From Summative Assessments to Quantified Self

The changing scope of Learning Analytics in the era of Big Data

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Drivers of Change, industries overall
Share of respondents rating driver as top trend, %

**DEMOGRAPHIC AND SOCIO-ECONOMIC**

- Changing nature of work, flexible work: 44%
- Middle class in emerging markets: 23%
- Climate change, natural resources: 23%
- Geopolitical volatility: 21%
- Consumer ethics, privacy issues: 16%
- Longevity, ageing societies: 14%
- Young demographics in emerging markets: 13%
- Women's economic power, aspirations: 12%
- Rapid urbanization: 8%

Challenges: Finding Talent

Expected change in ease of recruitment, 2015–2020
Perception rating on a −2 (“very hard”) to +2 (“very easy”) scale

Competing for Talent

Expected change in ease of recruitment, 2015–2020
Perception rating on a −2 (“very hard”) to +2 (“very easy”) scale

Lifelong learning is becoming non-optional

Future workforce strategies, industries overall
Share of respondents pursuing strategy, %

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invest in reskilling current employees</td>
<td>65%</td>
</tr>
<tr>
<td>Support mobility and job rotation</td>
<td>39%</td>
</tr>
<tr>
<td>Collaborate, educational institutions</td>
<td>25%</td>
</tr>
<tr>
<td>Target female talent</td>
<td>25%</td>
</tr>
<tr>
<td>Attract foreign talent</td>
<td>22%</td>
</tr>
<tr>
<td>Offer apprenticeships</td>
<td>22%</td>
</tr>
<tr>
<td>Collaborate, other companies across industries</td>
<td>14%</td>
</tr>
<tr>
<td>Collaborate, other companies in industry</td>
<td>12%</td>
</tr>
<tr>
<td>Target minorities' talent</td>
<td>12%</td>
</tr>
<tr>
<td>Hire more short-term workers</td>
<td>11%</td>
</tr>
</tbody>
</table>

So, what about the supply side?

7% students did not graduate from high school in 2015 (National Center for Education Statistics, 2015)

25% are not college ready (ACT, 2015)

42% do not graduate from 4-year schools within 6 years (NCES, 2015)

36% mal-employment rate for college-grads under 25 (Center for Labor Market Studies, Northwestern U., 2013)

8% unemployment rate of recent graduates (NCES, 2014)
Economic impact of educational shortcomings

$30,000 average student loan debt after graduation

more than 10% of students default on their student loans

$1.1 trillion outstanding loan debt among 37 million Americans

Innovations in learning are poised to solve many different societal and economic problems!
## Important Developments in Educational Technology for Higher Education

### Consumer Technologies
- 3D Video
- Drones
- Electronic Publishing
- Quantified Self
- Robotics

### Internet Technologies
- Bibliometrics and Citation Technologies
- Cloud Computing
- Networked Objects
- Semantic Applications

### Social Media Technologies
- Crowdsourcing
- Online Identity
- Social Networks

### Enabling Technologies
- Affective Computing
- Electrovibration
- Flexible Displays
- Machine Learning
- Mesh Networks

### Learning how to learn how to learn

- Bring Your Own Device (BYOD)
- Flipped Classroom
- Location Intelligence
- Makerspaces
- Preservation/Conservation Technologies

- Learning Analytics and Adaptive Learning
- Mobile Learning
- Online Learning
- Open Content
- Open Licensing
- Virtual and Remote Laboratories

- Information Visualization
- Visual Data Analysis
- Volumetric and Holographic Displays

- Open Hardware
- Speech-to-Speech Translation
- Virtual Assistants
- Wireless Power

Source: NMC Horizon Report, 2016 Higher Education Edition
Important Developments in Educational Technology for Higher Education

• **Time-to-Adoption Horizon: One Year or Less**
  – Bring Your Own Device (BYOD)
  – Learning Analytics and Adaptive Learning

• **Time-to-Adoption Horizon: Two to Three Years**
  – Augmented and Virtual Reality
  – Makerspaces

• **Time-to-Adoption Horizon: Four to Five Years**
  – Affective Computing
  – Robotics

*Source: NMC Horizon Report, 2016 Higher Education Edition*
Learning Analytics::Trends

• From Summative to Formative Assessments
  – From end-of-course to progressions
  – From curriculum-centric to learner-centric
  – From gatekeeper to enabler

• From General Performance to Personal ‘Success’
  – Adaptive Learning
  – Competencies
    • Skills, knowledge, abilities
  – Fit
    • Interests, values, behaviors
  – Self-Discovery
    • From Information to Insight
Learning Analytics::Big Data

- Environment
- Capabilities
- Abilities, Attitudes
Learning Analytics::Challenges

Barriers to adoption and application

• Digital Literacy
  – Learners, Influencers, Teachers, Administrators

• Analytics Literacy
  – Ditto.

• Privacy Angst
Learning Analytics::Challenges

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::Challenges

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Privacy Fears Over Student Data Tracking Lead to InBloom's Shutdown

The collapse of InBloom marks a backlash against the personalized learning industry

Are student privacy laws hurting students?

In Louisiana, a new law bars school districts from sharing personally identifiable information without parental consent. But administrators say the bill goes too far.

Education Data, Student Privacy Take Spotlight at Capitol Hill Hearing
Learning Analytics::Challenges

Barriers to adoption and application

• **Digital Literacy**
  – Learners, Influencers, Teachers, Administrators

• **Analytics Literacy**
  – Ditto.

• **Privacy Angst?**
  – Consumers
Would you exchange your personal data for a coupon from a firm you trust, and if so, how much would you expect?

<table>
<thead>
<tr>
<th>Data Type</th>
<th>% Who Would Sell</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your social security number</td>
<td>9%</td>
<td>$3,656</td>
</tr>
<tr>
<td>Your credit card information</td>
<td>15%</td>
<td>$418</td>
</tr>
<tr>
<td>Your photographs and videos</td>
<td>21%</td>
<td>$62</td>
</tr>
<tr>
<td>Your health history</td>
<td>24%</td>
<td>$962</td>
</tr>
<tr>
<td>Your digital communication history</td>
<td>27%</td>
<td>$263</td>
</tr>
<tr>
<td>Your physical location history</td>
<td>35%</td>
<td>$55</td>
</tr>
<tr>
<td>Your online transaction history</td>
<td>37%</td>
<td>$203</td>
</tr>
<tr>
<td>Your web browsing history</td>
<td>43%</td>
<td>$687</td>
</tr>
<tr>
<td>Your web search history</td>
<td>44%</td>
<td>$108</td>
</tr>
<tr>
<td>Your social profile</td>
<td>49%</td>
<td>$34</td>
</tr>
<tr>
<td>Your online advertising click history</td>
<td>54%</td>
<td>$53</td>
</tr>
<tr>
<td>Your contact information</td>
<td>59%</td>
<td>$90</td>
</tr>
<tr>
<td>Your demographic information</td>
<td></td>
<td>$663</td>
</tr>
</tbody>
</table>
Computing Research Opportunities

• Embedded Digital Literacy
  – 9 elements of digital citizenship

• Holistic Learning Analytics
  – Big Data beyond the classroom

• Data Privacy
  – Protective
  – Analytics-conducive
  – Transparency-supportive

• Systems approach to societal well-being
Systems approach to societal well-being
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