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Analysis of Asynchronous Discourse in Web-assisted and Web-based Courses

David A. Thomas & Cleborne D. Maddux

University of Nevada, Reno

The capacity of instructors to improve online discourse is dependent on their understanding of its evolving structure and content. Social network analysis and discourse analysis provide methodological and technological means for effectively using online course data to identify and characterize evolving structural and substantive aspects of student communication. Timely information of this sort might be used by instructors to reassign struggling or discontented individuals to different groups, to reconfigure groups and/or tasks to optimize emerging capabilities and insights, and to form a leadership team consisting of individuals from each student group. This paper examines current and emerging methodologies and technologies for meeting these challenges.

Keywords: *Discourse, Online, Analysis*

DISCOURSE IN ONLINE LEARNING

More and more, post-secondary education is supplementing or replacing classroom discourse with online discourse situated in course management tools such as *Blackboard* and *Moodle* and Web 2.0 applications that promote social networking.

While course management tools are well-understood and widely known, there is no universally-accepted definition of Web 2.0 applications. In fact, Liu and Maddux (in press) found that a Google search with the key words "Web 2.0 definition" resulted in more than 1,650,000 "hits." Definitions of Web 2.0 applications vary widely, but most refer to the fact that they allow users to add to or change the content of what is made available on the Internet. Thus, they have the potential to transform Web use from a passive, one-way process of information reception to an interactive, collaborative process of information manipulation and production that emulates (or even improves upon) what often takes place in face-to-face human encounters. Liu and Maddux (in press) surveyed the literature and list examples of Web 2.0 applications such as *blogs, wikis, multimedia sharing services, content syndication, podcasting* and *content tagging services*.

Professionals in many disciplines are working to make use of these new applications to facilitate collaboration among distributed human resource networks. This revolution in information technology is taking place because of the emerging consensus that our societal, economic, and individual futures depend on our capacity to engage complex issues, challenges, and opportunities in a bold, productive, collaborative manner.

David Thomas is Professor in the Department of Curriculum, Teaching, and Learning at the University of Nevada-Reno. Cleborne D. Maddux is a Professor in the Counseling and Educational Psychology Department, at the University of Nevada-Reno. Please send all correspondence to Dr. Thomas at 4001 William Raggio Building, College of Education, University of Nevada-Reno, Reno, NV 89577, dthomas3@unr.edu, 775-327-5215.

In the case of Science, Technology, Engineering, and Mathematics (STEM) education, we must do more than challenge students to master the content of their chosen disciplines. We must help them develop the communication and collaboration skills that characterize modern professional and R &D subcultures. The capacity of instructors and researchers to promote the development of these skills in online discourse is dependent on their understanding of its evolving structure and content. In courses where dozens (or hundreds) of messages are posted every week, instructors may fail to note the emergence of important and highly influential communication roles among their students. This can happen because instructors can become overly focused on the ongoing task of responding to the routine needs and demands of their students. The problem is compounded as declining educational budgets result in pressure for instructors to accept larger and larger online classes. The press of these and many other time-consuming tasks can easily obscure the evolving structure of student roles within the group. Instructors may not realize that some students are beginning to function as leaders, others as isolates, and still others as members of cliques. This would constitute a failure to recognize and make strategic use of *the structural aspects of communication*. It may be equally difficult for instructors to perceive the emergence of powerful new ideas, which would constitute a failure to recognize and make strategic use of *the content of communication*. This paper examines current and emerging methodologies and technologies for addressing these problems.

ONLINE COMMUNITIES OF LEARNING

Garrison (2006) emphasizes the importance of reflection and discourse in online learning, scientific inquiry, and other collaborative pursuits. Common forms of online asynchronous communication include email, blogs, and threaded discussion forums. In face-to-face environments, verbal agility, spontaneity, and confidence may determine who speaks and who listens. Online discourse, on the other hand, may be motivated and facilitated in ways that promote thoughtful reflection and systematic discourse. Indeed, there is growing evidence that online asynchronous communication can promote collaboration, discourse, and community among university students and do so more effectively than communication in on-campus courses. Asynchronous communication may result in more "group-centered" interaction patterns while face-to-face communication is frequently more "authority-centered" (Lobel, Neubauer, & Swedburg, 2005). However, few high school students have access to asynchronous learning environments of any sort (Redmond & Lock, 2006).

One of the leading learning theories situated in asynchronous learning environments is the *Community of Inquiry* model (Arbaugh, 2007; Garrison, Anderson, & Archer, 2000). In this model, teaching and learning take place in an environment that can be described in terms of its cognitive presence, social presence, and teaching presence (see Figure 1).

In the Community of Inquiry model, cognitive presence is the extent to which the participants are able to construct meaning through sustained communication. Social presence is the ability of learners to project their personal characteristics into the community of inquiry, thereby presenting themselves as 'real people.' Teaching presence is the design, facilitation, and direction of cognitive and social processes for the purpose of realizing learning outcomes.

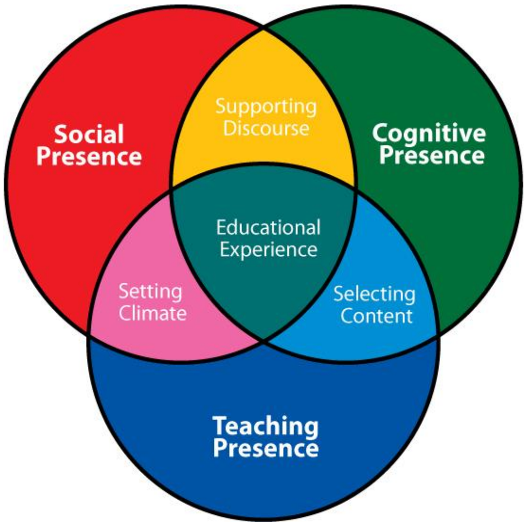

Figure 1. Community of Inquiry Model

The Community of Inquiry model resonates with a social constructivist view of learning (Lapadat, 2002), which states that knowledge is not handed down by instructors, but is constructed by students as they engage course content and one another in discourse. In asynchronous learning networks (ALNs), informal conversations and other social behaviors can be used to create and maintain a sense of community (Hoadley & Pea, 2002). These kinds of conversations contribute to the social presence of the ALN. However, if the main purpose of an ALN is to enhance cognitive presence, mechanisms are needed to ensure that the social aspects of discourse do not detract from or supplant the cognitive agenda. Research on ALNs has shown that there are problems related to the quantity and quality of online interactions. These problems can undermine inquiry goals (van Aalst, 2006). With regard to quantity, Guzdial and Turns (2000) studied 35 online university courses and reported an average of only 4.8 notes (messages) sent per student over 10 weeks. With regard to quality, Hewitt (2003) found that students rarely revisited a note once they had read it and they rarely returned to a discussion thread once they had read most of the notes in that thread. Similarly, online discussions have been found to focus primarily on facts rather than causal explanations (Hakkarainen, Lipponen & Järvelä, 2002; Lipponen, 2000). Because of these and other findings, we may need to rethink the purpose and nature of the work that students do online, moving from a focus on discussion to an emphasis on a variety of collaborative activities (van Aalst, 2006). The time may have come to shift the emphasis of social psychology research to the question of how to enable groups to achieve greater quality in problem solving (Witte, 2007).

KNOWLEDGE CREATION AND IMPROVEMENT

A key notion in the development of new models of online learning is that of distributed cognition (Karasavvidis, 2002). Rogers (2005) describes distributed cognition as a theory involving the interactions between people, artifacts, and internal and external representations. Pea (1993) argues that the concept of intelligence should not be thought of as a property of mind alone and should include the artifacts and tools that we use to represent complex thoughts and to alleviate tedious and burdensome cognitive tasks. In this context, collaborative knowledge creation may be viewed as a process occurring in the distributed cognition of a team of human collaborators and all of the representations, tools, and other technical aides used.

The effect of this frame of reference is to emphasize the importance of the manner in which ideas are shared, refined, extended, and tested. For example, Pea (1993) argued that with the help of imaging software, computers can be used to augment the skill of visualization and consequently contribute to the understanding of complex relationships in a way that would have been impossible without them. In order to facilitate collaborative knowledge creation, strategies and tools are needed that make clear at any time what has been learned, what is of current interest, and what opportunities for inquiry remain. Strategies might include note development procedures that summarize previous ideas and introduce new concepts, reuse of notes for new purposes, and personalizing or annotating the emerging knowledge base. In other words, a new conceptualization of online work is needed. In this new conceptualization, discussion should not play the central role. Instead, emphasis would be on a variety of activities intended to iteratively improve the ideas of members in a learning community (van Aalst, 2006).

For instance, in scientific inquiry the main goal is to advance the frontier of knowledge. This requires the creation and improvement of ideas new to the discipline. Scardamalia and Bereiter (2003) call this type of inquiry 'knowledge building.' There is growing evidence that students in elementary school and above are capable of participating in knowledge building in ways that develop their natural curiosity (Bereiter, 2002; Scardamalia, 2002). The key question is whether students understand the discourse they are engaged in as a method for producing new knowledge. In other words, do they treat ideas as objects of inquiry that can be improved by scrutiny, debate, testing and modification (Bereiter, 2002)? If they do, students may also recognize that disciplinary knowledge (e.g., the content of textbooks) has been produced this way. Rather than seeing expert knowledge as certain and complete, they may see it as improvable. Such positions are consistent with the highest stage of King and Kitchener's Reflective Judgment Model, a model that describes the development of critical thinking in adolescence and adulthood (King & Kitchener, 1994).

COLLABORATIVE TEAMS

Collaboration is critical because team cognitive properties and processes amount to more than the sum of the properties and processes of the individuals that comprise that team (Hutchins, 1991; Hinsz, Tindale, & Vollrath, 1997; Levine, Resnick, & Higgins, 1993). Researchers have suggested that the team itself may be considered a cognitive or information processing unit (Hinsz et al., 1997), another expression of the concept of distributed cognition in which team coordination and communication are critical aspects of team performance (Brannick & Prince, 1997). Witte (2007) identifies several strategies shown to improve team performance.

- The higher the quality of individual input regarding the subject matter at the beginning of the group interaction, the higher the quality of the group performance (Grofman, 1978; Lorge & Solomon, 1955; Sorkin, Hays, & West, 2001);
- The more individual inputs are independent of one another at the beginning of the group interaction, the higher the quality of the group performance (Sorkin et al., 2001).
- The more the group increases individual independent inputs, the higher the quality of the group performance (Hinsz et al., 1997);
- The more comprehensible the individual input is for each group member, the higher the quality of the group performance (Libby, Trotman, & Zimmer, 1987);
- The more high quality individual input influences the final group decision, the higher the quality of the group performance (Littlepage, Schmidt, Whisler, & Frost, 1995).

Witte goes on to note that normative influences on group performance (e.g., "group think;" "majority wins") processes can manipulate and distort the integration of individual input (Hinsz et al., 1997) and should therefore be reduced to a minimum. Consequently, collaborative teams should strive to:

- Maximize the informational influence on the group performance process;
- Minimize the normative influence on the group performance process; and
- Optimize the influence of individual input on the final group decision.

In this approach, the role of the facilitator is to ask leading questions, such as "What additional data would you need to explore that conjecture?" or "How could you justify that conclusion?" Facilitators may also provide information on general principles and practices of interest to all of the teams. They should not "help" teams as they struggle with their respective research hypotheses, designs, analyses, and document drafts. This suggestion is echoed by Simonsen and Banfield (2006).

In summary, the improvement of online discourse in collaborative settings should take into account the following research findings:

- Students given appropriate training are capable of collaborative inquiry.
- Collaborative learning should motivate and facilitate team discourse focused on knowledge development and improvement.
- Knowledge development and improvement in collaborative teams is best served when individual participants contribute their insights and expertise continuously.
- Technology-based collaboration tools are needed that facilitate the reuse of information by team members as knowledge emerges and evolves in team discourse.
- Knowledge construction may be thought of as occurring in a distributed knowledge, information, and computing space encompassing the individual team members and all of the information resources, modeling tools, and artifacts employed.

THE STRUCTURE OF ASYNCHRONOUS DISCOURSE

In ALNs, information flows between students and teachers in a variety of formats including threaded discussions and documents. Researchers seeking to understand the dynamics of this exchange and its associated cognitive and social outcomes often focus on either structure or content. For instance, in the process of communicating with one another in asynchronous threaded discussions, we know that students create implicit networks of relations with one another (Aviv, Erlich, Ravid, & Geva, 2003). Typically, communication networks include emergent structural features that appear and evolve over time with different individuals playing different roles. In responding to one another, students occasionally play a role known as *information broker*. Those who play the role of *coordinator* facilitate within their own study group. Those who are *gatekeepers* receive communication from other groups and pass it along to their own group members. *Representatives* pass on ideas to other groups, while *itinerants* act as facilitators between two or more individuals of another group. *Liaisons* facilitate communication between individuals in two groups.

By studying the connectivity structures of these networks, researchers may probe the underlying mechanisms that establish and maintain the networks, making possible the development of theories that explain their emergence (Contractor, Wasserman, & Faust, 2007; Monge & Contractor, 2003). Social network analysis (SNA) provides both a visual and a mathematical context for analyzing the structure of asynchronous online communication (Wasserman & Faust, 1994). This method has been used to analyze online collaborative learning communities (Aviv, Erlich, & Ravid, 2005) and to correlate network structures with knowledge construction (Aviv et al., 2003).

Network relations may be represented using a student response relation matrix, illustrated using the fictional data seen in Table 1. In this table, cell *(i,j)* indicates how many times the *i*-th (row) learner responded to postings by the *j*-th (column) learner during asynchronous communications. For example, learner 3 responded 6 times to the postings of learner 1. Notice that this matrix is not symmetrical. That is, not all learners engage one another in the same ways. Data of this sort may be obtained directly from server logs and/or compiled reports generated by discussion forum software.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.0	15.0	7.0	10.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	20.0	0.0	5.0	6.0	17.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	6.0	3.0	0.0	2.0	7.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	8.0	4.0	1.0	0.0	19.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6.0	13.0	4.0	18.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1.0	0.0	0.0	0.0	2.0	0.0	8.0	5.0	11.0	7.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	1.0	0.0	7.0	0.0	4.0	4.0	6.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	1.0	0.0	7.0	3.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0
9	1.0	0.0	1.0	0.0	0.0	4.0	3.0	5.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	1.0	0.0	9.0	8.0	5.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	1.0	2.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	3.0	3.0	3.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	2.0	2.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	2.0	0.0	2.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	0.0

Table 1. Fictional Response Data

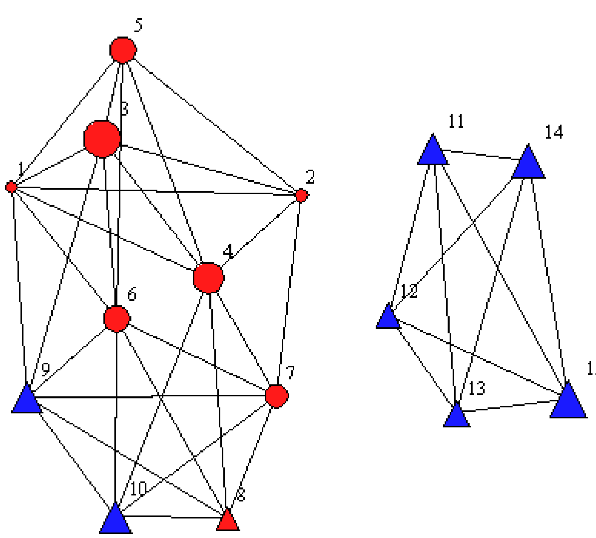

Figure 2. Structure of Student Discourse.

Graphical representations of this sort of data may be obtained using SNA software, such as *NetMiner* (Cryam, 2007). Figure 2 shows how *NetMiner* visualizes the data presented in Table 1. In this visualization, gender is coded by shape (i.e., circles for males and triangles for females), assigned discussion groups are coded by color (i.e., group 1 in red and group 2 in blue), and age is coded by size (i.e., older students appear as larger shapes). This visualization shows that three female students (blue triangles # 8, 9, and 10) participated in the male discussion group (red) rather than their assigned female group. It also shows that some students communicated with 6 or more of their peers (e.g., #1, 3, 4, 6, 7, 9), while every student communicated with at least 4 peers.

In addition to response data, student attribute data may also be incorporated in analyses. Table 2 shows the gender, group assignment, examination score, project score, and age of the same 15 fictional students seen in Table 1. This data may be analyzed using well-established statistical methods. In the case of many SNA tools, these analyses may be conducted within the same data management and analysis environment used to create the visualization seen in Figure 2. For instance, *NetMiner* (Cryam, 2007) may be used to test the null hypothesis that examination performance is unrelated to gender. The output of that analysis is seen in Table 3 and the result provides no evidence for the rejection of the null hypothesis ($p > .05$).

Table 2. Fictional Attribute Data

	Gender	Groups	Exam	Project	Age
1	1.0	1.0	75.0	1.0	20.0
2	1.0	1.0	80.0	1.0	24.0
3	1.0	1.0	92.0	1.0	61.0
4	1.0	1.0	50.0	1.0	50.0
5	1.0	1.0	78.0	1.0	44.0
6	1.0	1.0	80.0	1.0	42.0
7	1.0	1.0	87.0	1.0	37.0
8	2.0	1.0	79.0	2.0	39.0
9	2.0	2.0	70.0	1.0	50.0
10	2.0	2.0	55.0	1.0	52.0
11	2.0	2.0	99.0	1.0	49.0
12	2.0	2.0	100.0	1.0	40.0
13	2.0	2.0	87.0	1.0	44.0
14	2.0	2.0	80.0	2.0	54.0
15	2.0	2.0	68.0	1.0	60.0

Table 3. NetMiner Analysis of Attribute Data

Statistics: ANOVA - Vector

ANALYSIS DATA OVERVIEW

TITLE	C:\Documents and Settings\dthomas3\Desktop\Cleb Data\sampledata1.xls		
ATTRIBUTE VARIABLES	Categorical Vector : Gender Continuous Vector : Exam		
# OF NODES	15		
TRANSFORM HISTORY			
C > \Documents and Settings\dthomas3\Desktop\Cleb Data\sampledata1.xls			

RESULT OF ANOVA VECTOR

Source of variation	Sum of Squares	d.f.	Mean Square
Between groups	20.119	1	20.119
Within groups	2,755.214	13	211.94
Totals	2,775.333	14	

Normal Test

Eta-Square	F ratio	p
0.007	0.095	0.763

Thomas, Li, Knott, and Li (2008) used a similar approach to analyze over 1500 messages spanning three undergraduate, web-assisted mathematics courses. Thomas et al. (2008) found that the structure of student discourse in these courses was strongly related to individual student achievement on course examinations (e.g., r^2 statistics in different courses ranging from 0.50 to 0.70). That is, without examining what students actually said to each other, the structure of their discourse strongly suggested which students were succeeding and which were struggling.

The Content of Asynchronous Discourse

The previous section has attempted to establish the importance of studying and understanding the nature and function of the social networks that operate in human encounters in general and in student and instructor online encounters in particular. While it is critically important in teaching and learning to understand how information flows between students and teachers, and how student roles influence and are, in turn, influenced by these processes, it is imperative that we situate our understanding within the context of *what* is being communicated. In other words, we must understand how the way we communicate influences teaching and learning, but we must also take what is being communicated into consideration. As stated earlier in this paper, researchers seeking to understand the dynamics of information exchange and associated cognitive and social outcomes often focus on the structure and/or content of what is being communicated.

The pursuit of knowledge about the content of communications is called *discourse analysis*. There is no widely-agreed-upon definition of discourse analysis, partly because the term is used quite differently across a wide variety of disciplines. In extremely general terms, however, it can be said that discourse analysis is the study of the way language is used among a group of individuals. Chimambo and Roseberry (1998) take such a general approach and define it as: "A methodology for examining texts and the communicative process that gives rise to them" (p. ix). The term has a more specific meaning in the field of education. Bloome et al. (2005) call their approach to discourse analysis in education a social linguistic or social interactional approach, which "combines attention to how people use language and other systems of communication in constructing language and literacy events in classrooms with attention to social, cultural, and political processes" (p. xv).

A useful software tool for discourse analysis is called Leximancer (Leximancer, 2008). Leximancer can carry out thematic or conceptual analysis, which identifies and counts concepts within any text. Semantic or relational analysis can also be carried out, and a semantic concept map can be produced. Such a map visually illustrates connections and co-occurrances among concepts (Liu & Maddux, in press; Bluesine Consulting, 2005; Weber, 1990). Users exercise a great deal of control and can set, among other things, the size of analysis blocks, sensitivity, and whether or not tables and lists are to be included or excluded from the analysis.

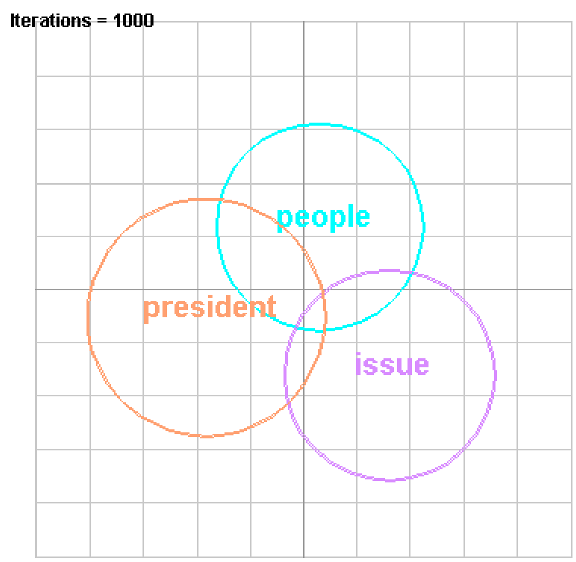

Figure 3. Leximancer Analysis of Principal Themes

Figure 3 shows the Leximancer concept map produced from analysis of the published text of the January 31, 2008 CNN debate between Barack Obama and Hillary Clinton. The text was first edited to make it consistent with Leximancer analysis. Leximancer was then used to search for main themes and produced the following visual depiction of main topics covered. The three main concepts extracted were people, president, and issue, and the overlap among these concepts are pictured through the use of the overlapping circles. The next step was to direct the software to add the speaker tags. Figure 4 shows the same concept map with seed concepts and speakers added.

What the Concept Map means:

- The brightness of a concept is related to its frequency (i.e., the brighter the concept, the more often it appears in the text).
- The brightness of links relate to how often the two connected concepts co-occur closely within the text.
- Nearness in the map indicates that two concepts appear in similar conceptual contexts (i.e. they co-occur with similar other concepts)

In Figure 4, the speaker's icons, TG_Clinton_TG and TG_Obama_TG, appear on opposite sides of the figure and closer to different themes. This orientation indicates that Clinton framed most of her responses in terms of the presidency and that office's role in dealing with specific problems. On the other hand, Obama framed his comments in terms of issues facing the American people. By clicking on any given concept (e.g., war), Leximancer shows all other concepts that co-occur with that concept. For instance, Figure 5 shows the connections to or co-occurences of concepts with the concept *war*.

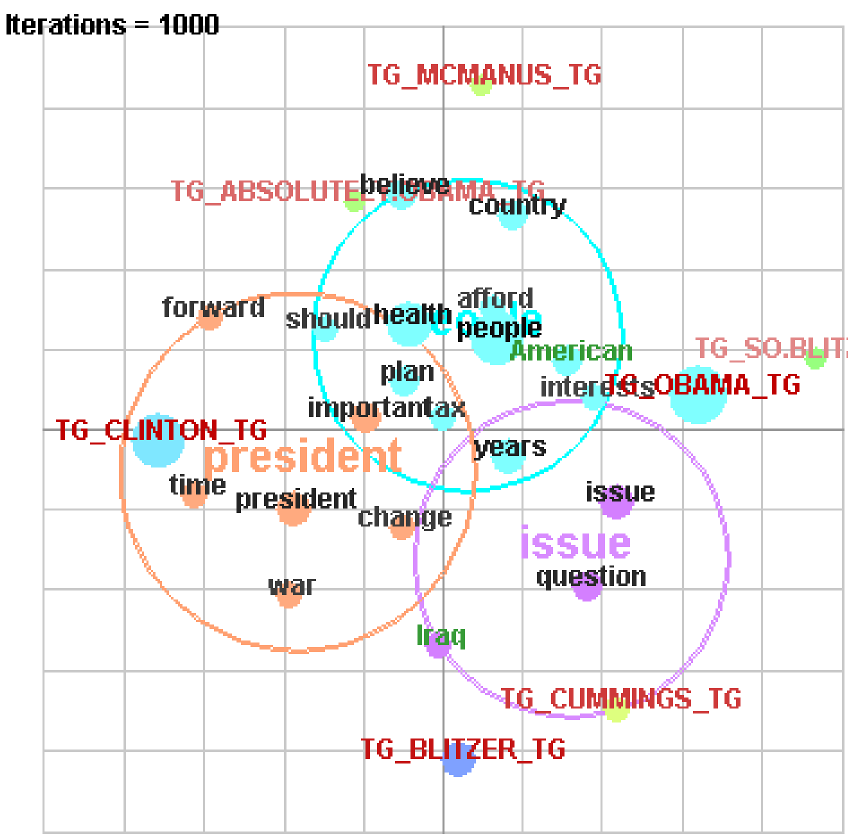

Figure 4. Principle Concepts and Speakers

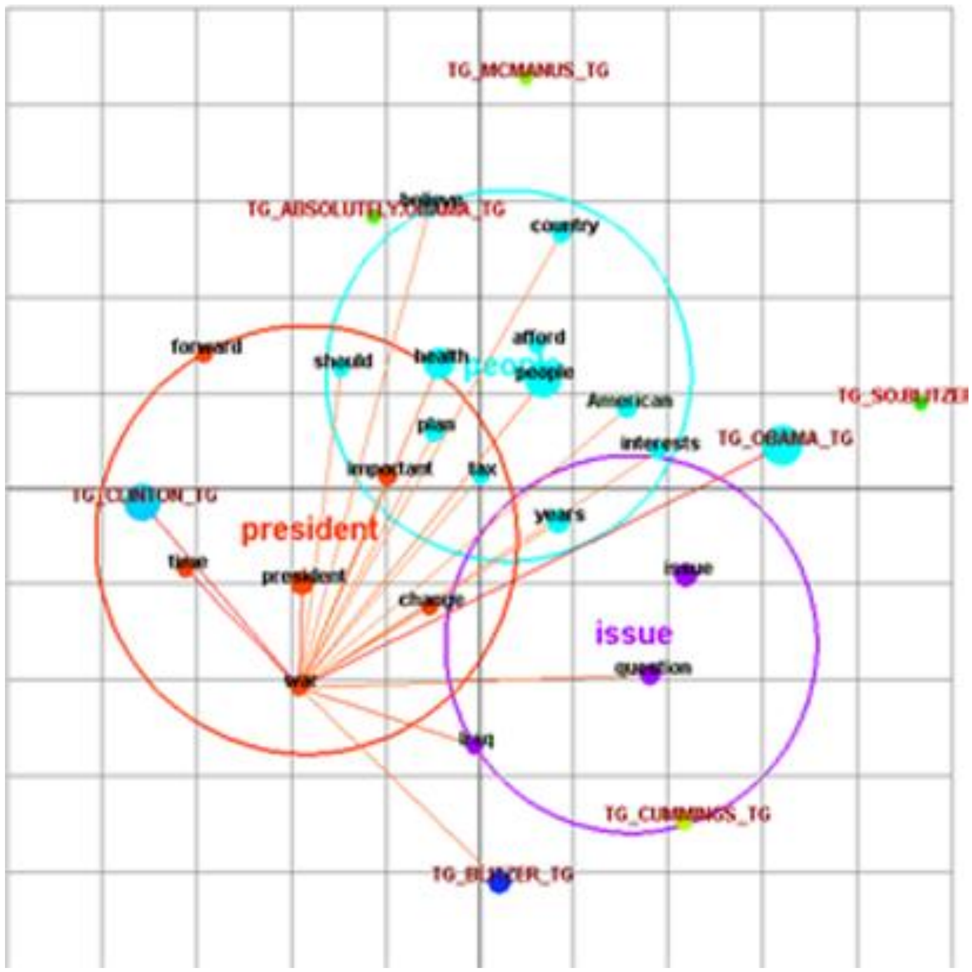

Figure 5. Co-occurrence of Concepts

Related Entities (and locations). (Count: 19)

Click on the **buttons** to browse the evidence

Concept	Absolute Count	Relative Count
TG_OBAMA_TG	9	60%
TG_CLINTON_TG	8	53.3%
time	6	40%
president	4	26.6%
Iraq	3	20%
health	2	13.3%
TG_BLITZER_TG	2	13.3%
people	2	13.3%
question	2	13.3%
tax	1	6.6%
interests	1	6.6%
should	1	6.6%
years	1	6.6%
plan	1	6.6%

Figure 6. Relative Frequencies of Co-occurrence

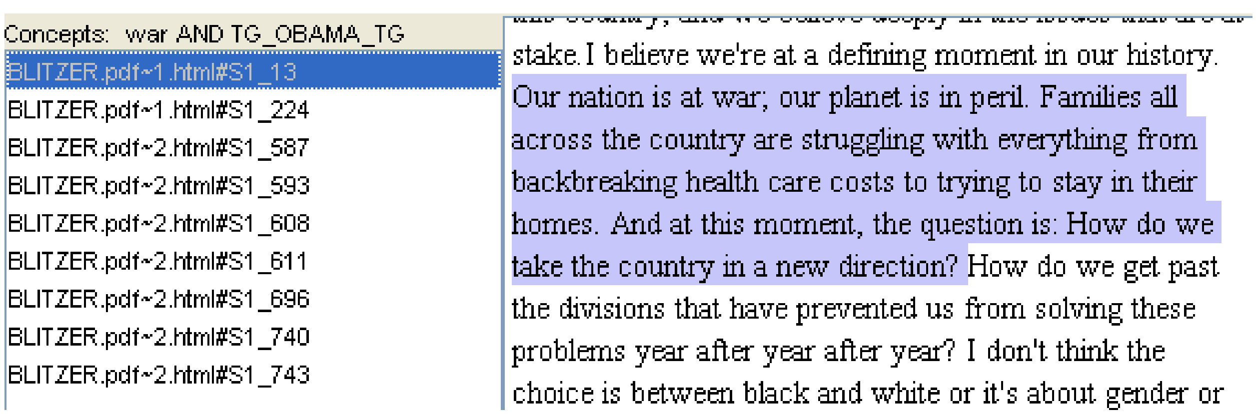

Figure 7. Links to Co-occurrences in the Original Text

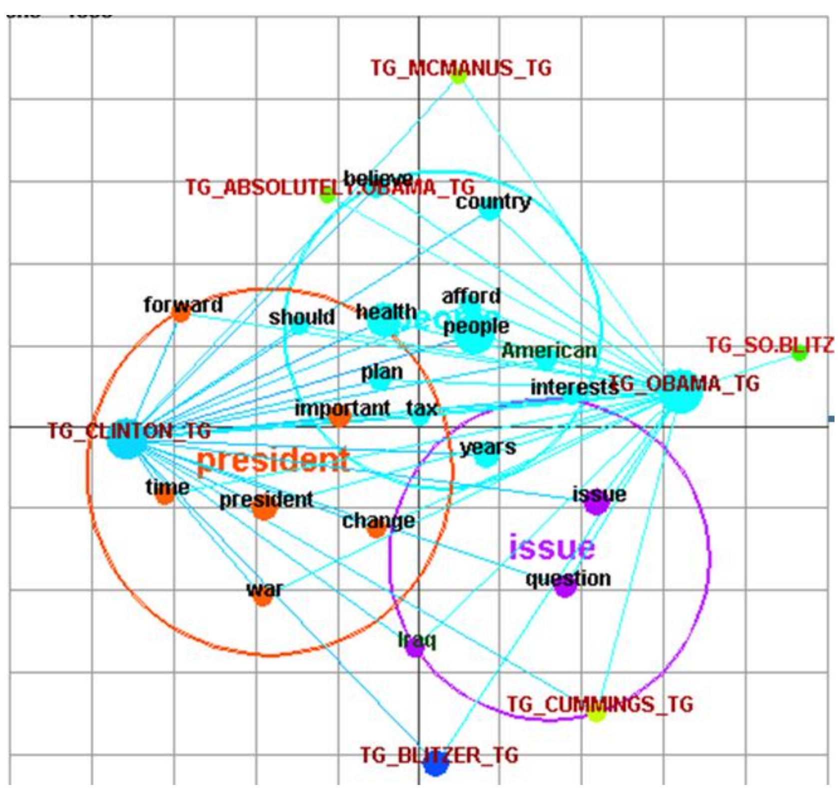

Figure 8. Concepts Addressed by Both Speakers

Leximancer may also be used to produce a list of the concepts co-occurring with *war* (see Figure 6), along with their absolute counts and relative frequencies. This list also provides links to those occurrences in the original text (see Figure 7).

Finally, Figure 8 below is Leximancer's depiction of concepts addressed by both speakers. Again, it can be seen that both Clinton and Obama discussed the same seed concepts such as "war," "Iraq," and "health" among many others. However, they approach these seed concepts from different perspectives.

Discussion

The capacity of instructors to improve online discourse is dependent on their understanding of its evolving structure and content. *SNA* and *discourse analysis* provide methodological and technological means for effectively using online course data to identify and characterize evolving structural and substantive aspects of student communication. Timely information of this sort might be used by instructors to reassign struggling or discontented individuals to different online groups, to reconfigure groups and/or tasks to optimize emerging capabilities, and to form a leadership team consisting of individuals from each student group. These and other strategies could be used to promote knowledge development and improvement throughout the term. Netminer and Leximancer are sophisticated programs to assist online instructors who wish to begin to use SNA and discourse analysis as part of their program to improve online communication and promote collaboration. Research on the use of these techniques for the analysis of online communication in web-based courses is in its infancy. Specific methods have not been subjected to research and evaluation. It is hoped that this paper will serve to stimulate interest in the topic.

There is another, less obvious advantage to the approach advocated in this paper. Over the years, the philosophical/methodological gulf between proponents of quantitative and qualitative research methodologies has widened to the point that meaningful dialogue between these "camps" is rare. For instance, "qualitative" researchers interested in teaching and learning in online environments have relied heavily on rubric-based, hand-coding procedures and qualitative interpretive practices to analyze online discourse. While this approach has produced a large body of work, much of it is unsatisfying to "quantitative" researchers. Likewise, many "qualitative" researchers find quantitative studies unsatisfying. We believe that *SNA* and *discourse analysis,* both of which have solid statistical foundations, may provide "common ground" on which quantitative and qualitative researchers may, once again wrestle with important questions and ideas without surrendering the strengths of their research methodologies. Perhaps AERA would consider hosting an online special interest group (SIG) dedicated to this pursuit.

Assuming that a suitable forum emerges for exploring mixed methods of content and structural analysis of online, asynchronous, student discourse, opportunities for collaborative research may arise naturally among the growing, nationwide community of faculty interested in improving teaching and learning in web-assisted and web-based courses. If that happens, it seems likely that many research questions normally associated with traditional instruction may be extended to web-based and web-assisted instruction. For instance,

- To what extent do web-based learning environments advantage/disadvantage students whose learning styles, language skills, and personalities interact with web-based instructional modalities?
- What skills and dispositions do teachers and students need to succeed in web-based, collaborative learning environments?
- How do instructors use content and structural analysis of online student discourse to assess student progress and to inform instructional decisions?
- In what sort of courses might this sort of analysis be most useful? Least useful? Why?

From the perspective of the authors, these investigations will do more than extend the scope of educational research; they will add a new and distinctive "flavor" to what we do as scholars.

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