6 Ways to Use Learning Analytics: A Functional Taxonomy

Sara Hagen
Collaborative for Engineering Education & Teaching Effectiveness (CEETE)

Sarah Traynor
School of Medicine & Public Health

Sponsored by Educational Innovation & DoIT Academic Technology
This is the 1st event in our learning analytics presentation series this fall.

**SEPT 18**  
6 Ways to Use Learning Analytics: A Functional Taxonomy  
Sara Hagen & Sarah Traynor

**OCT 16**  
The Importance of Meaning: Going Beyond Mixed Methods to Turn Big Data into Real Understanding  
David Williamson Shaffer

**NOV 13**  
TBD

Sponsored by Educational Innovation & DoIT Academic Technology
Evidence-based teaching

Learning Analytics

Blended Learning
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.**

---Society for Learning Analytics Research (SoLAR)

**Agenda:**
- Case Study
- Functional Taxonomy = Purposes
- Discussion
Case Study

- Post-fellowship case study at SMPH
- Approached two block leaders from new medical curriculum
- What do they want to know about their students?

Prework

- Are the students completing prework prior to in-class sessions?
  - Enduring Learning Objects (ELOs)
- Does student prework behavior vary throughout a semester?
- Does student prework behavior vary between Phase 1 and Phase 2?
How students interact with material online should inform block leaders of student behavior, which is an indicator of how they gain knowledge, skills and approach learning.
Learning Locker

• Capturing student behavior- every single click!*
• Student A [attempted, completed] this ELO
• Date/time accessed

* Disclaimer for students on syllabus: "All student activity in the Canvas Learning Management System (LMS) and SMPH Learning Repository is tracked and logged and can be used by the instructor, department, school, or institution for learning analytics to improve the student learning environment."
Functional Taxonomy

- Developed by Nguyen, Gardner, & Sheridan (2017) using machine learning* techniques and based on learning analytics literature

*Machine learning: the science of getting computers to act without being explicitly programmed
Functional Taxonomy

Visualize Learning Activities
Access Learning Behaviors

Predict Student Performance
Individualize Learning

Evaluate Social Learning
Improve Learning Materials & Tools

https://blendedtoolkit.wisc.edu/fellowship/evidence-based-teaching/
Predict Student Performance

- Predict students' success and identify at-risk students
- Early intervention
- Important to establish expectations of Canvas use early.
- Canvas use does not necessarily predict student performance
Access Learning Behavior

• Offers trends of learning engagement

• Click behavior
  • Student behavior in LMS

• Students can modify their learning behavior
Individualize Learning

- Adjustable content
- Based on an assessment or ongoing progress
- Seeks to fill gaps or provide acceleration
- May be based on learning style preference
- Focus on real-time continuous feedback
Visualize Learning Activities

- Tracing all learning activities performed by users in a digital ecosystem
- Produces visual reports on the learning process
- Can support both students and teachers to boost learning motivation, adjust practices

Canvas course analytics – page views & participation

Activity by Date

Fig. 1. Example of class visualizations retrieved from the Total Use of the Platform module
Evaluate Social Learning

- Understanding patterns of interaction
- Student-student and student-instructor
- What does a learning community look like?
- Analyzing and categorizing interactions
- Which interactions are indicative of learning?
Improve Learning Materials & Tools

• Learning analytics offer an objective evaluation of learning materials and tools

• Case study
  • We receive very little feedback from students about our online material
  • Knowing how the students are interacting with these materials online can lead to changes to the materials with each iteration

• Improve organization of Canvas course pages
Questions are Key

How do you choose your questions?

Depends on your . . .

• discipline
• role
• available data
• goals
• focus (course-level, program-level)
Thank you!

https://blendedtoolkit.wisc.edu/fellowship/evidence-based-teaching/

Learning Analytics Presentation Series
Sponsored by Educational Innovation & DoIT Academic Technology