LALink: Educational Data Science (Virtual) Demos

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CNS Talk, Social Science Research Commons, Woodburn Hall 200

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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?

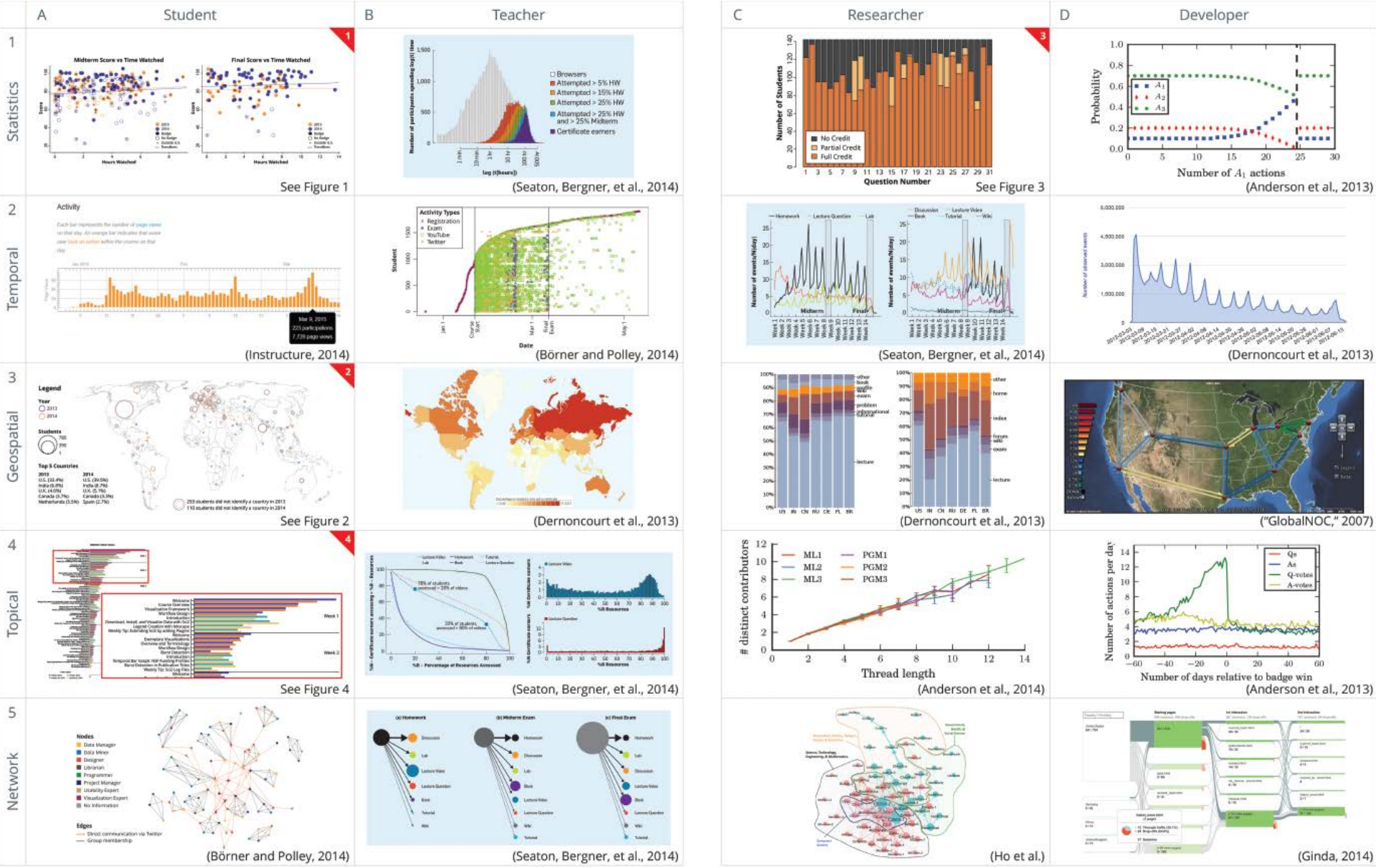

Figure 1: Analysis types vs. user needs.

Emmons, Light, and Börner. "MOOC Visual Analytics: Empowering Teachers, Students, Researchers, and Developers of Massively Open Online Courses". *Journal of the Association for Information Science and Technology (in press)*.

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."

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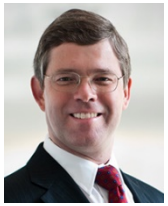
The Team

- **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







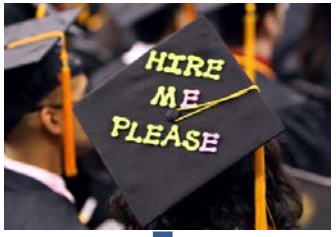

Big Questions

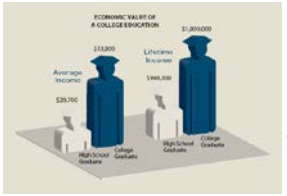
- What would college students, faculty, and other stakeholders do differently if they had easy, first-hand access to the data already created by college life in the information age?
- What wisdom about learning and life could students actualize from pathways visualized through documents, data, code, 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

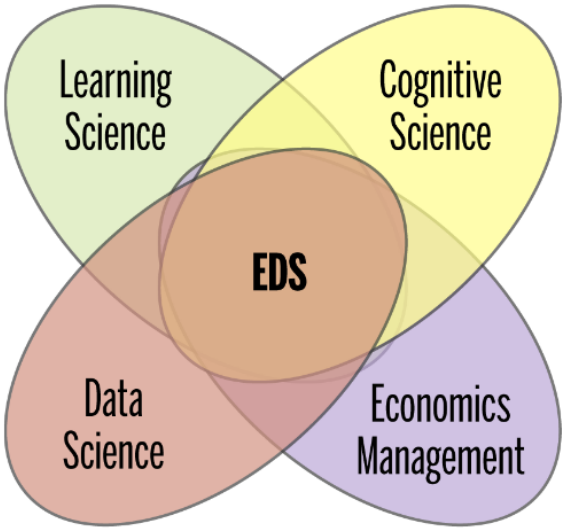




Research Cores

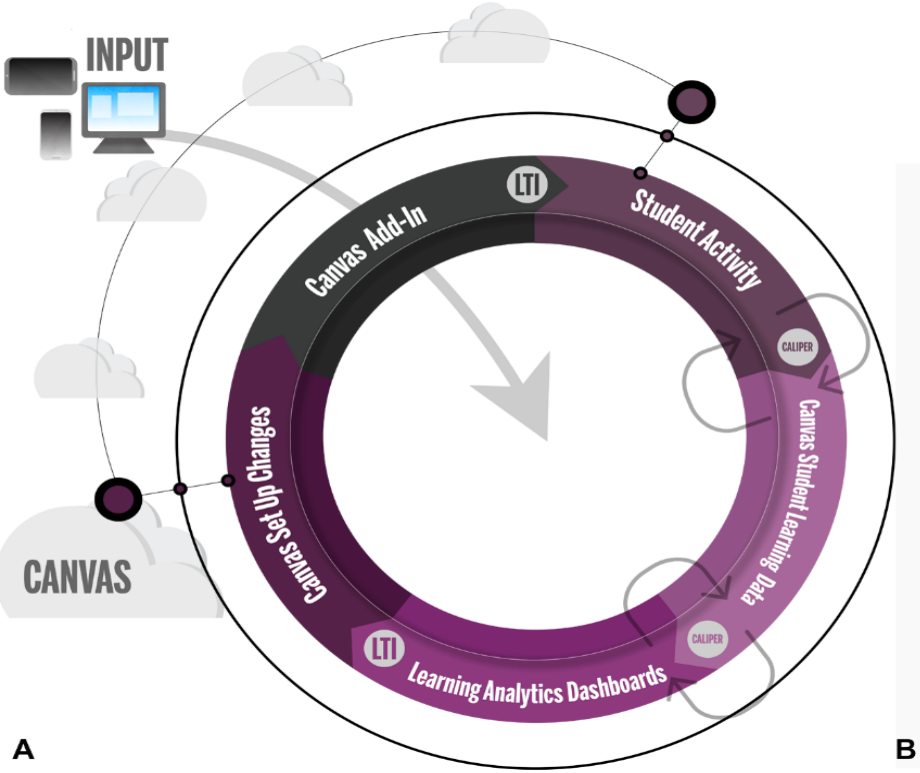
The team will perform cutting-edge, interdisciplinary research in **Educational Data Science (EDS)** at the intersection of four research areas:

- ***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.



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.



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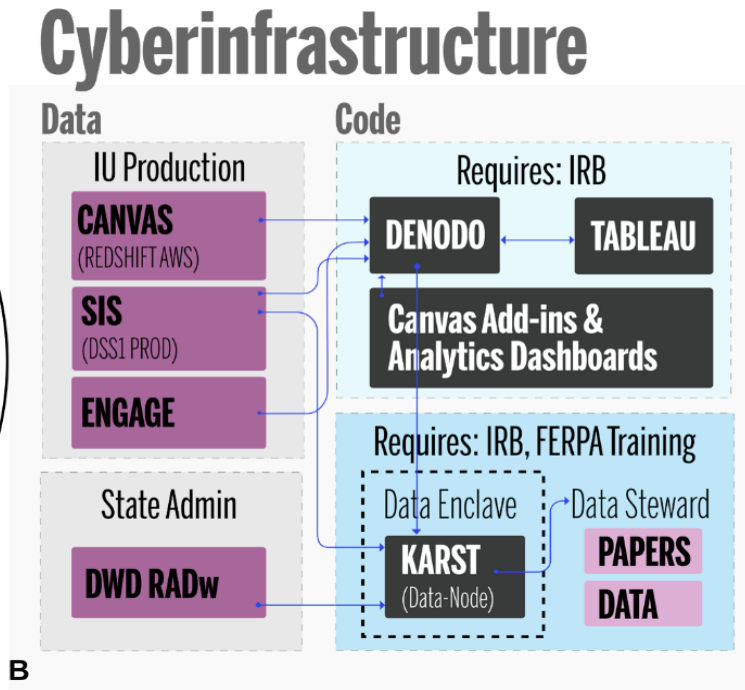

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Establishing EDS and Ensuring IU Leadership

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

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Unizin

Digital Innovation Greenhouse at University of Michigan

Pete Smith, University of Michigan

The University of Michigan has engaged in a breadth approach to learning analytics, and is involved in scholarly activity in the field, applied technology development, and institutional infrastructure investment. In this talk, the rich ecosystem of educational innovation initiatives will be surveyed, with a particular focus on (a) investments in scholarly learning analytics work, including two $1.25M interdisciplinary learning analytics grants funded in part through the UM data science initiative, (b) activities in the Digital Innovation Greenhouse (DIG), which serves as an on-campus education technology accelerator to address this challenge (http://ai.umich.edu/about-ai/digital-innovation-greenhouse), and (c) institutional investment in Unizin and the development of a learning analytics architecture to enable data-driven rescission making.

UTA: Bridging Research and Practice

Christopher Brooks & George Siemens
University of Texas Arlington

Large scale data has resulted in increased interest in learning sciences and related research. Much of this research interest is coming from non-traditional education fields as physicists, biologists, and others begin to analyze the data generated by learners in online and blended environments. A second trend has been to incorporate the practices of business intelligence to improve how universities make decisions about student support, recruitment, and institutional resource allocation. In most universities, the research and the practice of analytics are treated as separate silos. At University of Texas Arlington, we have created an integrated model where our learning analytics research (LINK Research Lab) coordinates extensively with our University Analytics department. This discussion will focus on the components of an integrated research/practice system as well as the challenges and ongoing opportunities.

Learning Analytics Initiatives at Indiana University

Serdar Abaci and Joshua Quick, IUB

We will present the initial developments of learning analytics initiatives at Indiana University at an institutional level. We will also give an overview of our experience in processing, analyzing, visualizing, and interpreting the e-textbook reading behavior data that is available from the Unizin Engage e-text reader and discuss the research implications of studying instructional activity data from digital learning environments such as the Learning Management System (LMS).