

Research Priorities in Learning Analytics

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Driving Questions / Purpose

Which areas of research are most likely to leverage modern data analytic tools in addressing critical questions in learning:

1. How can we define the educational outcomes, competencies, and habits of mind that are goals for HE?
2. How can these competencies be measured and communicated?
3. How can innovations in approaches to learning (tech & pedagogy) be evaluated?

Invited Workshop Participants

- **Academia:** Faculty with backgrounds in education, data analytics, information, and other areas
- **Industry:** Researchers in businesses providing services in people analytics, recruitment, and job placement
- **Non-Profit:** Representatives of NGOs exploring new approaches to defining, measuring, and communicating competence and skills

Process: 2-Day Workshop

- Introductory session outlined the purpose of the workshop and a brief overview of the topics to be covered (public)
- Two short talks on each of the three topic areas by academic and corporate experts (public)
- Two breakout sessions on each topic area chaired by speakers (private)
- Working dinner with invited speaker for “Reflections of the Landscape”(private)
- Breakout sessions resume for consolidating ideas (private)
- Plenary session discussing breakout session results and outlining next steps (public)

Findings

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- Universities and other post-secondary institutions are not providing prospective employers sufficient/relevant information about their students, including measures of competence (e.g. what they can do vs. what they know) and soft skills. Although employers don't know exactly what they do want...
- There is a demand for 21st century alternatives to standard transcripts and degrees, and increased emphasis on workforce-related skills.
- “People analytics” tries to fill this void using sophisticated data management tools. But this work has not been well documented in the academic research.
- Huge volumes of information are now available about students and workplace performance that can improve the way competence is defined and measured. But dangers lurk: privacy, training AI with biased data.

Principles

- Universities and companies must improve ways to define competencies actually valued in the workplace. New analytics tools can help define characteristics of successful employees.
- New instructional methods can test and communicate a rich set competencies that have meaning for students, employers, and instructors.
- Simulations, apprenticeships, and other strategies can both enrich learning and produce data that can be used to measure a sophisticated range of competencies.
- Competencies should measure what a person can actually do regardless of where skills were acquired– measure outputs not inputs (e.g., courses taken).

Surprises & Tensions

- Issues were often more organizational tensions in HE than tech barriers.
- University and corporate research groups were often not aware of the scope or sophistication of each other's work.
- There is strong commercial interest in recruitment tools that remove biases (race, sex, others) from the process. Can algorithms be more objective than people?
- There was clear concern that automation would replace human judgement in education and that new tools would undermine university goals not linked to employment. Liberal arts might be undervalued. (Although some data shows that liberal arts skills are highly correlated with employment success)

Recommendations

CISE and EHR should find a way to support initiatives in the use of data analytics tools in post-secondary education and encourage academic/corporate collaboration. This would include research directed to:

- Create tools to define the competencies actually valued in the workforce by different employers. Build tools for tracking graduates.
- Address the pathways through and across careers, and the infrastructure needed to support life-long career paths (e.g., “up-skilling”).
- Explore and test valid measures of these competencies, and explore the correlation between these measures and actual workplace performance.
- Explore use of new analytic tools to design instructional systems that can continuously improve based on measured gains. New approaches would include both new technologies (simulation, machine learning), and a range of new strategies – including new ways of combining work and formal instruction