The Digital Age: The Impact and Future Possibilities
Offered by Data and Technology

EDUCAUSE

UNCOMMON THINKING
FOR THE COMMON GOOD

We are a nonprofit association advancing higher education through technology innovation

www.educause.edu - John O’Brien – jobrien@educause.edu
Pace of Technology Change in Higher Ed

Transformation: Analog Technology
Transformation: Digital Technology

...and all these things fit in your pocket

20 years later
Moody's outlook continues to darken

Drivers

12

13
Michael Milken and the Corporate Raid on Education
by Kenneth J. Saltman
10-03-2003

 included in the Gathering:
Editor's gathering for thread tecnocapitalism
Junk bond swami Michael Milken jumped out of prison a few
years ago and into for-profit education. Ken Saltman submits
Milken's latest venture to the light of day.

“You’re in an industry which is worth hundreds of billions of dollars, and you have
a reputation for low productivity, bad management, and no use of technology.
We’re going to eat your lunch.”

Technology innovation...

✓ Allows us to do what we have been doing, but better
✓ Allows us to do what we have been doing, but less expensively
✓ Allows us to reinvent what we do

Paul LeBlanc, President, Southern New Hampshire University

https://er.educause.edu/articles/2015/10/when-it-no-longer-remains-anonymous-for-all-the-right-reasons

EDUCUSE

Dx: Digital Transformation of Higher Education

What is Digital Transformation?
Digital transformation (Dx) is a cultural, workforce, and technological shift. It is being driven by technology trends and changes that include advances in analytics, artificial intelligence, the cloud, mobile, consumerization, social networks, and storage capacities. Those drivers are enabling a new approach to everything from digital architectures to how campus leaders interact with the IT organization, all with the expected outcomes of new business models, improved student outcomes, different teaching and learning methods, and new research capabilities.

The Urgent Need to Adjust and Adapt
Technology has been gradually transforming higher education for decades. Recently, the
The Traveler’s Experience

- **Planning** – Travelocity.com, etc. (20% research trips via mobile app; 80% find travel reviews helpful)
- **Booking** – Expedia, Hipmunk (30% use mobile app)
- **While traveling** – 75% use a mobile device on the move
- **After returning** – 40-46% post reviews
- **Social sharing** – 76% post vacation photos
H-2 before the departure

12:11
Friday 1 September

Your flight will board at gate 14. Please make your way there as soon as possible. We wish you a pleasant trip.

After the arrival

12:32
Friday 1 September

Welcome to Barcelona! In a few minutes, you will be able to collect your luggage at carousel 3.

https://www.accengage.com/push-notification-case-study-air-france/
Delta unveils first biometric terminal in U.S. in Atlanta; next stop: Detroit

By Kathryn Steele • posted Nov. 29, 2018 6:00 am

Starting this December, customers can use facial recognition technology from curb to gate at ATL’s Terminal F

https://news.delta.com/delta-unveils-first-biometric-terminal-us-atlanta-next-stop-detroit
https://blog.beaconstac.com/2016/03/10-airports-using-beacons-to-take-passenger-experience-to-the-next-level/

Trends
EDUCAUSE Trends Research

http://tiny.cc/fc7b2y

Changing Student Expectations
EDUCAUSE Student Study

Institutions use EDUCAUSE Technology Research in the Academic Community (ETRAC) data to develop and support their strategic objectives for educational technology.

15 Years of Research
- Student Research: 15 years | 661,891 responses
- Faculty Research: 3 years | 44,178 responses
46% of students say they get more actively involved in courses that use technology.

78% of students agree that the use of technology contributes to the successful completion of courses.

Percentage of students who say that technology has helped them:

- Ask instructors questions: 79%
- Engage in the learning process: 71%
- Work with other students on class projects: 69%
- Participate in group activities: 65%

LEARNING ENVIRONMENT AND ACADEMIC EXPERIENCES:

82% of students prefer a blended learning environment.

6 in 10 students say they want their instructors to use these more:
- Lecture capture
- Early-alert systems
- Free, web-based supplemental content
- Search tools to find references/information online for class work

Students Want Personalization and Technology Enabled Advising

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalized support and information on degree progress</td>
<td>92%</td>
</tr>
<tr>
<td>Personalized dashboards that give you real-time feedback about your progress</td>
<td>89%</td>
</tr>
<tr>
<td>Suggestions for how to improve performance</td>
<td>88%</td>
</tr>
<tr>
<td>Personalized quizzes or practice questions</td>
<td>88%</td>
</tr>
<tr>
<td>Real-time feedback for your instructor about your performance or progress</td>
<td>88%</td>
</tr>
<tr>
<td>Guidance about courses you might consider taking</td>
<td>87%</td>
</tr>
<tr>
<td>Alerts if it appears your progress in a course is declining</td>
<td>86%</td>
</tr>
<tr>
<td>Suggestions about new or different academic resources</td>
<td>84%</td>
</tr>
<tr>
<td>Feedback about performance compared to that of other students</td>
<td>82%</td>
</tr>
</tbody>
</table>
Proven Trends

https://cel.umn.edu/support-services/tutorials/active-learning-classrooms

Active Learning Spaces
The textbook is undergoing a remarkable bit of evolution: it’s vanishing, as least in its traditional form.

Malcolm Brown,
EDUCAUSE Learning Initiative
“Textbooks don’t have to be texts. They don’t have to be books.”

https://www.youtube.com/watch?v=m17dG921RY4

IU Example: https://scholarworks.iupui.edu/bitstream/handle/1805/18000/196.pdf?sequence=1&isAllowed=y

23% Often Don’t Buy Textbooks


https://www.insidehighered.com/quicktakes/2017/09/20/study‐high‐textbook‐prices‐lead‐poor‐grades
OER Results

- First semester: students saved $60,000+
- Total cost of degree: 25% less
- Improved persistence: 6% lower drop rate

http://lumenlearning.com/success-story-tidewater/
OER Results
(11 studies, 50,000 students)

Open Education Group
Socially responsive research that concretely improves society

The Review Project

Led by John Hilton III

This review provides a summary of all known empirical research on the impacts of OER adoption (including our own). The version originally published here in February 2015 was abstracted from an article submitted for publication in a peer-reviewed journal. We are continuing to add reviews of new articles as we become aware of them. If you know of an empirical research study on the impacts of OER adoption that is not included in this review, please leave a comment below.

http://openedgroup.org/review

Data, Data, Data.

Empowered Students
2. Student Success
4. Student-Centered Institution

Trusted Data
1. Information Security Strategy
3. Privacy
5. Digital Integrations
6. Data-Enabled Institution
8. Data Management and Governance

21st Century Business Strategies
7. Sustainable Funding
9. Integrative CIO
10. Higher Education Affordability
### Use of Data and Analytics for Student Success

<table>
<thead>
<tr>
<th>Category</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other student data</td>
<td></td>
<td></td>
<td>40%</td>
<td>39%</td>
<td>14%</td>
<td>7%</td>
</tr>
<tr>
<td>Systems-level data</td>
<td>28%</td>
<td>42%</td>
<td></td>
<td></td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>Institutional business</td>
<td>20%</td>
<td>48%</td>
<td></td>
<td></td>
<td>21%</td>
<td>11%</td>
</tr>
<tr>
<td>Student information system data</td>
<td>2%</td>
<td>25%</td>
<td>42%</td>
<td></td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>

- Institution does not collect usable data
- Data are collected but not integrated
- Data are systematically collected and integrated


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### Collecting vs. Integrating/Using Data

**A Tale of Two Phone Calls**
The call that happened...

The call that never happened...

“last mile”
“They’re not silos... they’re Cylinders of Excellence!”

Resource Hub: https://www.educause.edu/ipass-grant-challenge/ipass-resources

Technology-Enabled Advising

iPASS Resources

Valuable insights from current iPASS projects as well as the experiences and outcomes of the 19 institutions funded by the Gates Foundation in 2013 to implement iPASS technology solutions.
Advising/Analytics Results: Georgia State University

End of 2016-17 year, graduation rate nearly doubled in a four year period

Advising/Analytics Results: Patrick Henry Community College

- In first year, 8% growth in year-to-year retention
- 2% gain in persistence
- Significant increase in graduation (43%)
Advising/Analytics Results:
Middle Tenn. State University

- 2017 to 2018 fall to spring persistence increased 2.4%
- 5.2% increase in persistence of new transfer students

Advising/Analytics Results:
University of Texas at San Antonio

Over the five-year period ending in spring 2017, 9% increased retention rate (62% to 71%)
Colorado State University noted a 3.6% increase in overall retention since 2006. The Community College of Philadelphia cited a 6% improvement in the one-year retention rate. Middle Tennessee State University saw a 1.5% retention rate increase over 2 years across the entire undergraduate population. Northeast Wisconsin Technical College saw a 10.5% retention rate increase among those who took part in integrated advising. Ramapo College of New Jersey, which focused on its population of transfer students, found a 1.4% improvement in retention over two years among transfer students.

Advising/Analytics Results:

Central Michigan University

3.6% increase in persistence from year 1 to year 2 resulting in an additional $3M in revenue.
iPASS KEY FINDINGS

$1 million, annually

Expected increases in student retention rates could generate net revenue averaging $1 million annually per institution (additional operating revenue from student credit hour activity, less the education-related expenses to provide those additional credit hours).

Calculator: https://www.educause.edu/ipass-grant-challenge/return-on-investment-toolkit

Adaptive Learning

List of Adaptive Learning Software from EdSurge:
https://www.edsurge.com/research/special-reports/adaptive-learning/software
Adaptive Learning Results

- Carnegie Mellon University students get same or better outcomes while completing the course 50% faster.
- Cal State Northridge saw a 67% increase in Math 103 pass rates (from 45% to 75%).
- Knewton/Arizona State University partnership increased pass rates by 18% and withdrawals dropped by more than 47% saving ASU an estimated $12M in lost tuition.

“The question of whether games can teach or not is settled science.”

Richard Van Eck
University of North Dakota

https://er.educause.edu/articles/2015/10/digital-game-based-learning-still-restless-after-all-these-years
Gaming Results

- A well-designed game improves learning over lecture by between 7% and 40%
- Learners in game-based instruction performed as much as one full letter grade better when compared to learners in non-game-based instruction

Review of 60,000 articles finds:

“significant positive effects on outcomes in science, math, and literacy”

Emerging Trends

Augmented Reality

https://library.educause.edu/resources/2005/10/7-things-you-should-know-about-augmented-reality
Images from Google Search for "Augmented Reality"
Virtual Reality

https://library.educause.edu/resources/2017/10/7‐things‐you‐should‐know‐about‐ar‐vr‐mr
Augmented and Virtual Reality for Teaching and Learning

We predict that as many as 40% of institutions will have institution-wide deployment of these technologies by 2023.

- 15% Already deployed institution-wide
- 30% Planning/piloting deployment
- 20% Tracking, not deploying or piloting
- 25% No actions planned in 2018

Don't know what this technology is
Artificial Intelligence (AI)

AI By The Numbers: 33 Facts And Forecasts About Chatbots And Voice Assistants

- 42% of consumers already use digital assistants, while 53% of millennials are using them (PwC)
- 27% of consumers weren’t sure if their last customer service interaction was with a human or a chatbot (PwC)
- By 2020, the average person will have more conversations with bots than with their spouse. (Gartner)
- Half of all searches will be voice searches by 2020. (iProspect)


Alexa for All: Saint Louis University Students Receive Virtual Personal Assistants in Their Rooms

Saint Louis University (SLU) will become the first university to bring virtual personal assistants into every student residence on its campus and to equip them with a private, SLU-specific skill through Alexa for Business. This fall, SLU plans to place more than 2,300 Amazon Echo Dots in residence hall rooms and student apartments.

The special “Ask SLU” skill will also include information about Billiken athletics games, concerts and major speakers, student events and organizations, and service and mission opportunities, among many other aspects of student life. By 2019, the University hopes to make more personalized features available to students, such as their class schedules and grades.

[Article](https://aws.amazon.com/blogs/publicsector/alexa-for-all-saint-louis-university-students-receive-virtual-personal-assistants-in-their-rooms/)
[Video](https://www.youtube.com/watch?time_continue=61&v=Q8JfcxM7yQw)
Meet Jill Watson: Georgia Tech's first AI teaching assistant

Nov 10, 2016 | By Hillary Lipko

This is incredibly cool

Thank you for sharing. This indeed incredibly interesting to me. I wish I would have the opportunity to implement something like this in my own research.

Just when I wanted to nominate Jill Watson as an outstanding TA!
More Writing Through Automation

University of Michigan adds an automated text-analysis tool to a growing program intended to give more students a chance to learn through writing.

by Carl Straumsheim for Inside Higher Ed

High-enrollment courses often lead professors to assign multiple-choice quizzes, as more complicated forms of assessment dramatically increase the time they take to grade. This fall, the University of Michigan at Ann Arbor will test whether automated text analysis can help professors integrate more writing into their courses without imposing significant new time constraints.

The automated text-analysis tool is the latest addition to M-Write, a program run by the Gayle Morris Sweetland Center for Writing at Michigan. The program targets students in large introductory science courses, using writing as a strategy to improve student learning.

http://tiny.cc/v49b2y

Exemplars to Explore
Deep and broad technology elements in 2040 Plan such as:

- Online learning
- Transcript based on block chain with microcredentials
- Analytics-Rich advising
- Technology-enhanced advising “supporting personalization at scale”
- Artificial intelligence for personalization systems (Jill Watson+)


“technology, technology, technology”

https://www.asu.edu/
Unizin’s Foundational Strategy

1. Content
   - Creating an intuitive workflow
   - Having an easy to use catalog of content

2. Learning Experience
   - Technologies (Instructure, TopHat, TurnItIn, etc…)
   - Creating a unified Learning Experience for our users

3. Data
   - The Ingestion of data into UDP
   - Creating a common data model
   - Creating algorithms in order to detect early warning signs for students
   - Dashboards to gain a better understanding of overall class performance

4. Research
   - Universities opt-in to share your University’s data
   - This data can be used to do research on and find trends in teaching and learning
   - This can allow universities to gain insights on the best teaching practices for students

Community of Practice

http://www.theuia.org/
We proved students from all backgrounds can succeed at the same levels.

Georgia State is a national model for student success. Over the past decade, the university has increased our graduation rate by 25 points. We’re graduating 2,800 more students a year than just five years ago and we’ve reduced the time to degree by half a semester, saving students $18 million a year. We’ve eliminated achievement gaps based on race, ethnicity or income.

24/7 Responses w/ Pounce, the Chatbot

[Image of a phone screen showing an interaction with a chatbot named Pounce, highlighting a 21.4% reduction in summer melt and a 3.9% increase in enrollment of GSU, along with student satisfaction ratings of 80% giving Pounce 4 or 5 stars and 94% recommending GSU offer Pounce to next class.]
Advisement: GPS Advising
Predictive Analytics Project with EAB

10 YEARS OF DATA | 2.5 MILLION GRADES
144,000 STUDENT RECORDS | 800+ ANALYTICS-BASED ALERTS
30,000 STUDENTS TRacked DAILY

Reminder
You have a quiz tomorrow in MATH 120. Schedule time to study
Close Schedule

201,000
Results: Decline in Time to Degree

Credit Hours at Completion: All Bachelors Students

$18M Student ROI

Savings to the Class of 2018 in tuition and fees when compared to the Class of 2012

Results: Increased Undergrad Degrees Awarded

2010-11: 4,222 2016-17: 7,047

INCREASE: +2,825 (+67%)
Results: Graduation Rates by Race & Ethnicity

- **White**: 2003: 15.0%, Today: 50.4%, Today, with Clearinghouse Data Added: 76.4%
- **African American**: 2003: 31.6%, Today: 25.6%, Today, with Clearinghouse Data Added: 77.5%
- **Hispanic**: 2003: 75.0%, Today: 22.0%, Today, with Clearinghouse Data Added: 76.7%

**Cautions**

DIGITAL ETHICS
@mayank_jea can i just say that im stoked to meet u? humans are super cool.
M.I.T. Plans College for Artificial Intelligence, Backed by $1 Billion

The Massachusetts Institute of Technology is taking a particularly ambitious step in preparing students to develop, and consider the implications of, artificial intelligence. It is creating a new college, backed by a planned investment of $1 billion. Cody O’Loughlin for The New York Times

If You Read One Higher Ed Book This Year, Make it 'Robot-Proof'

Where we fit, and how we must change, in the age of intelligent robots.

By Joshua Kim // April 18, 2018


It is not an accident that I’m putting my review of Robot-Proof in ‘Inside Digital Learning.’ My goal is to drive maximum awareness of this book among anyone thinking about the future of higher education.

Aoun, a linguist who also happens to head Northeastern University, makes the case that our economy is on the cusp of enormous change. He is largely supportive of the argument that accelerating improvements in the bundle of technologies that comprise artificial intelligence (sensors, processing, big data analysis) will drive fundamental changes at every level of our economy. This artificial intelligence driven shift will be as consequential as the two earlier large-scale economic shifts, that of agricultural to manufacturing and then from manufacturing to services.

Book Website: http://robot-proof.com/#title
Cautions

HYPE AHEAD
DON’T JUMP TOO SOON

“Books will soon be obsolete in the schools... Our school system will be completely changed in 10 years.”

Thomas Edison
1913
Once upon a time, in the year 2007, people were really excited about Second Life. Businessweek ran a cover story with the headline "Virtual World, Real Money." Brands opened stores in Second Life malls. It was even featured on an episode of *The Office*. Colleges were among those that bought the hype of the Linden Lab-developed virtual world. Many universities set up their own private islands to engage students; some even held classes within Second Life.

Most of these virtual universities are gone.
Cautions

DON'T JUMP TOO SOON

Cautions

BUT DON'T NOT JUMP
At Your Service: EDUCAUSE Staff

Thank You!
jobrien@educause.edu
https://gem.snhu.edu/