RESEARCH HORIZONS 2016

Katy Börner

Visual Analytics: Empowering Teachers, Students, Researchers, and Leadership

COLLABORATORS
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INDIANA UNIVERSITY
SCHOOL OF INFORMATICS AND COMPUTING

IVMOOC 2017

Learning Analytics

**Empowering Teachers:** How to make sense of the activities of thousands of students? How to guide them?

**Empowering Students:** How to navigate learning materials and develop successful learning collaborations across disciplines and time zones?

**Empowering Researchers:** How do people learn? What pedagogy works (in a MOOC) and when?

**Empowering MOOC Platform Designers:** What technology helps and what hurts?
Visualizing IVMOOC Data

Data was collected from different sources:

- 1,901 students registered via GCB (1215 male/557 female)
- 52,557 slide downloads from our server
- 18,893 video views via YouTube
- 193 accounts made 730 tweets
- 134 students took 183 exams in GCB
- 674 remarks on 215 different forum threads in Drupal
- 64 students submitted projects via Drupal
Student Registration and Activity

1215 male students
557 female students
1215 male students
557 female students

Student Registration and Activity

Male IVOOOC Student Activity

Student Registration and Activity

Novice IVOOOC Student Activity
Student Registration and Activity

Expert IVMOOC Student Activity

Student Client Projects: All Interactions
Custom interactive visualizations of IVMOOC student engagement and performance data, explore functionality online at [http://goo.gl/TYixCn](http://goo.gl/TYixCn)

Figure 1: Analysis types vs. user needs.
Educational Data Science: Precision Learning, Teaching, and Leadership
IU Emerging Area of Research Proposal

“We will develop, validate, and optimize models that explain and help predict the impact of different interventions on student success at IU and in life.”

The Team

• **Katy Borner**, Victor H. Yngve Distinguished Prof of Information Science, ILS, SOIC
• **Raymond Burke**, E.W. Kelley Prof of Marketing, KSB
• **Robert Goldstone**, Chancellor’s Prof, Psychological & Brain Sciences, COAS
• **Dennis Groth**, Vice Provost for Undergraduate Education
• **Daniel Hickey**, Prof, Learning Sciences Program, SoE
• **Michael Kaganovich**, Prof of Economics, Economics, COAS
• **George Rehrey**, PI Consultant with IU’s CiTL; Director of SOTL
• **Anastasia Morrone**, Prof of Educational Psychology, IUPUI School of Education; Associate Vice President for Learning Technologies, OVPIT; Dean of IT at IUPUI
• **Jennifer Meta Robinson**, Prof of Practice, Anthropology, COAS
• **Linda Shepard**, Senior Assistant Vice-Provost for Undergraduate Education; Director of Bloomington Assessment & Research
• **Timothy F. Slaper**, Indiana Business Research Center, IUB
Big Questions

• What would college students, faculty, and other stakeholders do differently if they had easy, first-hand access to the data already created by college life in the information age?
• What wisdom about learning and life could students actualize from pathways visualized through documents, data, code, expertise, laboratory outcomes, class performance, and grades?
• What leverage points for learning could faculty discern and operationalize?
• What interventions should faculty/units/institutions implement for positive gains?

Changes in Higher Education

Today

Tomorrow
The team will perform cutting-edge, interdisciplinary research in **Educational Data Science (EDS)** at the intersection of four research areas:

- **Cognitive Science > Classroom Experiments** investigates the cognitive and social variables, patterns, and leverage points in learning and teaching.
- **Learning Science > Student Support** investigates the impact of curricular interventions on student success at IU and in life.
- **Decision Science: Economics of Higher Education** investigates the economic value of education across scales—from micro to macro.
- **Management/Student Choice Research** investigates the impact of incentives and educational product offerings on short-term and long-term decision making.

**Data Science > Learning Analytics** performs research on data mining, modelling, and visualization techniques that increase “data (visualization) literacy” and data-driven decision making.

**Research Cores**

**Cyberinfrastructure Core**

- Implements novel means to provision sensitive data via secure data enclaves and federated Denodo virtualized databases.
- Develops novel functionality for existing learning management systems (LMS) such as Canvas using LTI and Caliper.
- Uses/extends Tableau to serve actionable dashboards for IU leadership.
Establishing EDS and Ensuring IU Leadership

Capitalizing on existing IU strengths:
• Student Learning Analytics (SLA) Fellows Program
• Scholarship of Teaching and Learning Program
• Learning Technologies, UITS
• Learning Science Research, PBS, COAS
• Cognitive Science Program, IUB
• Learning Sciences Program, School of Education
• Bloomington Assessment and Research (BAR) office
• Indiana Business Research Center, http://ibrc.indiana.edu
• Decision Support Initiative, http://dsi.iu.edu

Proactive collaborations with other institutions:
• Unizin—11-institution digital learning consortium, http://unizin.org
• Bay View Alliance—8-institution Student Learning Analytics (SLA) initiative

THANK YOU

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