Learning Analytics

Big Data in Education

Top: Server farm adapted from Big Data Will Drive the Next Phase of Innovation in Mobile Computing by Lourdes Munoz Santamaria via flickr under CC BY-NC-SA (Links to an external site.)

Right: Learning Analytics #oucel15 keynote by @houshuang via flickr under CC BY-NC-SA 2.0
Agenda

Learning analytics

Big data and education

Interdisciplinary analysis

Computer science | Statistics | Education | Psychology | History | Economics | Law | Ethics

Praxis

Learning Community
Learning Analytics

“The 2016 Horizon Report describes learning analytics as ‘an educational application of web analytics aimed at learner profiling, a process of gathering and analyzing details of individual student interactions in online learning activities.’”

“…[T]he measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs.”


Data Sources

Activity data (clickstream)

Demographics

Achievement data (grades, GPA, credential)

Engagement (Student ID)
Big data and education

Canvas Course Analytics
Starfish Attendance Tracking and Zoom-In
Predictive Analytics Framework

Student Success
Retention
Completion
Content mastery
Learning outcomes

Administration
Centralized communication
Scheduling
Strategic planning (ROI)
“My short-term goal is to have 20-25 people leave by the 25th” of September, Mr. Newman wrote in an August 21 email to the provost, David B. Rehm. “This one thing will boost our retention 4-5%. A larger committee or group needs to work on the details, but I think you get the objective.”

“This is hard for you because you think of the students as cuddly bunnies, but you can’t. You just have to drown the bunnies … put a Glock to their heads.”

Praxis

How do I see learning analytics enhancing my teaching or students’ learning?

What are some possible unintended consequences of learning analytics? How can they be mitigated?

What are the implications of maintaining students’ learning data? How can they be managed?

Under what conditions should students’ learning experiences be analytics-enhanced or -automated?

How should students be involved in the decision to implement learning analytics in a course?
Interdisciplinary analysis: Library & Information Science

Information has Value

Learners who are developing their information literate abilities

- make informed choices regarding their online actions in full awareness of issues related to privacy and the commodification of personal information.

Information Literacy CALG

Students will be able to

- identify the legal, ethical, economic, and social issues (including privacy, copyright and plagiarism) associated with the use of information.


Interdisciplinary analysis: Computer science

Data harvest (system interoperability)
  Data hoarding

Governance
  Cloud storage
  Roles & permissions
  Cybersecurity & risk

Persistence (discoverability)

Transferability

‘Black-box’ proprietary algorithms

Automation; analytics-enhanced decision-making
Interdisciplinary analysis: Statistics

Bayesian inference

Ecologic fallacy

Data integrity, validity

Implications for analytics-enhanced, automated decision-making

Correlation vs. causation

Spurious correlations (and implications of proprietary algorithms)
Six Provocations for Big Data

Do the numbers speak for themselves?

Is the data objective?

Is the data representative?

Does analysis account for data limitations?

Was data collection ethical?

Is there data equity?

Interdisciplinary analysis: Education

Learning
  Gamification & means-end inversion

Rapport
  Confidentiality

Pedagogy

Instructor-student interactions
  Interpersonal communications

Social mobility vs. demography-as-destiny
Interdisciplinary analysis: Psychology

Cognitive psychology

Intellectual & neurodiversity

Behavior modification
  Intellectual conformity

Identity formation
  Self-fulfilling prophecy
  Privacy

Bias

“Algorithmic fairness”
Interdisciplinary analysis: History & Political Science

Neoliberalism
- Centralized bureaucratic governance
- Resource distribution, accountability through quantification
- Means-end inversion

Surveillance

Chilling effect

Censorship

Social conformity
Figure 3. Pre and Post June 2013 Article View Trends (Outliers Excluded)
The sudden drop in views and trend shift—from increasing monthly views over time to decreasing after June 2013—is consistent with a significant and long-term chilling effect.

1 in 6 writers has avoided writing or speaking on a topic they thought would subject them to surveillance. Another 1 in 6 has seriously considered doing so.

See also:
Disparate impact

Structural surveillance of “dangerous classes” creates disproportionate burden, risk of false positives for some populations:

- people of color: 45.3% of our student body (2016 Fall Third Week Credit Enrollment Report)
- religious minorities
- international students: ~200 students/year
- recipients of social services
  - financial aid: 67% of FTFT students (IPEDS 2015-16)
- borrowers with high credit risk
- students with history of legal offense, etc.

Friedler, Sorelle, Carlos Scheidegger and Suresh Venkatasubramanian. *Algorithmic Fairness*.


Interdisciplinary analysis: Business & Economics

Innovation imperative
Public-private partnerships
Venture capital
Data commodification
Opportunity cost
Reputation cost
Cost-benefit analysis
Interdisciplinary analysis: Law

FERPA

Discoverability

Compliance

Privacy jurisprudence
Interdisciplinary analysis: Ethics

Paternalism

“Institutional gaze”

Institutional power
Preference falsification

Collection posture

Institutional priorities

Individualism

Free inquiry

Informed consent

Data minimization

Disciplinary ethics

Cui bono?
Praxis

How do I see learning analytics enhancing my teaching or students’ learning?

What are some possible unintended consequences of learning analytics? How can they be mitigated?

What are the implications of maintaining students’ learning data? How can they be managed?

Under what conditions should students’ learning experiences be analytics-enhanced or -automated?

How should students be involved in the decision to implement learning analytics in a course?
Learning Community

2xF2F TBA

Canvas anytime

To enroll: Sarah (shartmancaverly@dccc.edu)

Michael (mlamagna@dccc.edu)

Thank you