Visualizing Interaction: Learning analytics to improve online discourse
Agenda

• Online discourse and collaboration
• Social Network Analysis
• Action Research Project with SNAPP
• Future of discourse learning analytics
• Q and A

Discourse & Online Collaboration

• What is the value of collaboration in an online environment?

• What are the challenges & opportunities do instructors face in facilitating online collaboration?

• To what extent have the roles of instructor and student changed?
The Importance of Collaboration

• To **refine** and **confirm** personal understanding with a community of learners

• To **develop**, **foster**, and **practice** higher-order thinking skills

• To **share** and **co-construct** knowledge to support emerging collectives
Online Collaboration

Challenges
• Increased Workload
• Difficulty of Encouraging and Sustaining High-Level Discourse
• Asynchronous Interactions
• Lack of F2F Connections
• Challenge of Self-Motivation
• Technical Difficulties

Opportunities
• Time Allocated for Thoughtful and Reflective Dialogue
• Permanency of the Written Word
• Tools Available to Facilitate Interaction and Engagement
• Opportunities for Student Agency and Efficacy
Making the Shift in Roles from...

... Traditional Instructor to Guide and Facilitator

... Presumed Authority to Collective Credibility

... Student as Passive Recipient to Active Producer and Co-Creator
“Learning is in social relationships – situations of cooperation with others... Both the learner and the community in which they participate are transformed by the community as a complementary unit that work in harmony to promote learning...”

(Dooley, Lindner, Dooley, & Murphy, 2005, p. 49)
Community of Inquiry

- Social Presence
- Setting Climate
- Teaching Presence
- Supporting Discourse
- Selecting Content
- Cognitive Presence

Educational Experience

Communication Medium
SNA Concepts: Centrality
Centrality

Source: http://socialmedialab.ca/wp-content/uploads/2011/02/Fig.1.jpg
Frequency of Interaction between specific users

Supreme Court Data

How often judges voted the same way across all 10 years of the Rehnquist Court
Information Brokers

Acquaintance network

Acquaintance ties among drug injectors on streets of Hartford
Contagious Happiness
A new study finds that a person's happiness is influenced by the happiness of close friends and family, and to a lesser extent by the friends of friends, up to three degrees of separation.

Happiness in clusters
The diagram above shows the relationships among 1,020 people in 2000. Groups of happy and unhappy people are visible as light and dark clusters.

Sources: James H. Fowler; Nicholas A. Christakis; BMJ

http://katelivesonamat.wordpress.com/
SNA and Online Discourse

• Very little SNA research on online learning and discourse

SNA/Online Discussion: General Findings:
• More evenly distributed activity beneficial
• Low hierarchical structures better (groups interacting, teacher not playing central role)
• More interaction not necessarily better (density)

Social Networks Adapting Pedagogical Practice (SNAPP)
What SNAPP can tell you

Other SNAPP metrics

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Dawson et al findings: Instructor use

“extremely effective in promoting reflection on teaching activities and rapidly assessing overall effectiveness.”

“However, teachers require additional support and training to better understand the relationship between their implemented online learning activities and the resultant online student behavior...”

Interpretation and Learning Design

“Future research and professional development should seek to merge *learning design* with learning analytics and data interpretation. A sound understanding of learning design principles will greatly assist academics in better interpreting the learning analytics data into informed pedagogical action”.
Research Questions

1. How does SNAPP fit within a model of faculty professional development around online teaching and course design?

2. Diagram patterns compare with Dawson et al?

3. Other methods to determine interaction quality?
Action Research Steps

1. Create visual taxonomy
2. Choose instructors
3. Collect data
4. Send “Visual Key” and “Custom Report”
5. Interview instructors
6. Follow-up with instructors
Visual Taxonomy
Instructor-Led
Learning Community
Combined Patterns
Learning Community with strong instructor presence
Emerging Learning Community
Emerging Learning Community with strong instructor presence
Weak Learning Community
Learning Community Development
Two Facilitation Styles
Facilitator Role: Central vs Peripheral

Instructors critical to success of discussion

- Blignaut & Trollip, 2003; Ferdig & Roehler, 2004; Greenlaw & DeLoach, 2003; Love, 2002; Roblyer & Wiencke, 2003; Kearsley, 2000; Arnold & Ducate, 2006; Darabi et al., 2011; Ertmer et al., 2011; Liu & Yang, 2012;

Instructors should take a back seat, let students construct own knowledge

Learner Population: Undergraduate Business

Typical Pattern: Learning Community with strong instructor presence

Intervention Suggestions: Reduce/eliminate instructor postings, add summary or “weave” following discussion, use student-led facilitation, organize discussions with use of titled posts.

Intervention Plans: Reduce instructor posting in some discussions and better organize initial posts.
Instructor: High Centrality, Low In-Degree
Lessons Learned

• Potential of SNAPP
• Discourse tools
• Focus on design
• What human infrastructure support do you need to consider when implementing L.A.?
• Which departments or support personnel should be involved?
• What types of expertise are required?
• How can we extract value from LMS systems data to improve learning?
Future of discourse learning analytics

Source: http://www.studentsoftheworld.info/sites/people/32917.php
Centrality: Two Views
Group interaction over time
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Individual Discussion Thread: Click on edges

Lu

Had a quick look at your presentation. I found it interesting to read about your being a "guardian". One of my team members once told me that I was like the rudder of a ship, keeping the boat on a stable course, especially in rough waters.

Take care and have a nice evening.

Arianna
Natural Language Processing
Dan Jurafsky, Professor. Christopher Manning, Associate Professor

Language Technology
making good progress

mostly solved

Sentiment analysis
Best roast chicken in San Francisco!
The waiter ignored us for 20 minutes.

Coreference resolution
Carter told Mubarak he shouldn’t run again.

Word sense disambiguation (WSD)
I need new batteries for my mouse.

Parsing
I can see Alcatraz from the window!

Machine translation (MT)
The 13th Shanghai International Film Festival...

Information extraction (IE)
You’re invited to our dinner party, Friday May 27 at 8:30

still really hard

Question answering (QA)
Q. How effective is ibuprofen in reducing fever in patients with acute febrile illness?

Paraphrase
XYZ acquired ABC yesterday
ABC has been taken over by XYZ

Summarization
The Dow Jones is up
Economy is good

Dialog
Where is Citizen Kane playing in SF?
Castro Theatre at 7:30. Do you want a ticket?

https://www.coursera.org/course/nlp
Automated Analysis of discourse

Discourse analysis with Xerox Incremental Parser (XIP)

Detection of salient sentences based on rhetorical markers:

**BACKGROUND KNOWLEDGE:**
Recent studies indicate ...
... the previously proposed ...
... is universally accepted ...

**CONTRASTING IDEAS:**
... unorthodox view resolves ...
paradoxes ...
In contrast with previous hypotheses ...
... inconsistent with past findings ...

**GENERALIZING:**
... emerging as a promising approach
Our understanding ... has grown exponentially ...
... growing recognition of the importance ...

**NOVELTY:**
... new insights provide direct evidence ...
... we suggest a new ... approach ...
... results define a novel role ...

**SIGNIFICANCE:**
studies ... have provided important advances
Knowledge ... is crucial for ...
understanding
valuable information ... from studies

**OPEN QUESTION:**
... little is known ...
... role ... has been elusive
Current data is insufficient ...

**SUMMARIZING:**
The goal of this study ...
Here, we show ...
Altogether, our results ... indicate

Learning Analytics: Notes On the Future of Learning Analytics, Buckingham, S.
“...a major class of learning analytic will emerge at the intersection of research into learning dynamics, deliberation platforms, and computational linguistics. These learning analytics... generate information displays that help learners and/or educators to understand where significant discourse patterns are happening and that support interventions to improve discourse for learning.”
Student Success System: Desire2Learn
• How should you prepare to deal with Learning Analytics tools appearing in new systems?
• Are off-the-shelf tools appropriate for your institution?
“The ties between people make the whole greater than the sum of its parts”

Nicholas Kristof, Sociologist