BREAK OUT SESSION

Learning Analytics & Educational Data Mining

Co-leaders
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Overarching Themes

• How can learning analytics support innovations in education?
  – This includes individual and collaborative learning environments, intelligent tutors, open-ended learning environments, adaptive hypermedia, recommender systems, flipped classrooms, Maker spaces, informal/blended learning, Learning @ scale, visual analytics
  – Learning analytics as a change agent for educational innovation

• Focus on Personalized Education
  – What kind of data to collect to support personalized education?
  – Learn about human cognition

• Infrastructure needs to advance learning analytics and educational data mining
  – Access to data/share datasets
  – Access to new/novel techniques for analysis
Overarching Themes

• **What exactly are the Data Sciences?**
  – How do we train a new generation of data scientists?
  – Use the vast amounts of data collected by Flickr, Amazon, etc.

• **Professional development across all levels**
  – Teachers, Researchers

• **Undergraduate education**
  – Develop analytics and mining techniques to support students through their degree curricula
  – What kind of support do we provide?
Recent Success

• Data Collection/Online Analysis/Assessment Reports for Students and Teachers
  – Assisstments: web based intelligent tutor design by Neil Heffernan at WPI
    – widely used
• Analyzing the success of MOOCs
  – Large dropout rates
  – Participation of students and instructors
  – MOOCdb – Common interface to edX & Coursera data
• Data Sharing for Analytics
  – MIT Scratch online Community
  – CMU’s LEARNLAB – microanalysis of student learning with intelligent tutors
• Algorithmic advances
  – From HMMs to Recurrent neural networks to Deep Learning of student models
  – Mining and Analytics to understand students learning behaviors –
    cognitive, metacognitive, affect, and self-regulation processes
• Dashboards for student progress
• The very fact that we are even talking about LA/EDM
Major obstacles

• Educational institutions/administrators have no idea of how to use data collected in any significant way
• Access to data/lack of shared datasets
  – How do we integrate data from multiple sources
  – Lack of standardized formats
  – Need instrumented environments to collect data
• Infrastructure to keep up with novel methods/techniques
• Still haven’t been able to use collected data to develop comprehensive models of “how people learn”
  – What kind of data do we need to support comprehensive personalized learning?
  – Collaborative learning
• Privacy issues
  – Educational institutions are risk averse when it comes to sharing data
• Need Interdisciplinary/Multidisciplinary approaches
  – Domain experts + data science experts
Areas of Neglect

• Interpretive understanding of context
  – Who defines students success (graduating on time/not going to prison?)
  – How do we define learning?

• Professional development
  – Education researchers still largely do not use analytics/data science
  – Practitioners have little knowledge of how to access analytics to support/improve their learning

• Analytics focused on micro-interactions
  – Lack of macro or cross-level understanding

• Policy decisions to support data sharing while preserving privacy and security
Strategic Priorities to Advance Innovation

• Infrastructure
  – Shared data and repositories
  – Shared tools for analysis
  – Building tool chains that support end to end analysis

• Bridging perspectives
  – Need domain experts and end-users involved from the start
  – May require more cross-disciplinary courses and curricula

• Professional development

• Support to Scale-up innovations