“The world is one big data problem”

Gilad Elbaz
Estimated Baccalaureate Degree Attainment by Age 24 by Family Income Quartile
1970 to 2009

[Graph showing the estimated baccalaureate degree attainment by age 24 by family income quartile from 1970 to 2009. The graph compares the attainment rates for different income quartiles, with the top income quartile showing a generally higher rate of attainment compared to the other quartiles.]
Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.
<table>
<thead>
<tr>
<th>Focus of analytics</th>
<th>Who Benefits?</th>
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<tbody>
<tr>
<td><strong>Course-level</strong>: social networks,</td>
<td>Learners, faculty</td>
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<tr>
<td>conceptual development, language analysis</td>
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<tr>
<td><strong>Aggregate</strong> (big data) predictive</td>
<td>Learners, faculty</td>
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<tr>
<td>modeling, patterns of success/failure</td>
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<td><strong>Institutional</strong>: learner profiles,</td>
<td>Administrators, IR, funders, marketing</td>
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<td>performance of academics, resource</td>
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<td>allocation</td>
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<tr>
<td><strong>Regional &amp; National</strong> (state/provincial): comparisons between systems</td>
<td>Governments, administrators</td>
</tr>
<tr>
<td><strong>International</strong>: ‘world class universities’</td>
<td>National governments (OECD),</td>
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</table>
ARE LEARNING ANALYTICS NEW?

No: testing, assessment, institutional research, retention

Yes: data quantity, models, personalization, adaptivity, techniques, data sources, processing power
Analytics Model

Collection & Acquisition

Storage

Cleaning

Data Sources:
- Datamarts
- LMS
- SIS
- Sensors
- Manual entry

Data Team:
- Sponsor/Stakeholder
- Data scientist
- Programmer
- Statistician
- End user experience (visualization, reporting)

Tools & Techniques of Analysis:
- SNA
- NLP
- Concept Development
- Prediction
- Risk Determination
- Course Sequencing
- Help seeking

Representation & Visualization

Analysis

Integration

Multiple datasets/formats

Structured and unstructured data

Data depends on purpose:
- Marketing
- Advising
- Faculty Impact
- Learning
- Administration
- Institutional Research

Action

Intervention
Optimization
Alerts and warning
Guiding/nudging
Systemic improvements (design, teaching)
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Data loop

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THE TOOLS AND TECHNIQUES OF ANALYTICS ARE OFTEN SEEN AS THE INTENT OF ANALYTICS
Limited interaction. Most are isolated

http://www.snappvis.org/
Introduction forum posts: CCK08

Participants: 178
Posts: 431

Dialogue limited: Group too large?
ANALYTICS SHOULD LEAD TO NEW WAYS OF THINKING AND ACTING
To avoid getting lost in the “mass of inconsequential”

(Bush, 1945)

We still need control, but the points are different than where the education system has assigned them in the past.
BUT, ANALYTICS ARE NOT (SHOULD NOT BE) PRIMARILY A TECHNICAL ACTIVITY...
ALL THE IMPORTANT STUFF WITH ANALYTICS HAPPENS...AFTER WE’VE DONE THE ANALYTICS
i.e. the social processes

Educator intervention
Learner self-regulation
Rethinking teaching
Evaluating learning design
WHY IS SENSEMAKING (AND SOCIAL PROCESSES) SO IMPORTANT?

- Multiple data sets/sources
- Learning is a complex social activity (technical methods do not capture the full scope and nuanced nature of learning)
- Integrated social and technical systems provide diverse and nuanced approaches
Complex systems:
“a set of diverse actors who dynamically interact with one another awash in a sea of feedbacks.”

Miller and Page, 2007
Complexity:

“disturbing traits of mess, of the inextricable, or disorder, of ambiguity, or uncertainty”

Morin, 2008
COHERENCE IS THE THING…
SENSEMAKING

“Sensemaking is a motivated, continuous effort to understand connections . . . in order to anticipate their trajectories and act effectively”

(Klein et al. 2006)
“Sensemaking is about labeling and categorizing to stabilize the streaming of experience”

(Weick et al. 2005: 411)
WE ARE SKILLED AT SENSEMAKING IN SOCIAL SYSTEMS
BUT WE EASILY ACQUIESCE TO TECHNICAL SYSTEMS
LESS SKILLED AT SENSEMAKING THROUGH TECHNOLOGY
(DATA CAN BE KINDA UNSETTLING)

- Target
- Utah spy center
- Military
FOCUSING ANALYTICS

- On the end user experience & related social cognitive/learning needs

(most end users will not be skilled in analytics…the human intervention/social systems need to be reflected in analytics)
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