few days as well, visiting the class I’m teaching online; anyone in the area should email me to check, if you’re interested.


Our online book club is part way through reading Kim Stanley Robinson’s New York 2140, a science fiction imagining of that great city after serious climate change. Discussion is very energetic. Join us by checking out blog posts and comments here: https://bryanalexander.org/tag/newyork2140/.

I appreciate everyone who supports this work on Patreon, and invite you all to contribute what you can at https://www.patreon.com/bryanalexander. As an independent futurist, I can’t do the work without your help.

Thank you all for your feedback and recommendations. As ever, contact me with more thoughts at bryan.alexander@gmail.com.
# Future Trends in Technology and Education

## The Higher Education Crisis

- Student debt
- Campus mergers and closures
- Graduate school shrinkage
- Partisan and bipartisan political pressure

## Education and Contexts

- International education
- Racial inequality
- Sexual assault
- Athletics
- K-12 and higher education
- Macroeconomic indicators
- Library changes
- Alternative degrees
- Shared academic services
- Remedial classes
- Challenges to internships
- Adjunctification
- Green sustainability
- Demographics
- Executive compensation
- Enrollment changes
- Alternative certification
- Inter-generational tension
- Responses to Trump

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- Gaming in education
- Badges
- Flipped classroom/blended learning
- Educational entrepreneurship
- Open education possibilities
- Crowdsourcing in academia
- Digital humanities develops
- Faculty criticizing deployment of technology
- Big data and data analytics
- Maker movement
- Shared academics
- Rise of the net generation

## Technology

- Internet of Things
- New forms of creativity
- Digitization
- The limits of the web
- Cloud computing
- Moore's Law
- Open source
- Office vs. web office
- Shopping online
- Copyright battles
- New interfaces
- Fragmented internet
- Onshoring hardware

## Automation in education

- Automation's promise
- Blockchain
- Digital security threats
- Crowdfunding
- E-books
- Device ecosystem
- Social media
- 3D printing
- Digital video
- Virtual reality

### 1. Education and contexts
Macroeconomic indicators. American gross domestic product rose 4.1% during the last quarter.\(^1\) While working as apprentices, women and black people of both genders earn less than men, according to a new study.\(^2\)

The majority of American automation is located in the Midwest, followed by the northeast, according to new research.

<table>
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<tr>
<td>Rochester, NY</td>
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Source: Authors’ database.

Library changes. (See “More MOOCs and online learning” below)
Demographics. China’s population continues to age as marriage and birth rates fall.  

Enrollment changes. High school graduates coming from lower socio-economic positions are significantly less likely to pursue post-secondary education, according to new research. They are also less likely to attend four-year or selective institutions.

Alternative certification. The number of American states supporting Biliteracy Seals increased, with the possibility of hitting all fifty in the near future.

Academic responses to the Trump administration. Some colleges and universities are considering cutting research and other ties with the U.S. Immigration and Customs Enforcement (ICE) agency.
II. Technology

3d printing continues to innovate and grow. Lockheed Martin is now printing large pieces for rockets and satellites. The United States Department of Justice chose not to block dissemination of 3d printed gun plans.

Digital security threats expanding. (See “Blockchain” below)

Augmented reality’s steady march. Countervailing trend: AR and VR headset sales have been slow for a year.

Device ecosystem keeps growing.

- The personal computer market grew for the first time since 2012, largely driven by business demand.
- Virtual reality headsets: Magic Leap released information about their mixed reality headsets’ operating system, Lumin.

Social media. Google, Facebook, Twitter, and Microsoft formally announced a Data Transfer Project, which allows users to more easily share information across those services.

Facebook announced it was taking down pages and accounts it claimed were involved in efforts to destabilize upcoming American elections.

Countervailing trends: the Ugandan government imposed a social media tax, which elicited protests. A growing number of political parties and governments support troll armies, either explicitly or by association.

A shift in Moore’s Law? Countervailing trend: researchers developed new ways to store data at the atomic level.

Shopping continues to migrate online. Snap (formerly Snapchat) has released a feature for their Android app which connects users, what they see through their device, and Amazon.

Fragmented internet. A new study finds some Americans experiencing worse broadband access than the FCC estimates, while internet service providers (ISPs).

Automation’s promise. The city of Amsterdam is preparing to pilot autonomous boats, delightfully named “roboats.”

IBM publicly tested Project Debater, AI software that can conduct debates about contentious ideas with humans. Chinese officials spoke of letting AI help shape that nation’s foreign policy. A Swedish bank cut costs significantly by replacing 6,000 jobs with software. Google is rolling out AI-driven grammar assistance to Google Docs.
Countervailing trends: Uber gave up its self-driving truck enterprise, while continuing to focus on autonomous cars. IBM received criticism after its Watson AI offered bad, even dangerous, medical advice. A report forecasts that if automation proceeds in southeast Asia, the resulting unemployment should lead to worsening labor experiences and even slavery.

**Blockchain.** Countervailing trend: bitcoin wallet provider Bancor suffered a security breach.

**Quantum computing.** Google published two toolkits designed to make quantum programming easier, Cirq and OpenFermion-Cirq.

III. Education and Technology

**The LMS world.** Moodle and Blackboard severed ties.

**More MOOCs and online learning.** Lynda.com is making some of its learning content available to Ohio residents through public libraries, for free.

The University of Pennsylvania is offering a master’s degree in computer science through MOOC provider Coursera. (See also “Shared academics” below)

**Social media in education.** Twitter is working with several universities from different nations to find information about improving its service – specifically, aiming to increase civility and decrease abuse. Clemson University researchers collaborated with data analysis site FiveThirtyEight to publicly share millions of tweets produced by Russian agents. Wisconsin’s Supreme Court ruled against Marquette University for terminating a professor based on his blog writing.

**Rise of the net-generation.** As they enter the workforce and the rest of adulthood, Millennials as a whole are earning less than their generational predecessors.

Japanese researchers find that teens, while thoroughly conversant with mobile phones, are increasingly familiar with desktop and laptop hardware and interfaces.

**Big data and data analytics.** Stephen F. Austin University used data analytics to determine which classes were most in demand and least well supplied, then hired faculty to fill those holes.

**Automation in education.** An AI created by a Chinese university team outperformed skilled medical professionals in offering diagnoses. Academic researchers who created simulations that represent present-day and near-future socio-political dynamics have recently expressed concerns that governments or other political forces could misuse their findings.
**Campus digital security threats growing.** A number of campus experimental devices running the Robotic Operating System (ROS) are vulnerable to hacking, according to Brown University researchers.41

**Open education possibilities.** The United States Department of Education will award between one and three grants next month for open education projects.42 A new study found student use of open education resources linked with higher grades.43 The University of British Columbia now includes use and development of OER in its hiring, promotion, and tenure policies.44

The Vincent van Gogh Museum made 1,000 of that artist’s images openly available online.45 SAGE added scholarly monographs to its open publications.46

**Crowdfunding in academia.** A Belgian archaeologist successfully crowdfunded a World War One battlefield dig.47

**Virtual reality in education.** Case Western Reserve University is developing VR cadaver labs.48 Washington University School of Medicine faculty developed a scheme for using VR to visualize the human heart and the cardiovascular system.49

The Rome Reborn 3d project launched VR features.50

**Shared academics.** Three Michigan colleges shared a media studies class and will collaborate on a larger curriculum this fall.51

**Blockchain in education.** The Royal Melbourne Institute of Technology is working with Credly to add blockchain architecture to students’ credentials, including their cvs, along with links to LinkedIn.52 Another startup, DISCIPLINA, offers to build blockchain academic credentials.53

IV. The higher education bubble, continued.

Unfortunately, the fact is that too many [historically black colleges and universities] may face the threat of closure within the next decade.

- Harry L. Williams, president and CEO of the Thurgood Marshall College Fund54

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:

- Moody’s Investor Services forecasts between 11 and 16 private colleges will close per year in the short-term future.
• Claremont Graduate University closed its philosophy program and laid off its tenured faculty members.\(^5\) Earlham College’s leadership is considering major cuts in order to reduce a mounting deficit.\(^5\) Northwestern University is cutting 80 administrative positions.\(^5\) Antioch University will cut back its face-to-face course offerings while investing to expand its online offerings.\(^5\) Investor services downgraded Oberlin College.\(^6\)

• New research finds that black borrowers are more likely than whites to bear higher loan amounts.\(^6\) Norwich University will offer students an income-share alternative to loans.\(^6\) A game show launched, offering to pay off winners’ student loans.\(^6\)

• Texas A&M and Oklahoma University each launched high-end residence halls this year and saw low student interest in them.\(^6\)

• Campus chief business officers (CBOs) divided in their assessments of institutional sustainability in a new survey. Some saw relative health in the short term, with trouble in the medium range. A fraction reported ongoing discussions about merging their campus with another.\(^6\)

• Student loan debt may be plateauing for younger students, due to regulatory limitations, but growing for their parents:
A majority of Americans are increasingly dissatisfied with the future of higher education according to a new survey. The Federal Reserve Bank of St. Louis found the income returns to a post-secondary degree declining over time, but the impact on wealth dropping even more steeply:

Source: Mark Kantrowitz (SavingForCollege.com)
Politics, partisan: proposed Republican and Democratic education bills differ in key ways, including on ways of restructuring aid and loan processes, outreach plans, and accountability systems. The DeVos Department of Education published proposed strict new rules for “borrower defense,” under which a student loan holder can seek redress from academic institutions; it would become harder to obtain relief, and the budget for assisting such relief would be cut.

Countervailing trends:

- Paul Quinn College is launching a new unit in Texas, expanding its “urban work” plan.
- Georgia Tech published an ambitious plan for its future, including many changes based on trends familiar to FTTE readers.

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: changes in international education; racial inequality in/and education; campuses and sexual assault controversy; athletic budgets doing well; K-12 and higher education; alternative degrees; shared academic services; remedial classes; challenges to internships; adjunctification; campuses and sustainability; executive compensation controversy; possible intergenerational tension.

Technology: eBooks; digitization shifts from physical media to streaming; the limits of the Web; cloud computing; open source; data and analytics; crowdfunding growing; onshoring hardware production; Office versus Web office; digital video rising; copyright battles continue; new interfaces; internet of things; new forms of creativity.

Education and technology: mobile devices in education; gaming in education; badges; flipped classroom/blended learning; educational entrepreneurship; video and education; eBooks in higher education; 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. Alternatively readers can support FTTE through Patreon, https://www.patreon.com/bryanalexander.

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

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Endnotes
28 @Bancor, “Here is the latest update on the recent security breach;,” Twitter, 4:35 PM eastern time zone, July 9, 2018, accessed August 4, 2018, https://twitter.com/Bancor/status/1016420621666963457.


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https://bryanalexander.org/research-topics/how-healthy-are-american-colleges-their-chief-business-officers-speak/.


