Future Trends in Technology and Education
November 2016

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

Table of Contents:

I. Education and contexts
   Changes in international education - Campuses and sexual assault controversy -
   Macroeconomic indicators - Enrollment changes

II. Technology
   Digital security threats expanding - Device ecosystem keeps growing - Social media -
   Digital video rising - Shopping continues to migrate online - Copyright battles
   continue - Automation’s promise - Internet of things.

III. Education and technology
   The LMS world - More MOOCs and online learning - Social media in education -
   Gaming in education - Big data and data analytics - Automation in education -
   Campus digital security threats growing - Virtual reality in education - Flipped
   classroom/blended learning - Shared academics - Video and education.

IV. The higher education bubble

V. Other trends
   About FTTE – endnotes

This FTTE report is generously sponsored by NYSERNet.
Editorial notes: It’s been a delight to meet so many FTTE readers over the past month, especially at EDUCAUSE, but also at NWACC. It’s also a continuous treat to see some of you participating in the Future Trends Forum.

Travel note: I’ll be in Finland November 12-20, and would look forward to meeting more of our European readers.

Thank you all for your feedback and recommendations. As ever, contact me with more thoughts at bryan.alexander@gmail.com.

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I. Education and contexts

Changes in international education. Reuters reporters charged a Chinese company with corrupting a series of American college and university admissions officers.\(^1\)

Campuses and sexual assault controversy. Some campuses are taking steps to restrict student alcohol consumption as a way of reducing sexual assaults.\(^2\)

Macroeconomic indicators. The American economy grew nearly 3% in third quarter of 2016, according to early data.\(^3\) Unemployment stayed low, at 4.9%, while average pay grew: “In October, average hourly earnings for all employees on private nonfarm payrolls rose by 10 cents to $25.92, following an 8-cent increase in September.”\(^4\)

The American economy may grow at a rate of 1.25%, due to a slowdown in workforce growth:
The gig economy continues to grow, according to recent research.

**Nonemployer Firms and Employment (1997-2014) (United States)**

- **8.3 payroll employees per nonemployer firm in 1997**
- **6.1 payroll employees per nonemployer firm in 2014**

Source: Brookings Analysis of Census Bureau and Moody’s data
The volume of international trade failed to grow for 2016’s first quarter, and actually declined slightly in the second.\textsuperscript{2}

**Enrollment changes.** High school graduated rates increased again.\textsuperscript{8} A large number of students exiting collapsing for-profits are having a hard time transferring credits, and may leave higher education entirely.\textsuperscript{2} The number of students enrolled in community colleges declined from 2014 to 2015, continuing a half-decade trend.

<table>
<thead>
<tr>
<th>Community College Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2015</td>
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<tr>
<td>Fall 2014</td>
</tr>
<tr>
<td>Fall 2013</td>
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<tr>
<td>Fall 2012</td>
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<tr>
<td>Fall 2011</td>
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II. Technology

**Digital security threats expanding.** A massive distributed denial of service attack (DDoS) took major chunks of America’s internet access offline for a day.\textsuperscript{11}

**Device ecosystem keeps growing.**

- Nintendo released a new game console that has multiple configurations.\textsuperscript{12}
- Amazon launched a new streaming music service aimed at its Echo device.\textsuperscript{13}

**Social media.** Facebook received a storm of criticism when ProPublica discovered that the site’s advertising options included the ability to exclude audiences based on their race.\textsuperscript{14}

**Digital video rising.** The proportion of internet traffic devoted to video has grown to enormous levels:
Shopping continues to migrate online. The head of Alibaba, China’s huge internet company, floated the idea of creating an international digital market for farmers.  

Copyright battles continue. BitTorrent, often used for copyright infringement, has shrunk as a proportion of internet traffic.  

Automation’s promise. Chinese digital giant Baidu launched Melody, a mobile app bot that helps users self-diagnose medical problems.  
Robots: a yardwork robot was offered for sale in the United States.  
In military developments, a naval exercise successfully involves three non-human-crewed vehicles interacting: an autonomous ship, an autonomous sub, and a drone.  
Google researchers announced a new AI pattern, one combining external data storage with neural networks’ ability to learn.  
Stephen Hawking launched a center to study AI possibilities and threats.  

Internet of things. Countervailing trend: the role of IoT devices in October’s massive DDOS attack is leading some to rethink IoT security policies, including the European Commission.  

III. Education and Technology  
The LMS world. Learning management system leader Blackboard shared research indicating the supermajority of instructors use that LMS only to share documents and announcements:
New data on campus use of learning management systems (LMSes) shows Blackboard retaining the dominant position, Moodle in second place, Canvas continuing to win adherents, and cloud hosting on the rise.
More MOOCs and online learning. Georgia Tech is trialing an undergraduate computer science class based on a MOOC. Coursera is experimenting with a monthly subscription fee.

Social media in education. A court ruled in favor of expelling a student from a graduate program because of two of his Facebook posts. College advancement programs are increasingly using social media, especially Facebook.

Gaming in education. An anti-Trump election game launched.

Big data and data analytics. Indiana and Texas have developed state-level higher education analytics tools for public use.

Automation in education. Pearson and IBM partnered to explore applying Watson to education. A leading computer scientist and entrepreneur announced plans to extend automation in law.

Campus digital security threats growing. Ransomware intrusions into colleges and universities are on the rise, according to a new report.

Virtual reality in education. Pearson has partnered with Microsoft to develop virtual and mixed reality content using the latter’s HoloLens technology. Carnegie-Mellon students are building VR content.

Flipped classroom/blended learning. 55% of faculty responding to a Campus Technology poll stated that they were flipping their classes:
Shared academics. A group of liberal arts colleges is exploring resource sharing for undergraduate math. California community colleges will allow students to take classes at other institutions in that system.

Video and education. A Spanish university is experimenting with a video-drenched classroom, wherein many screens show up to 80 individual students’ video feeds, along with tools for indicating responses to instructor questions.

IV. The higher education bubble, continued.

“The plain fact is that tuition at NYU places an unacceptable financial strain on too many students… NYU is not unique in that regard by any means…”

- NYU President Andrew Hamilton
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:

- Student debt continued to grow. According to recent data,

  about seven in 10 (68%) college seniors who graduated from public and private nonprofit colleges in 2015 had student loan debt... These borrowers owed an average of $30,100, up four percent from the 2014 average of $28,950...

That debt varies on a state by state basis:

<table>
<thead>
<tr>
<th>HIGH-DEBT STATES</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>New Hampshire</td>
<td>$36,101</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>$34,798</td>
</tr>
<tr>
<td>Connecticut</td>
<td>$34,773</td>
</tr>
<tr>
<td>Delaware</td>
<td>$33,849</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>$32,920</td>
</tr>
<tr>
<td>Minnesota</td>
<td>$31,526</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>$31,466</td>
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<tr>
<td>District of Columbia</td>
<td>$31,452</td>
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<tr>
<td>South Carolina</td>
<td>$30,564</td>
</tr>
<tr>
<td>Ohio</td>
<td>$30,239</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOW-DEBT STATES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah</td>
<td>$18,873</td>
</tr>
<tr>
<td>New Mexico</td>
<td>$20,193</td>
</tr>
<tr>
<td>California</td>
<td>$22,191</td>
</tr>
<tr>
<td>Wyoming</td>
<td>$22,683</td>
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<tr>
<td>Florida</td>
<td>$23,379</td>
</tr>
<tr>
<td>Hawaii</td>
<td>$23,456</td>
</tr>
<tr>
<td>Nevada</td>
<td>$23,462</td>
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<tr>
<td>Arizona</td>
<td>$23,780</td>
</tr>
<tr>
<td>Washington</td>
<td>$24,600</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>$24,849</td>
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</tbody>
</table>

- Indiana University- Purdue University announced the end of many majors and several academic departments, including geology, women’s studies, and philosophy; anthropology, sociology, and fine art will be folded into other units.  
- Tuition-driven Chicago State University’s enrollment is less than half of what it was in 2010.  
- The state of Virginia is considering a 7.5% cut to public higher education funding.  
- Pennsylvania State System for Higher Education faculty struck for a week.  
- The number of law schools attending the Association of American Law Schools hiring fair declined again, signaling that they are hiring fewer faculty.  
- American attitudes towards higher education have turned increasing skeptical, according to a new poll:
Politics, bipartisan: rising populist politics could build up anti-higher education policies.

Countervailing trends:

- Experiencing college might be correlated with longer lifespans, especially through avoiding certain diseases, according to a new paper.

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: Racial inequality in/and education; athletic budgets doing well; K-12
and higher education; library changes; alternative degrees; shared academic services; remedial classes; challenges to internships; adjunctification; campuses and sustainability; demographics; 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; a shift in Moore’s Law? open source; crowdfunding growing; onshoring hardware production; Office versus Web office; digital video rising; new interfaces; fragmented internet; new forms of creativity.

Education and technology: Mobile devices in education; rise of the net generation; badges; educational entrepreneurship; open education possibilities; video and education; crowdfunding in academia; 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.

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

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Endnotes
17 Joon Ian Wong.
Thanks to Linda Burns for pointing this one out.


34 Thanks to Linda Burns for pointing this one out.


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https://bryanalexander.org/2016/10/19/new-data-on-student-debt/.


https://bryanalexander.org/2016/10/18/another-campus-in-sharp-decline/.


