Using discussion webs to Develop an Academic Community of Learners

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Abstract

The World Wide Web has made possible an entirely new form of communication in the classroom: asynchronous, public, non-sequential, and selective (Windschitl, 1998). However, it is unclear how discussion webs can contribute to educational processes. Our research investigates the role of instructional interactive webs in promoting among preservice teachers an "academic community of learners," defined as an academic community that grounds inquiries and dilemmas emerging in their practice in an academic discourse based on considering alternatives and providing argumentation and evidence for their claims (Wells, Chang, & Maher, 1990). Based on this definition of a community of learners and concerns raised by fellow instructors, we created categories and analyzed one class discussion web, coding a total of 1,124 web entries of undergraduate students and their instructor to examine references they used, topics, genres, and relationships with other messages. Our findings suggest that students' web postings were mostly very sophisticated in that students were able to integrate outside references with new and enriching discussion topics, thereby providing viewpoints alternative to and sometimes critical of those expressed by the instructor and other students. These findings suggest that instructional interactive webs can be a useful tool for promoting and building an academic community of learners.

Key words

Academic community of learners, Web discussion

Historical Background

Internet-based classroom applications have been enthusiastically adopted in various educational settings. By 2003 the majority of community colleges were offering on-line courses (Bagnato, 2004), 81% of all post-secondary institutions offered some on-line courses, and a third offered entire on-line programs (Conhaim, 2003). Deakin University in Australia has recently begun to require that all graduates complete at least one on-line course (Woodhead, 2004). To what extent and in what ways will this internet-technology boom transform higher education? According to Windschitl (1998), the Internet may enhance classroom learning in one of two ways: it may improve access to information or expand potential for communication. This expanded potential, however, is not simply increased efficiency. Wertsch points out that the internet, as a tool mediating communication, will not simply extend or improve existing forms, but will necessarily make qualitative changes to the nature of communication (Wertsch, 2002). Bonk, Appleman, and Hay (1996) pose important questions concerning the use of internet-based tools: “How might these tools encourage learners to explore and accommodate alternative viewpoints?” and, “How does one gain a greater sense of intersubjectivity and common ground through computer technologies?”

While web-based technology offers an opportunity to change the nature of classroom communication, often this new technology is used only for facilitating low level tasks such as posting the syllabus, distributing lecture notes, or administering multiple-choice exams (Jack A. Cummings, Curtis Jay Bonk, & F. Robert Jacobs, 2002; Marx, Blumenfeld, Krajcik, & Soloway, 1998; Means, 1994; Putnam & Borko, 2000). In some cases, the

technology is used for "disseminating conceptual information and testing conceptual knowledge" (Kidwell, Freeman, Smith, & Zarcone, 2004, p. 149) in much the same way as in face to face instructor-student interactions, but across greater distances. In some cases, print materials (such as textbook and lecture notes) are presented multi-modally to accommodate different cognitive styles (Brown & Liedholm, 2004) or to provide easier access to these materials (Jensen-Lee & Falahey, 2002). Nevertheless, a Power Point presentation available on-line is no different from a passive classroom lecture (Boylan, 2004). This "pre-packaged print-based component" of much on-line learning may very well derive from the institution context (Kuboni & Martin, 2004, p. 28). Rather than focus on the "business as usual" aspect of current practice, however, it is much more useful to focus on the innovative "outliers," which may provide guidance for how web-based teaching may provide new kinds of interactions among students and teachers in the classroom (Jack A. Cummings, Curtis J. Bonk, & F. Robert Jacobs, 2002) Specifically, the purpose of this study was to examine whether and how interactive discussion webs can support the process of developing an academic community of learners and, thus, enhance students' learning.

Koschman (1996) argues that the use of computer-mediated communication (CMC) in education has been guided by diverse psychological paradigms such behaviorist, information processing, Piagetian, and sociocultural. Each of this paradigm replies to the question of the role of internet-technology in education differently. Our framework stemmed from a sociocultural approach assuming that learning involves a transformation of participation in a community of practice (Lave & Wenger, 1991). The theoretical roots of this investigation, however, began with instructors' concerns about using discussion webs. At the time of the writing of this article, the first author has used discussion webs in 32 classes, which he has taught at three different universities 24 of which classes targeted preservice teachers. The second author has used discussion webs in 8 classes. The first author has also given many workshops to faculty about the effective use of web discussions in college courses. While giving these workshops, the first author of this paper compiled a collection of the practical concerns expressed by university faculty about ways in which the discussion web might functionally fail to meet instructional goals. We analyzed these concerns to extract the implicit assumptions of what defines a successful classroom discussion web. We found that these assumptions are reflected in Wells, Chang, and Maher's definition of "an academic community of learners" as an academic community of inquiry that grounds inquiries and dilemmas emerging in their practice in an academic discourse based on considering alternatives and providing argumentation and evidence for their claims (1990). This notion is very compatible with Putnam and Borko's (2000) notion of "a discourse community for preservice teachers" that focuses on the development of a "teaching culture" (Stigler & Hiebert, 1998) where means of teaching are "polished" by efforts of all community and not left to individual teachers. Discussion-webs explicitly based on the notion of creating a virtual teaching community have reported success in terms of providing a common discourse as well as discussing issues emerging directly from practice (Wiske, Sick, & Wirsig, 2001). Salmon argues that the web-based discussion can facilitate reflection-in-action, a collaborative reflection that take places "in the midst of practice"(2002, p. 380). In one survey of preservice teachers, over 90% reported that participation on an online web discussion allowed them to benefit from peer discussions while engaged in their practicum (Khine & Lourdusamy, 2003). Goodfellow (2004) cautions that this notion of a virtual learning community is not completely unproblematic, since socialization into this community, as in any institutional setting, may involve some degree of social conflict and institutional resistance. With this in mind, our analysis focuses on the nature of the student interactions as well as the content of the postings.

Research questions

We extracted from Wells, Chang, and Maher's definition for an academic community of learners four key defining aspects, which corresponded to the four major concerns expressed by instructors. We then recast these as research questions, which in turn led to coding topics from which emerged our coding categories for data analysis. These coding categories will be explained in more detail in the coding section of this paper. Below we describe the four main aspects of a community of learners, research questions based on these, and the resulting coding topics (see Table 1).

Table 1. Research questions and coding topics

Aspect of a community of learners	Research question	Coding topics and variables
Intersubjectivity: Shared focus on academic themes	How did the topics of students web postings relate to course topics?	Type of topics brought to web by students
Ontology: Integration of participants' lives into community practice	Did students refer to their lives outside the class in their web postings?	Type of explicit reference in student postings

Problematicity: Defining/addressing professional inquiries	Did students both define and address issues, concerns, and dilemmas on the web?	Genre of problems defined/genre of problems addressed
Dialogicity: Academic/Dialogic relations among web postings of different authors	Did students both support and challenge each others' and instructors views?	Type of relationship of student posting to previous posting
Motivation: Ownership of the web discussion	Did the students go beyond extrinsic motivation of fulfilling the classroom requirements while participating in the web discussions?	Number of postings per week and word length of their postings

As mentioned earlier, we also spoke with colleagues to understand what they considered to be potential sources of web talk failure. We took these into account, and for each aspect of a community of learners, we used these related instructor concerns to define potential web failure as well as web success (see Table 2).

Table 2. Web discussion functional failures and successes

Aspect of a community of learners	Web discussion failure	Web discussion success
Intersubjectivity: Shared focus on academic themes	Chit-chat	Shared focus on the academic themes
Ontology: Integration of participants' lives into community practice	Assignment board	Integration of the community practice and other (non-community) aspects of participants' lives in an academic discourse
Problematicity: Defining/addressing professional inquiries	Shallow contributions	Defining and addressing professional/academic inquires in individual web postings
Dialogicity: Academic/Dialogic relations among web postings of different authors	Collective monologue	Academic dialogic relations among web postings of different authors
Motivation: Ownership of the web discussion	Minimum efforts	Ownership of the web discussion

In the following section we discuss in more detail the four aspects of a community of learners, the potential web success and failure associated with each, and some theoretical grounding for the relevance of these issues.

1. Intersubjectivity: Shared focus on academic themes

What were the themes of students' web discussions? How did the topics of the students' web postings relate to the courses' topics? Did the class web discussions successfully create "intersubjectivity in a shared social space" (Bonk, 1998; Schrage, 1990) and shared collective reality (Gallimore & Tharp, 1992) relevant to the course foci? Intersubjectivity is referred to herein as shared themes, problems, and approaches to solve them coordinated by the participants (Matusov, 1996). During the workshops, some instructors expressed concern that the web discussion could deteriorate into "chit chat," wherein students socialize through conversation having nothing to do with the class focus. Coding topic: "Type of Topics Brought to Web by Students".

Some web research has claimed that the professor not permit off-topic postings (Lim & Cheah, 2003), and that webtalk success depends on strict structure and guidance provided by the professor (Lobry de Bruyn, 2004); "student participation and learning benefited as the professor actively charted a preliminary course for the lessons based on prior discussions and the objectives of the course" (King, 2002, p. 241). We wanted to see if the students would themselves provide this focus on course objectives without the instructor's explicit constraint. It is important to notice that although the instructor may not impose any explicit constraint for the classroom shared focus on web discussions, it may be placed implicitly in the minds of the students who may actively

interpret the institutional norms and the instructor's intentions and may be concerned about their potential consequences for the students' well-being and professional future.

2. Ontology: Integration of the community practice and other (non-community) aspects of participants' lives in an academic discourse

Did the students refer to dilemmas and issues coming from their lives outside of class? Did the students provide references to the literature (both read and non-read in the class) and other classes? Instructors expressed concerns that the class might be reduced to an *assignment board* wherein students, worrying mostly about grades, might try to guess what the instructor wants from them and narrowly address the class agenda defined by the instructor without initiating their own topics and integrating them with a broader context. Coding topic: "Type of Explicit Reference in Student Postings."

Windschitl (1998, p. 31) makes a point that "communication scholars have studied how students learn from various arrangements of text and graphics on a computer, but these studies have focused on communication whose purpose is to instruct users, not to relate to them on a personal level." Traditionally, institutionalized learning occurring within institutional academic settings has typically involved a two-stage sequence. During the first learning stage, a student has to learn decontextualized skills and knowledge; during the second stage, the student should learn how to apply those skills and knowledge in different practical contexts. This model of learning has posed the issue of "transfer" -- what the student has learned in one context (e.g., abstract, decontextualized) has to be applied in another context (e.g., concrete, practical). Unfortunately, this "transfer" often does not occur in schools (Anderson, Reder, & Simon, 1997).

Alternatively, a sociocultural view of learning is a holistic approach and involves a process in which students' experiences and reflections are woven within a theoretical framework which promotes reflections in conjunction with one another. The sociocultural notion of learning defines it as a whole-person-learning-in-activities penetrating all aspects of a student's life (Cole, 1996; Lave, 1992; Palmer, 1998). This understanding of learning is very compatible with Wells, Chang and Maher's notion of an academic community of learners.

Many discussion webs analyzed in the literature have as their goal a specific task of tasks assigned by the instructor, that is, either coming to an understanding target concepts (Lobry de Bruyn, 2004; Orvisa, Wisher, Bonk, & Olsond, 2002), completing a task (Kidwell et al., 2004), or solving a problem (Orvisa et al., 2002; Rose, 2004). By contrast, we partially defined success of the classroom web discussions by the ontological nature of the students' web contributions -- the degree to which students were able to introduce their own extra-curricular references into the web discussions. In the case of preservice teachers, it is especially beneficial to read about what other students are experiencing in their teaching practicum, as well as how teachers in the field address classroom situations that they may encounter themselves someday. The totality of a student's learning experiences is much greater and far more expansive and comprehensive when integrated with issues from outside the class, particularly pedagogical issues encountered in one's teaching practicum. Learning is enhanced and a natural byproduct of such a situation is that course content is expanded beyond that which the text and lecture alone are able to provide (Bonk, Daytner, Daytner, Dennen, & Malikowski, 1999).

3. Problematicity: Defining and addressing professional/academic inquires in individual web postings

Did the students bring issues, concerns, and dilemmas to the web discussions and try to address them? Teacher electronic networks have been criticized for their lack of critical reflections (Putnam & Borko, 2000). Instructors expressed concerns that students might provide only shallow contributions, being unable either to define important and relevant issues or to address these issues in depth. Coding topic: "Genre of Problems Defined/Genre of Problems Addressed in Student Postings."

In the literature on innovative education, the notion of "community of learners" is often defined as shared ownership for both *problem-defining and problem-addressing* processes (Bonk & K.S.King, 1998; Dewey, 1966; Lave, 1988; Rogoff, Matusov, & White, 1996; Wells et al., 1990). In Moss (1998), there were concerns that practicing teachers did not develop an appreciation for "reflecting on their practice through a problem-solving model." Web-based learning communities, have the potential to strengthen connections between classroom and real world learning (Johnson, 2001). Unlike case-based teaching, where students are assigned cases for discussion and success is defined by the degree to which student discussion remains oriented to these assigned tasks (Schellens & Valcke, 2005), we wanted our students to define for themselves problems that were

important to them as developing members of the teaching community. In our analysis we hoped to find evidence that students were able to both define problems in their field and engage in meaningful attempts to solve them.

4. Dialogicity: Academic dialogic relations among web postings of different authors

Did the students provide support and challenge to each other's and the instructor's statements on the web? Did they present supporting examples, evidence, and personal experiences for their claims? Did they provide alternative views? Piaget (Piaget, 2002) defined a conversation consisting of unrelated or loosely-related statements as a "collective monologue." In contrast, we hoped to find the type of engagement described by Bakhtin (1990) as "*dialogic relations*." Dialogic relations between participants' utterances bounded by dialogic turns involve participants' reactions toward what has been said before by the others. During the workshops, some instructors expressed concerns that students would post messages that are either unrelated or loosely related to each other. Coding topic: "Type of Relationship of Student Posting to Previous Posting."

The meaning making process involves a response to the questions of others. Meaning is a dialogic relationship between the question and the response. As Bakhtin wrote, "Understanding comes to fruition only in the response; understanding and response are dialectically merged and mutually condition one another; one is impossible with the other" (Bakhtin, 1991, p. 282). Yang and Lui's analysis of a professional development web discussion for teachers found that messages were more like board postings than true conversations (Yang & Liu, 2004). Pena-Shaff and Nicholls found that students tended to agreeing or disagreeing with a previous posting and then engaged in an extensive monolog where they elaborated their view, and that they very rarely returned to defend or elaborate on a statement which had been challenged by another (Pena-Shaff & Nicholls, 2004). However, Bonk (1998) found that students provided mentoring, questioning, scaffolding, feedback and task structuring for one another and that they were quite adept at exploring and articulating ideas for each other in their class web discussions. These characteristics mirror Latour's notion of changing "modality," a core characteristic of scientific discourse (Latour, 1987). Studying scientific discourse, Latour (1987) found that one of the most important functions of the discourse is to change the modality of statements that scientists make. According to Latour, modality of a statement is elevated when the statement is supported by the author such a way that the statement sounds more like a "fact" by de-emphasizing the statement's authorship and by objectivizing its content (e.g., "The Earth rotates around the Sun" – we are not informed by the statement about who is making this claim and on what grounds). In contrast, modality is lowered when a scientific statement is undermined by the author in such a way that the statement sounds like an "artifact" because it emphasizes its authorship shaped by a false subjectivity (e.g., "Aristotle confused force and movement"). These changing modalities, a requisite of dialogic exchange, are an important aspect of an academic community of learners that we hoped to find in our web discourse.

5. Motivation: Ownership of the web discussion

Did the students go beyond the extrinsic motivation of fulfilling the classroom requirements while participating in the web discussions? During our workshops about the use of webs in classrooms, some instructors raised a concern that the students will try to minimize their efforts and do the minimum required or even less so. To examine this issue, we coded number the students' actual postings per week and length of the postings.

One of the core features of a community of learners is intrinsic motivation and shared ownership for learning activities (Bonk & K.S.King, 1998; Dewey, 1966; Lave, 1988; Rogoff et al., 1996; Wells et al., 1990). A sociocultural approach to motivation stresses the social, participatory nature of motivation. It values the development of intrinsic motivation that provides dynamic access to changeable sociocultural practices. Motivation implies openness, making choices, taking the risk and responsibility for choices, cooperation, sharing interests, and quality of participation as the outcome of learning. These feature are manifested in students' doing beyond what is required by the instructor.

Method and Procedures

Participants and Contexts

We analyzed the discussion web created during a 3-credit course entitled "Instructional Strategies and Reflective Practices" (referred to as EDST390) taught by the first author in the Spring Semester of 1998. This course was

conducted over a 16-week period, including a week of spring break and a final exam week (although there were no exams for this class). As stated in the syllabus, the instructor's purpose for the class was:

> "to examine our perception and priorities regarding teaching and learning. I hope that such reflection will promote experiential knowledge that can help you to become a schoolteacher, who fosters meaningful education for all your future students. In this class, we will focus on how to develop teaching goals and priorities for instruction and 'in flight' decision making in the classroom to promote active learning in students." (EDUC 390 course syllabus)

The course was a part of the Elementary Teacher Education Program and was a mandatory core class for preservice teachers. The course was also connected with a methods class on teaching literacy (referred to as EDDV305). As part of the class, students were involved in an 8-week teaching practicum in an elementary school, wherein the students were required to make observations on teaching and to prepare lessons on teaching literacy (reading and writing). The class and web discussion during practicum time was an important way for students to meet together to reflect up experiences they had in different settings; providing a common community of practice for students actually engaging physically distant practices (Buckingham, 2003).

There were 23 students from several eastern states, most of whom were and white middle-class females in their early twenties. The class had one African-American student, one Latino student, two male students, and two returning adult students who had returned to college after having had professional careers in other areas. The instructor (first author of this paper) was a white male Russian immigrant in his thirties. The third author of this paper was a student in the class. None of the students had prior experience with web discussions.

The class had a seminar format in which class time was devoted to the instructor's presentations, group discussions of readings, preparation and presentation of group projects, and open class discussion. The course also required participation on the class web, used for posting and completing assignments as well as a free discussion forum called "WebTalk." It is this WebTalk, the unstructured discussion web created by the students and teacher during the course, which is analyzed in this investigation.

The Interactive Discussion Web (WebTalk)

Although the instructor provided immense freedom to the students in initiating and supporting as many discussion threads as they deemed appropriate and necessary, he also designated the minimum number of web postings that students had to write on the web. He required each student to read all postings and to contribute at least two messages on the web per week (either an initiation of or a reply to a discussion thread). The required number of postings was comparable with the average number of postings occurring in web discussions in which there is no requirement of mandatory participation. Thus, Dysthe (2002) reported that during her 2-week class web discussion 9 out of 10 students generated 27 postings. In our studied class, there were also four structured reading groups and each group was required to make one posting per week concerning a topic discussed during class. The instructor monitored each student's progress in terms of total number of web postings and provided the class with a confidential means of viewing a progress report indicating whether or not the student had fulfilled the course requirements, including the number of weekly postings to the Web Talk. Students behind in their postings could fulfill the requirements of the course by doing additional web postings. There were no web postings required during the following weeks: week 1 (orientation to the class), week 8 (Spring Break), week 15 (last week of class), and week 16 (the exam week).

The instructor asked that the messages be broadly relevant to the class and encouraged students to provide reflections on the following activities: class presentations, practicum experiences, literature, feedback on the class, personal experience relevant to the class discussions, information sources that facilitate other students' learning, and personal and career development. Students had an opportunity either to initiate a new topic or reply to somebody else's posting and, thus, to continue (or alternate) an existing discussion thread. Each message was indexed in the hypertext content table. Each reply was automatically indented as reflected in Figure 1.

The hypertext content table provided information about the message title, author, and date and time of the posting. The privacy of the students' Internet web discussions was protected by a password available only to the members of the class. The instructor used Microsoft Front Page 98 to design the class web.

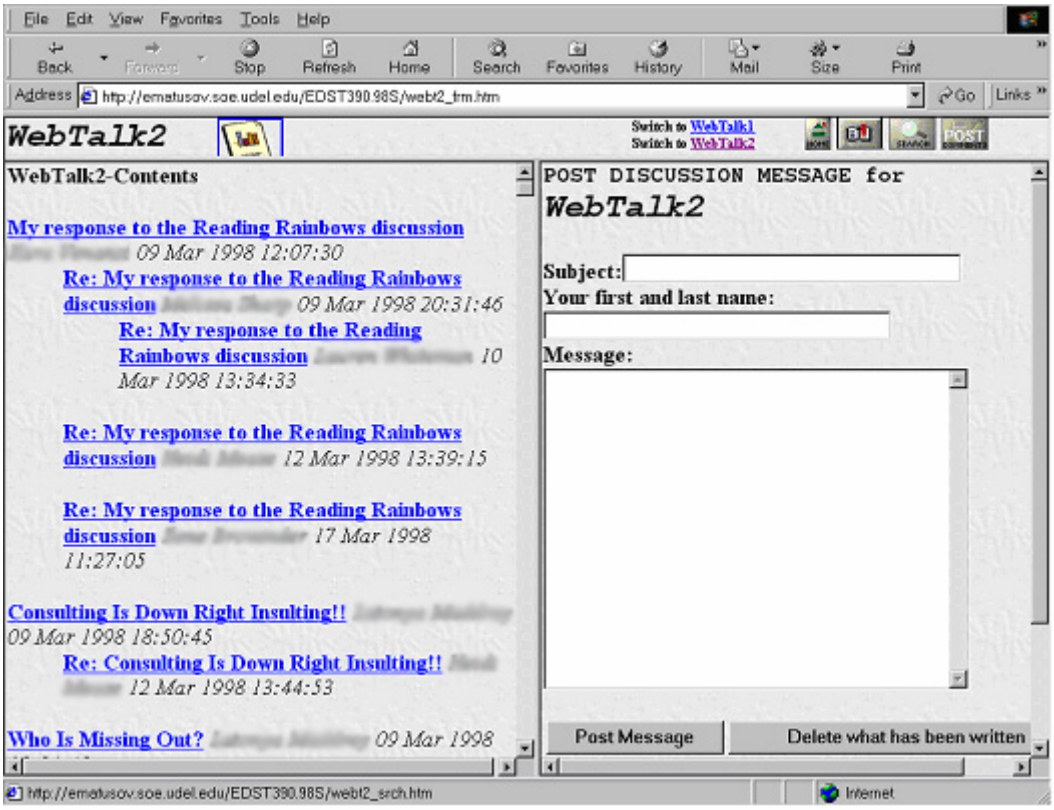

Figure 1. Class discussion web

Similar to Dysthe's (2002) pedagogical design, postings were not graded or evaluated for content. We decided that grading the content would restrict the freedom of postings and change the medium from student-oriented discussion to instructor-oriented assignment. In the words of one instructor, her initial choice to grade web postings in her preservice teacher discussion forum turned out to be "counterproductive to reflectivity" (Wickstrom, 2003). There was no requirement concerning the length of a posted message; however, the instructor advised the students to keep postings brief to save other people time in reading. The genre of the participants' writing was similar to Dysthe's (2002) definition of a "hybrid genre" (p.341) which involves a combination of "freewriting" (Elbow, 1973) or "writing-to-think" (Dysthe, 2002) and presentational writing aimed at the audience of the classroom community. Students were guided to focus on clarity of communication rather than grammatical correctness. During the web orientation on the second day of class, the instructor "modeled" how making a grammatical mistake in his own posting did not alter the content of the posting and thus, an informal atmosphere of web participation was promoted (Wegerif, 1998). This pedagogical design was aimed to develop "relaxed norms of coherence" that are important for the successful functioning of computer-mediated communication (Danet, Ruedenberg-Wright, & Rosenbaum-Tamari, 1998; Herring, 1999). Students tend to assume they are constantly being evaluated, and it is up to the instructor to eliminate this assumption of quality control (Schallert & Reed, 2003-2004).

Web Talk Pedagogical Design: Theoretical Underpinnings

While many class discussion webs are designed to enable students to participate in teacher-initiated problems-solving (Orvisa et al., 2002; Rose, 2004), our particular Web Talk was designed to promote student-initiated discussions of preservice teachers' class and practicum experiences focusing on how they themselves view and learn new ways of teaching (Putnam & Borko, 2000). Following Bakhtin (1999), we believe that truth only exists in dialogue rather than that truth emerges from a dialogue. In contrast to some educators who view engagement of the learners in interactions with others as an enhancement of their learning processes (see, for example, Laurillard, 1993), we consider social interaction as the necessary medium in which learning occurs and knowledge exists. Our pedagogical goal fits a recent trend of the use of electronic discussions to promote collective reflections among preservice teachers wherein they are guided by the instructor about topics of interest or problems seen in the schools (Admiraal, Lockhorst, Wubbels, Korthagen, & Veen, 1997; Bonk, Malikowski,

Angeli, & Supplee, 1998; Whipp, 2003). For preservice teachers, electronic conferencing has been implemented in an attempt to alleviate "(1) the isolation students feel when in the field; (2) the lack of community and dialogue among teacher education participants; (3) the disconnectedness between classroom knowledge and field experiences; (4) the limited reflective practices observed among novice teachers; and (5) the need to appreciate multiple perspectives and diverse cultures." (Bonk et al., 1999). Our Web discussion is part of a multi-modal design sometimes referred to as "blended learning" (Garrison & Kanuka, 2004; Khine & Lourdusamy, 2003) or a "hybrid course" (Brown & Liedholm, 2004) where the advantages of on-line asynchronous discussion (such as freedom from space and time constraints) are coupled with the advantages of classroom discussion (such as spontaneity). Furthermore, the immediate physical availability of the instructor during class meetings and office hours also helped to alleviate the technical frustrations and feelings of alienation identified in some exclusively web-base distance learning seminars (Hara, 2000). In this sense, our web design most closely mirrors the BBS (electronic asynchronous bulletin board system) described by Pena-Shaff and Nicholls, where professor and teaching assistant participate in the discussion largely sustained by students (Pena-Shaff & Nicholls, 2004). This design was primarily based on the accumulated teaching experiences of the first author, as well as on his conversations with other instructors and students, including reflections on the nature of communication desired in the classroom and the potential and restrictions inherent in various forms of communication.

The instructor had a special role on the web discussion. This role involved guiding the preservice students in how to analyze pedagogical actions regarding classroom instruction, classroom management, communication with parents, and so forth by considering and inviting the students to consider the short- and long-term teaching goals and priorities, the complexity of desired and undesired consequences, educational philosophies, cultural values and assumptions about education, and institutional and historical contexts and constraints. The instructor also pushed the students to provide justification, clarification and examples for their ideas so that other class members would follow and visualize the situations and problems discussed. Finally, the instructor modeled for the students how to create a web community through providing supportive and respectful criticism by: inviting other class members to join and continue the discussion (e.g., all instructor's postings were ended with the question, "What do you think?" – a practice that many students eventually adopted); bringing examples of successful and unsuccessful teaching from his own personal teaching experiences; supporting "non-popular" dissent and minority views; inviting and supporting students' criticism of his own ideas; considering pros and cons for each idea; and supporting students who had not received replies from other students at the beginning of the semester. While other instructors have chosen not to participate in the discussion with the goal of encouraging student-student interaction rather than student-teacher interaction (Pinch & Graves, 2000; Rose, 2004), our experience has been that a careful instructor presence could enhance, rather than inhibit, student dialogue.

Data Coding and Analysis

It is only recently that web discussions have begun to be analyzed using qualitative methodology, and early attempts to create coding categories have been vaguely defined and difficult to work with (Pena-Shaff & Nicholls, 2003). In our study, we chose to derive our research questions and coding categories from our own pedagogical experiences and concern with the development of an academic community of learners. To address the main research question of whether or not web discussions may support the development of a community of learners, the primary focus of our analysis centered on 859 student postings. The excluded messages, such as assignments posted by the instructor and assignments completed by the students, were deemed to be "assignment board" postings and not considered for purposes of the analysis. Many studies of web discussions have focused implicitly on characteristics of individual postings as the unit of analysis, such as degree of critical thinking (Henri, 1992), cognitive complexity (Christopher, Thomas, & Tallent-Runnels, 2004), or task orientation (Nicholson, 2002). Nevertheless, recent studies focusing on the web's potential to foster community have begun to consider the relations among postings (Dringus & Ellis, 2005; Makitalo, Hakkinen, Leinonen, & Jarvela, 2002). In this spirit, we have noted an emerging focus on the nature of interactions, using inter-posting relationships as a unit of analysis (Pena-Shaff & Nicholls, 2004). Since we were concerned primarily with community development, we used two units of analysis: individual postings and the relationship between postings written by different authors. As described earlier in this paper, research questions reflecting both characteristics of an academic community of learners and potential failures were recast as coding topics for analysis. Based on these topics, postings were coded according to the following nine categories, and the results were compiled in a database:

1. date

This is the date that the posting was submitted to the Web Talk.

2. word length

This is the total number of words in a single posting, excluding the title.

3. author

Students were required to sign their postings so that class members were aware of who they were addressing.

4. thread position

This refers to the position of the posting in the discussion thread (web discussions around a certain topic). Participants chose whether to start a new thread or respond to a posting within an existing thread. Postings were organized visually into threads in such a way that postings were situated directly underneath the posting to which it responded, and indented.

5. number of replies to the posting

This includes all postings that either replied directly or replied to another posting that replied to the initial posting. In other words, the total number of replies includes all postings situated beneath the posting in its discussion thread.

6. topics discussed

This category indicates the thematic foci of the students' web postings and includes (but is not limited to) the following: discussion of educational philosophies and instructional strategies, classroom management and discipline, co-operating practicum teachers, aspects of self-concern, self-confidence, self-management, career and what students should do in specific situations, issues of diversity and special education, professional issues of how to become a teacher, issues of testing and learning assessment, and so forth. For example,

> I would just like to comment on the issues of disciplining. Through all of my elementary education, the teacher was the one who made the rules of his/her classroom and it was the student's job to obey them or who knows what would happen, your name on the board, stay inside with the teacher at recess, etc. These are some examples of what would happen in my previous elementary school and they are also the rules of my cooperating teacher. These are the rules that I have really only seen in my past and in field placement; In my opinion, they are not that bad of rules. …(student posting coded as classroom management).

This category can help to address the question of whether topics discussed by the students on the web discussions were relevant to the class (i.e., the chit-chat concern).

7. explicit references

This category includes other postings, the teaching practicum, class discussions, literature experiences, out-of-class life experiences and so forth. For example,

> I just read Melanie's message and I too got an excellent evaluation from my cooperating teacher. (coded as having references to both another student's posting and to the teaching practicum).

This category was designed to address the question of whether the students brought broader issues and topics from outside of the class to the web discussions (i.e., the *assignment board* concern).

8. posting genres

This category includes students expressing concern, surprise, dilemma, complaint, statement, sharing positive or negative feelings, asking for advice, providing suggestions, raising or addressing a question and so forth. For example,

> The teachers that I worked with were not even aware of their responsibilities to us…We had a thirty second discussion prior to my teaching, and then NO discussion following. I am basically disgusted with this situation and I can only pray that my cooperating teacher for student teaching is enthusiastic about helping out and getting involved. …(coded as complaint).

Another example is,

> The article on rewards really surprised me. To me rewards were a good idea. I thought that children enjoyed getting them I was surprised to hear that when children were told that they were going to get a reward that they did not work as hard as the kids who were not going to get a reward….(coded as surprise).

This category was aimed to address the question of whether the students brought problematicity on the web discussions (i.e., the *shallow contributions* concern).

9. relationships to the previous posting

Postings were considered to be either supporting or challenging the original author's message. This category includes explicit agreement, explicit disagreement, aligning with the author's idea or experience, elaboration, explicit encouragement, acknowledgement and appreciation of the author, presenting alternative ideas or opposite case, request for clarification of ideas, and conflict. Consider the following exchange between two students:

> The article on rewards really surprised me. To me rewards were a good idea. … I still think that some kids like being motivated this way. If it gets them to learn what's the problem? I guess the teacher has to monitor this for long term effects. This is just my opinion.

Four hours later (7:45pm), a student replies:

> I think the problem they had with rewards is that the students aren't retaining the information they should be learning. They only try to get the reward, and are rushing through the work to get pleasure from the reward, and not from learning. Were you pleased because you were learning or were you pleased because you were acting as you were expected? This is the question they are trying to attack in the article. Does this help? (coded as disagreement and providing alternative views).

This category can help to address the question of whether the students relate to each other's postings on the web discussions (i.e., the *collective monologue* concern).

The coding was not mutually exclusive within or between categories. For example, the posting above was coded as both "explicit disagreement" and "providing alternative views," both of which are options within the category relationships to previous posting. In addition, this particular posting was also coded across all other categories, for example as "providing suggestion" in the category of posting genre.

To access students' "intrinsic motivation" for posting through how lengthy students' posting were, we randomly selected 100 messages from the XMCA e-mail list of professional academic researchers interested in issues of learning, education, and human development archived at http://communication.ucsd.edu/MCA/Mail/index.html. We measured the number of words in these messages and found the median. Student postings were considered "extra long" when the number of words exceeding this median.

All data was coded by a coder "blind" to the research questions. About 20% of the students' postings (170 postings) were also coded by the first author. The inter-coder agreement on the categories ranged between 89% and 95%. The database created thereby has enabled us to compile research data in order to assess the ability of this particular class to promote asynchronous communication and interactivity by, between and among the students and the instructor. It is for this reason that only four of the nine coding categories (topics discussed, explicit references, posting genres, and relationships to previous postings) are used for analysis in this paper. It is expected that this paper will provide a framework for discussion that will lead to questions for further analysis.

Findings and their Discussion

A: Intersubjectivity: Did the Web's topics focus on academic educational issues central to the course?

The students had a great deal of freedom in terms of the themes and topics encompassed by their web postings. The overwhelming majority of the discussion threads was initiated by the students (365 postings or 97% of all postings' initiations), indicating that nearly all topics were brought to the web discussion by the students and not by the instructor. Since there was nothing in the instructional design, as articulated by the instructor, that prevented the students from freely defining themes and topics, we wondered if this freedom might allow students to stray away from the focus of the course and use the web discussion for their chitchat socialization.

We sought to determine what topics were discussed by students on the web and whether these topics were relevant to the purpose of this course as described in the EDST 390 course syllabus, "In this class, we will focus on how to develop teaching goals and priorities for instruction and 'in flight' decision-making in the classroom to promote active learning in students" (Course syllabus, p.1). To this end, we coded each posting within the topics discussed category described above, and graphed the type of topic by frequency. We then compared the topics brought to the Web Talk by the students to the focus of the course as described in the course syllabus by the instructor.

By far, the most frequent topic was "educational philosophy and instructional strategies" (58%). The following student web posting illustrates this topic:

> I just had a thought about what to do about the advanced students in the class - how do I handle them when I'm conducting a lesson and they know every answer to every question, and they don't let other students have a chance to answer? I have a handful of students in my 1st grade classroom that are on a 5th grade reading level. They always finish their work ahead of time, and it seems that they are always the first to call out the answers to questions I have for the whole class. This makes the other children want to participate less because they know that the smart kids will come up with the answers first. I did my read - aloud lesson on Friday morning and I prepared a series of pre-reading and post-reading questions for the students. Right away, 2 of the advanced kids called out telling me that they had already read the book and spoiled the ending to my story. This bothered some of the other students who really wanted to hear the story. I didn't know weather to

say something to them or not, seeing how I had only been in the class 3 times. I kind of shhhhh-ed those 2 students and continued with my story, even thought I was a little discouraged. I know that things won't run smoothly all the time, but I was hoping that my first experience teaching this class would have been a bit better.

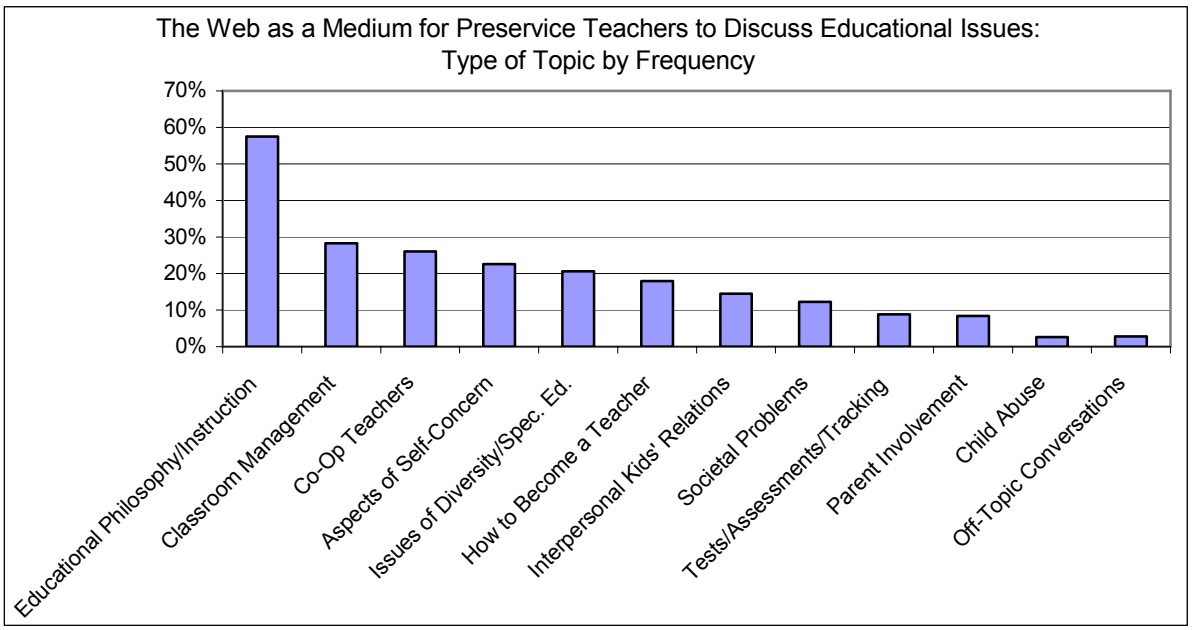

Figure 2. Web as a Medium for Students' Classroom Discussion

Other topics ranging in frequency from 26% (classroom management) to 3% (child abuse) constitute legitimate subtopics of the primary course focus. Thus, the frequency distribution of students' web themes reflects the instructional focus as articulated in the course syllabus, that is, the topics most frequently brought to the Web Talk by students reflect the course purpose, suggesting that students' and instructor's shared ownership for the class thematic focus was supported by the Web Talk discussions.

By contrast, only 3% of all students' postings could be categorized as "off-topic," which is consistent with similar research (Bonk et al., 1998) that concluded that "the off-task behaviors were essentially nonexistent." Curiously, similar research into a synchronous chat among military trainees found that up to a third of all postings were social rather than task oriented; and that the patterns of off-task chat followed the patterns typical of face-to-face collaborative interactions (Orvisa et al., 2002).

Here are three examples of "off-topic" posting:

1. Good job. Nice message girls!
2. I just wanted to wish everyone luck next week on teaching their special education units. It is definitely a stressful period, because so much is going on. Keep your heads up and remember that this semester is almost over.
3. Hi everyone, I just wanted to tell you all to have an awesome summer -- we DESERVE it!!! This has definitely been a hectic year and we all have worked so hard, so live it up for the next few months while you can! I will be student teaching next semester, then I'm all finished. But I'm sure I will see you sometime in the near future. Good job on the presentations and the party on the last day was great! Good luck to everyone and I hope all goes well for you guys in Fall.

The issue of "off-topic" web postings is ambiguous and complex. Like these three postings cited above, many of the web messages that we coded as "off-topic" involved students' encouragement and emotional support of each other. While some researchers on class electronic discussions express a negative attitude to students' expressions of "social acknowledgments" on the class web (Bonk et al., 1998), Salmon considers online socialization to be an important aspect of the discussion, and that early in the discussion the professor should encourage socialization through "sensitive and appropriate" design and participation (Salmon, 2000, p. 28). We agree that students' socialization with each other is often very important for developing a feeling of community that may be an especially important part of socialization for female students – the overwhelming majority of the class which

is the subject matter of this investigation. Similar points are made in feminist psychological literature (Gilligan, 1993), social psychology (Forsyth, 1998; Gillette & McCollom, 1990), and literature on conversation analysis (Jefferson, Sacks, & Schegloff, 1987). One researcher seemed surprised that adult students surveyed valued highly these affective messages, "It is easy to assume that most of the learners in online university-level courses are adults, and therefore do not need to be affectively validated… However, our interviews with learners provided data that this is not true." (Blignaut & Trollip, 2003, p. 161). Other studies have further supported the importance of internet-based communication channels solely intended to provide social support (Herring, 1999; Nicholson, 2002). Thus, it may even be undesirable to have zero "off-topic" web postings.

B: Ontology: Did the web allow students to bring and to integrate in-class experience with out-of-class experience?

Being able to bring and use observations, experience, information, readings, and opinions from different and even unassigned sources is a hallmark of an authentic academic community of learners, as defined and developed within the sociocultural theoretical framework described above. We found that the students referenced diverse sources in their writings to the web discussions. We divided the references into explicitly in-class references (other web postings, teaching practicum, and the class itself) and explicitly out-of-class references (other classes, life experiences outside the class, non-class references, and discussions outside the class).

According to our analysis, 85% of all students' web postings had explicit in-class references (such as to other students' and instructor's postings, classroom discussions, assigned readings, class assignments, and practicum experiences); 40% contained explicit out-of-class references (such as other classes, life experiences, readings outside the class, discussion with friends and relatives about the class topics, and so on); and 6% had no explicit references. (Please note that these are not mutually exclusive categories, it is quite possible for a posting to contain both in-class and out-of-class references).

Our coding of the references expressed in the students' web postings was conservative – we coded only explicit references when the students clearly marked the source of their message. It seems safe to assume that the messages had more tacit references than we coded. Figure 3 shows the frequency distribution of in-class and out-of-class references.

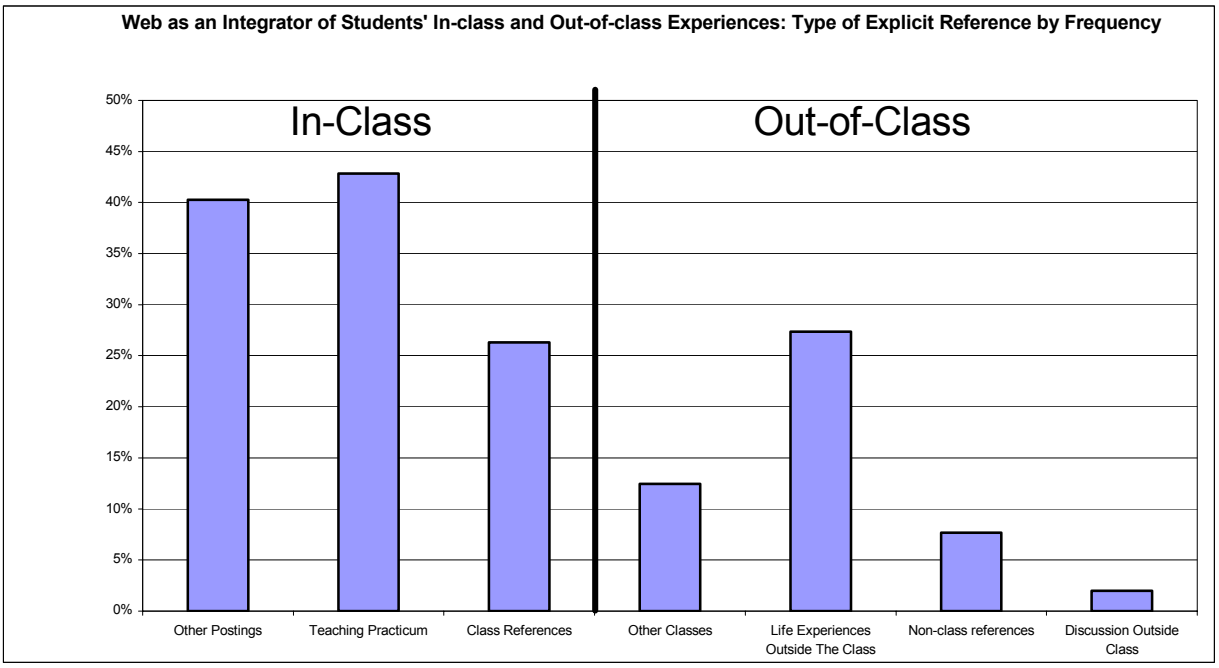

Figure 3. How Web Integrates Students' In-Class and Out-of-Class Experiences

At times students made explicit connections between in-class and out-of-class references, but we feel that even without explicit connection, these in-class and out-of-class references were integrated by the nature of being

placed in the web conversation. For example, one student referenced a local political event that she discussed with a roommate outside the class:

> The other day my roommate asked me if any of my classes were talking about the Governor and what he did during an assembly that he was speaking at. I had no clue what she was talking about. She told me that it was this big controversy, her teachers were talking about it and it was also in the newspaper. I am not always up to date (like I should be) on my current events. But she told me that the Governor was a guest speaker at some school in Delaware As he was giving his speech, the students were not paying attention at all, so I guess the Governor got a little mad and told the kids to SHUT UP! I am not exactly sure what happened, all I know is that the students were told to shut up by the Governor. (either he said "SHUT UP" or "Would you SHUT UP!") either way he told them to shut up. I may be getting my info. wrong, but from what I heard I thought it was kind of funny. I could not help to laugh when she told me-it could have been the way she said, but... I mean he should not have done that, but I do not think it was that big of a deal. I think that the children should have shown him more respect. The students should have been told prior to his appearance on how to behave-maybe they were but it does not seem that way. Just wanted to share this with you (all my facts may not be entirely true, I did not get to hear about this from a newsman or anything like that.) But I thought it was interesting.

The student explicitly refers in this posting to an out of class event (discussion with her friend), which has a very clear but implicit reference to an in-class topic (classroom management). It is clear that this posting was inspired by the extensive in-class discussion of classroom management, and since her audience consisted of classroom peers and the instructor, who were involved in this discussion, it was not necessary to explicitly connect the story of the governor's classroom management problems with the in-class ongoing discussion of this topic. In this case, the student integrated relevant information from outside sources into the web discussion on classroom management issues in much the same way as she would have done in any FTF conversation, without explicit connection or introduction.

The students were motivated by diverse sources in their postings to the web discussions. The graph shows that students' practicum experiences (43%) and other participants' web postings (40%) were the highest motivators of students' writing to the web discussions followed by students' relevant life experiences outside the class (27%) and issues emerging during classroom meetings and assignments (26%).

The web involved conversations that established dialogic relations among the messages and participants and was not simply a static space registering students' ideas. Often class material and experiences were understood, reflected, and analyzed by the students using out-of-class references and vice versa. Through this process, students' experiences, reflections, and analytical tools were integrated and woven together (Putnam & Borko, 2000). Consider, for example, the following exchange among three students:

(Student 1) I just have a question that I just don't understand. WHY ARE SOME OF THE TEACHERS SO JEALOUS OF SOME PRACTICUM STUDENTS, WHO AREN'T EVEN CERTIFIED? (Caps in original)

(Student 2) L, I am not quite sure that I know exactly what you mean, but I hope that I have an idea. If you mean that some of the teachers are jealous of the relationships that the practicum students have with the children, then it could be simple. Some teachers seem to have a bond with their class and when someone new comes in and creates a new relationship with the students, friction may be felt. I definitely don't agree with that at all because I feel that the more positive influences in a student's life at school, the better. Students need all of the help and support that they can get and I think that teachers need to put the best interests of their students first. What do you think?

(Student 3, replying to "M" above) I agree with you on this one. Teachers do build up their own relationships with their students and even grow to love them like their own kids because of all the time they spent with each other and when someone else comes into the classroom and your students start building up a relationship with these new people and doing thing to please them, it just starts to hurt your feelings. You know your students still feel the same for you, but having someone new in the class is exciting and gets students curious so naturally they start bonding with the new person. I'm sure the teacher knows this, but it does still hurt you to see your class turning their attention to the new person. My sisters had a student teacher in their class this year and they as well as the other students were so excited, especially since the student teacher was a male which is rare over there. Kids were always around him, they seemed to have fun in everything they did and they absolutely loved him. One day the real classroom teacher went over to check on them on she saw the kids laughing it up and giving the student teacher hi fives for correct answers and she just broke down. She was over in my mom's class crying about

how much the kids love him and how she was losing them. I know she felt the kids were learning and that he was doing a great job and she was in this program to help him graduate and it was in everyone's best interest to see new teaching methods and all, but teachers do have feeling too, and when this sort of "take-over" of their kids comes up, of course their going to be a little jealous or upset about their kids suddenly turning all their attention to someone else.

This is clearly a dialogic exchange where the students' postings are intended to respond to and elicit the response from each other (note the comments like "feel free to write" and "what do you think?"). In this sense, the Web Talk is a dialogic space where the discussion by the first two students of their practicum and in-class experiences elicits the third student's description of her sister's story, an out-of-class experience.

It is important to note that the practicum and out-of-class experiences were student-initiated references and not examples elicited by the professor to illustrate the instructor's curriculum. This provides evidence of the students' active learning and shared ownership for the class being supported by the Web Talk discussions. Moreover, these student-initiated references helped to guide the instructor's class instruction by revealing students' practicum and life experiences relevant to the class and the "hot" issues of the students' immediate concerns. In this way, the students guided and owned the curriculum on the web rather than treating it as an "assignment board" for narrow replies to the instructor's questions.

C: Problematicity: Did the students use the web both to define and to address problems?

We found that both processes were present in the web discussion. According to our analysis, 47% of all student web postings involved problem-defining issues and 94% of the postings included attempts to address issues or solve problems, while only 3% of all student postings did neither. We coded different degrees of expression of problem-defining and problem-addressing processes in the students' web postings as shown on Figure .

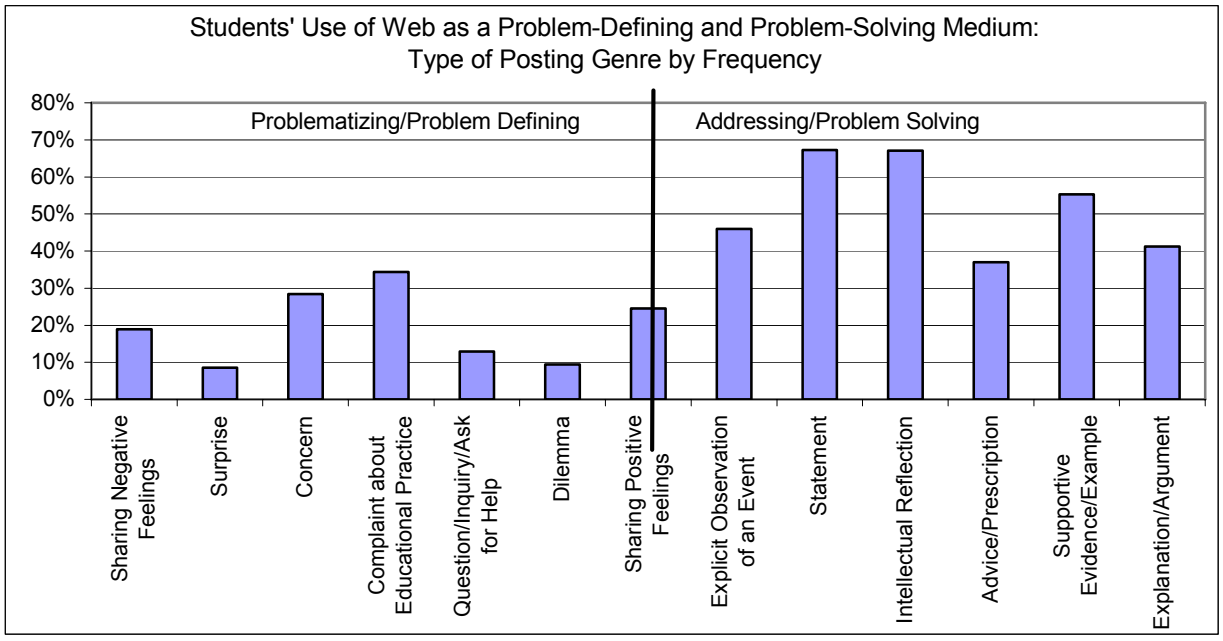

Figure 4. Web as Problem-Defining and Problem-Solving Medium

We think that both problem-defining and problem-solving processes support the professional nature of this learning community and address the concern about the possibility of students' individual web postings making "shallow contributions." Problem-defining most frequently took the form of students' complaints (34%) and concerns (28%) about educational practices they witnessed and/or experienced in their teaching practicum or as students (in their past and present). Once defined, these problems provided opportunities for reflection and critical thinking initiated by the students, evidenced by the high frequency of problem-solving postings and exemplified by intellectual reflection (67%) and statements (67%) about educational practices, supportive evidence or examples (55%), observation of a practicum event (46%), and explanation and argumentation (41%). The interplay of student-initiated problem-solving and problem-defining postings seems to reflect students' deep

intellectual engagement and constructive and critical thinking about educational practices – the core component of the discourse responsible for development of capable educators and a key component of a community of learners.

D: Dialogicity: Did students both support and challenge ideas of other students?

We analyzed the relations among students' web postings to see if we could find dialogic relations of supporting and challenging each other's ideas that characterize an academic discourse. Out of all students' web postings, 60% involved providing support to the original author's messages, 15% challenged, and 37% neither supported nor challenged. However, if we take out students' initiations (42% or 365 postings) and focus on only students' replies (494 postings), the percentages are 94%, 24%, and 4%, respectively.

As indicated in figure 5, we identified several different methods of support as well as challenge. The most frequent means of support was through elaboration (32% of all students' postings) and aligning with author's experiences or ideas (22%) (see figure 5).

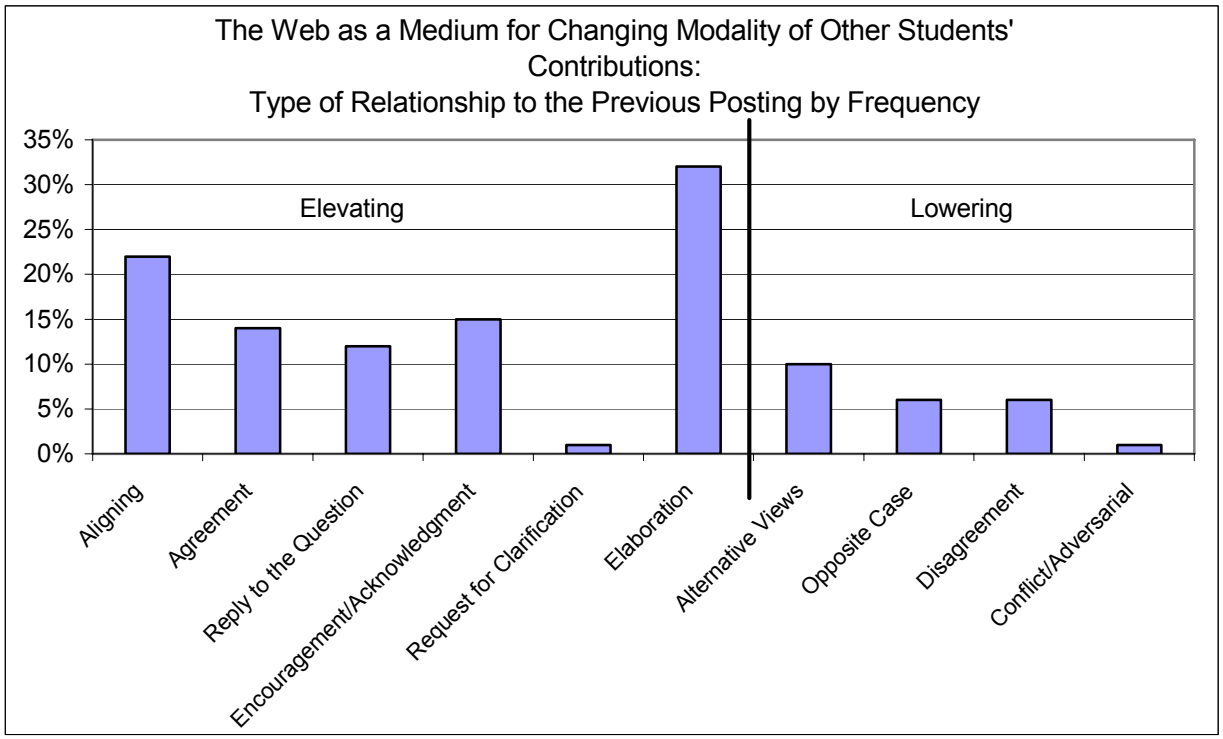

Figure 5. Web as a Medium for Supporting and Challenging Other Students' Ideas

It is important to note that elaboration on the original author's posting is "a borderline" case of supporting the original author because an elaborating reply often transcended the original author's ideas and, thus, may problematize it as is evident in the following exchange among three students:

(Student 1) I have noticed that alot of the students in my class tell on each other immediately about everything. Even the most trivial things. They are in first grade and I have been telling them that nobody likes a tattletale and they should work things out themselves. Have I been handling this OK? I never know what to do.

(Student 2, replying to student 1) L, I think you are absolutely correct in telling your kids that no one likes a tattletale. My cooperating teacher deals with tattletaling in one quick and easy way -- she has been telling the kids from the beginning of school, "I don't want to hear about it unless someone is hurt or there's a fire." This narrows it down a bit for them, and now they won't dare go up to her and say something like, "Johnny knocked my book on the floor!" I hope this helps you out a little.

Although Student 2 seemed to think that Student 1 was "absolutely correct," her elaboration of the first student's approach leads to an indirect critique of the approach. Blind forbidding of kids' reporting on each other can be

dangerous. She points out that her practicum teacher legitimately reserved students' reporting on each other for some serious cases. This hidden critique became explicit in another student's later reply to Student 1 (it is difficult to say how much Student 3 was influenced by Student 2's message):

(Student 3 in reply to Student 1) I think that you definitely handled the situation correctly, but next time a situation arises you might want to explain a little more. In other words, I feel that the student should know that if it is serious issue or problem that it is then okay to tell. That is the only thing I would encourage, but other than that you handled it great.

The most frequent ways of challenging the original messages were by the students' introducing alternative ideas (10%), bringing opposite cases (6%), and openly disagreeing (6%). Often students both increase and decrease the modality of the original message as in the following example, where students write advice to future EDST 390 students:

(Student 1) This class can be overwhelming, only if you let it get that way. From day one, students should be reading the syllabus so they know what is due and when. What I did, which worked out great, is planning ahead. I figured out when things were due and worked on them ahead of time so I wouldn't get bogged down at the last minute. Another bit of advice, that is kinda obvious, is to really do the readings. I got so much out of the readings and I think the people who didn't learn a lot from this class didn't do the readings.

(Student 2 in reply to Student 1) I think what you said about actually doing the readings holds true in most cases. The reason why I think most people don't do the required readings is because a combination of the assigned readings in all of your classes is way to overwhelming to even consider. In the perfect world, we would have nothing tempting us from reading 10 or more chapters a week. But let's face it, in most cases this does not happen. The best thing to do would be to keep most of your education textbooks for future reference. You may not think so now, but I bet they definitely come in handy later. Just an idea for those who aren't broke right now and in desperate need of selling books back!

Although Student 2 formally agreed with Student 1 about the importance of reading assigned class literature on time, she actually undermined the original statement by arguing that in the real world reading on time can't be possible because of the amount of literature assigned by different courses.

Students not only challenged each other but also the instructor, as is evident from the following example:

(Instructor) I really like the discussion K. is initiated (although some people raised similar questions earlier). I want just comment on one point that E. made, "If I don't do my work then I may have to miss recess to get it done." One of the problems with the strategy you described is that it makes the student feel the learning and activity almost as punishment (i.e., negative). In the innovative school I participated and observed in Utah (OC), this was a major concern of the teachers and parents -- how to make consequences favorable for learning. For example, after all-school program "Inventions and Inventors" all children were asked to invent something and write patents. Then, there was an invention convention when kids from all school come to see the inventions presented by the authors. Those kids who didn't put enough efforts have opportunities to observe how little audience their invention gathered. In my view, this type of "natural consequences" supports learning and learning activities because as I observed many kids learned to put more efforts next type in their projects. What do you think?

Student 1 (in reply to Instructor) Eugene, although I agree that what you described can translate into learning for some individuals, I do not think that all students will benefit from this. Nor do I think all students will benefit from "staying in at recess." What you described, though (students not receiving an audience for the work they did) can only be applied in a situation where an audience would be a factor. This does not always happen in normal classroom structure. Take for example, a student whom I know. He was not doing his math homework and did not know the lesson once he went to school. At school, he felt bad about himself--because he didn't know the answers when called on. His parents took away privileges in order to get him to do his homework. He had a set amount of time to do math homework. He also had the support and help of his parents. What this student will now tell you is that he feels good about himself; he is surprised to find out that he is not stupid, and that he is not "bad at math." He learned through CONSEQUENCE that it is important to study and that the result of that can lead to the intrinsic desire to continue learning.

Based on the presence of both supportive and challenging relationships among postings, we concluded that the students were in dialogic relations with each other. In a similar analysis of a web-based discussion, Dysthe

(2002) also found a high degree of dialogicity among participants, and argued that this dialogicity was at least in part due to the nature of the discussion prompt provided by the instructor, an open-ended question about one of the class readings. Dysthe argues that "it is crucial to set an interesting and challenging initial assignment, so there a certain curiosity about the input from different voices" (Dysthe, 2002, p. 346). Wickstrom also concluded from her own preservice teacher discussion forum that the most interesting postings occurred when students brought their own genuine concerns to the web (2003). We agree, but in our own case we believe that the student motivation to engage in dialogic interaction came from the lived and unpredictable practicum experience. Theoretical and hypothetical questions, no matter how engaging, are no match for reality.

The process of collective reasoning and reflection sometimes, but not always, led to students' declarations of changing their mind or initial positions, as has been described in other research (Lampert & Ball, 1998). Although less frequent than support and agreement, challenging and disagreeing was a part of the class web discussion. The students clearly agreed more with each other than they disagreed, which is consistent with findings from similar research (Bonk et al., 1999). One study has linked feedback, particularly supportive feedback, with deeper level discussions, suggesting that this process fosters interactions by creating a "sympathetic sense of community" (Makitalo et al., 2002). It may be a "natural" process of any academic discourse that participants have a higher percentage of postings supporting rather than challenging each other's ideas. Or, it may be that the students tried to be "nice" to their peers and not challenge them too much (possibly to avoid spoiling relations over disagreements). Indeed, one study found that students in an online discussion were more likely to make negative comments out previous postings if they were able to do so anonymously (Freeman & Bamford., 2004).

It is important to recall that our web participants were a strikingly non-diverse group in terms of ethnicity and class, as mentioned earlier. It has been claimed that web-based discussions allow discussants more freedom to express themselves because markers race, gender, class, and ethnicity are not visually available (Lenert & Harris, 1994). Nevertheless, at least one study has found majority-minority conflict in web-based discussion involving majority (Anglo) and minority (Hispanic and Navajo) students, with the troubling tendency of the minority voices to be silenced and diminished (Sujo de Montes, Oran, & Willis, 2002). In this light, we suspect that the relatively homogenous nature of our students might have further contributed to their tendency to support each other, and that minority perspectives that really challenged the students' majority world view tended to come from the situations arising in the practicum and sometimes from the instructor, further emphasizing both the importance of the diversity practicum and the key role of the instructor, as described earlier.

Motivation: Were students motivated beyond the extrinsic motivation of course requirements to participate in the web discussion?

We made an indirect analysis of students' motivation to participate on the web. Our results suggest evidence of mixed motivation for many students. We assessed the number of students writing additional and extra-long postings. Additional number of postings was defined as exceeding the minimum number of 2 per week as required by the instructor. Extra-long postings were defined as posting having more than 215 words (see Figure 6). This threshold came from the median of number of words in the XMCA professional academic e-mail list as described above. Bonk and his colleagues (1999), whose class web discussions were organized as response to cases, found that the average number of words per student posting varied between 110 and 140 words per class. Dysthe (2002), whose web design involved postgraduate students' response to the instructor questions, reported on average 300 words per student posting.

Almost all students exceeded requirements at some point of the class. For the semester, web postings generated intensive writing from the students with totals ranging from 11 to 84 300-word double spaced pages with a median of 19 pages. Of course, there could be alternative explanations of why students posted additional web postings per week rather than intrinsic motivation (e.g., possible informal competition among students for being "the best student", expecting extra credit from the instructor despite the fact that the instructor did not promise any extra credit). However, it is difficult to find an alternative explanation of why the students wrote extra-long postings. It is also important to remark that to some degree, our assessment of intrinsic motivation is indirect and "conservative."

The graph also suggests that the number of students exceeding the number of required postings per week and/or writing extra-long postings both increased in the first part of the semester. In the second part of the semester, the number of students posting extra-long messages decreased somewhat, probably because of an increase of demands from other classes and because of the end of the practicum in week 12.

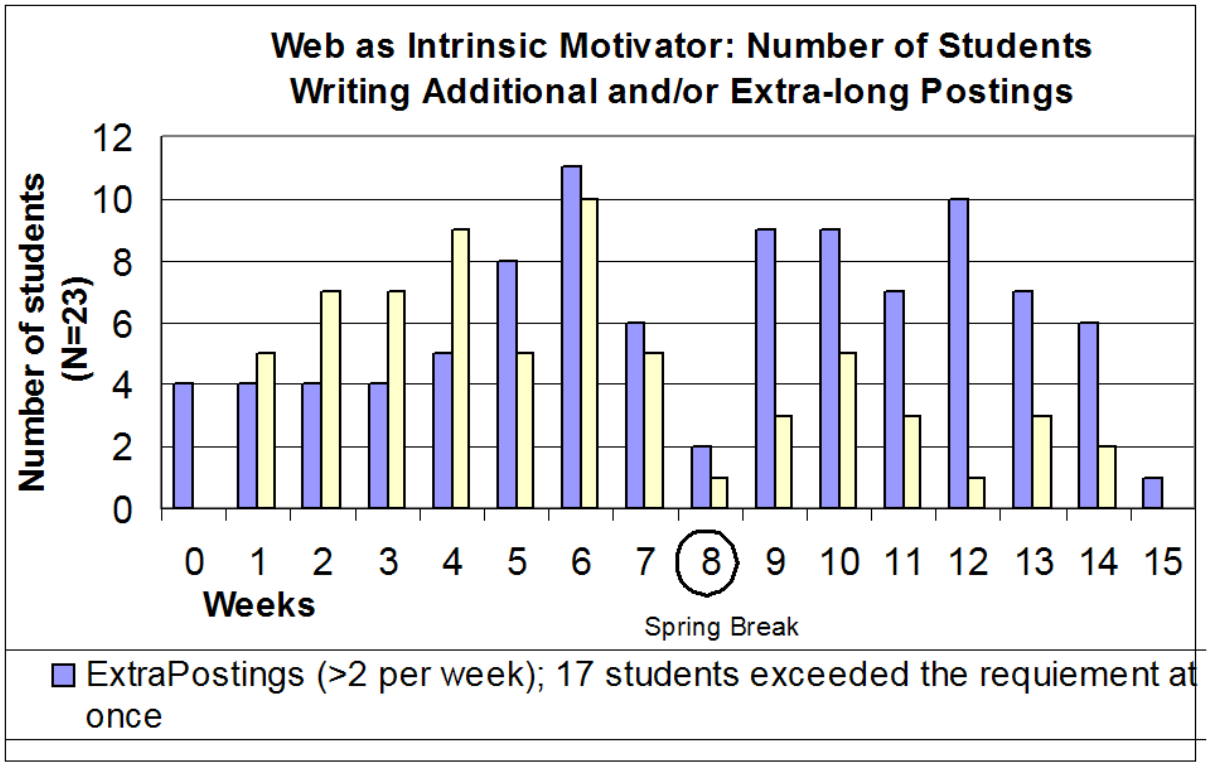

Figure 6. Number of Students Writing Additional and/or Extra-long Postings

The fact that some students did not write additional or extra-long postings per week does not suggest that they did not have intrinsic motivation. We also cannot conclude that the students were intrinsically motivated to participate in their web discussions all the time during the semester. The students' anonymous course evaluations showed that all students liked participation on the web very much and considered it as the one of the most successful features of the class, although some students also indicated initial reluctance to participate due to problems with computers, initial lack of computer skills, negative attitudes to computers, initial disruption of life habits associated with systematic checking the class web, and, finally, the mandatory nature of their participation on the web discussions (not knowing what to write). However, they unanimously insisted that the success of the web discussions was associated with mandatory participation. This indicates some complex intertwining of extrinsic and intrinsic motivation, at least for some students. More research is needed to investigate this issue. In sum, the findings suggest that at least for some students at some time, participation on the web discussion was intrinsic and authentic beyond the extrinsic motivation of the class requirements.

Conclusions

Our findings suggest that discussion webs can support the development of an academic community of learners. Our web-based discussions demonstrate that:

1. Students comments demonstrated a shared focus on the academic themes defined by the instructor in the syllabus, despite the fact that he did not assign topics for web discussion or penalize off-topic comments.
2. Students integrated their lives outside the classroom and outside the teaching practicum with the issues discussed, suggesting they participated deeply as "whole-person-in-leaning" rather than disembodied information receptacles.
3. Students defined their own problems and addressed them; this is especially important to prepare students for teaching, since problems and issues defined by instructors may not be relevant for them in their future practice.
4. Students were able to enter into dialogic discussions with each other, both supporting and challenging the statements of others in various and often subtle ways.
5. Students seemed to have shared ownership of and genuine interest in their class web discussions.

As we mentioned in the introduction, we believe that new media, as any tool, has the potential to fundamentally change the nature of communication, both in ways that we hope for and in perhaps less desirable ways. In this

paper we have demonstrated one way that on-line discussion can help us to achieve our goal of creating a community of learners, but how might this happen? The nature of web discussions is different from both face-to-face communication and e-mail exchanges. Unlike face-to-face communication (FTFC), web discussion is asynchronous, non-sequential, and selective (i.e., participants can ignore other persons' messages without any negative consequences). The discussion web creates and stores its own history and provides a shared space for communication; "Unlike a live classroom, where conversations disappear, the Web allows every thought to be captured for future examination, elaboration, and extension" (Owston, 1997, p. 29). In this sense, web discussions can provide opportunities for deeper reflection and promote more access from different students to classroom communication. The non-linear graphically represented discussion threads help students follow and reflect on the ongoing web discussions because they preserve "turn adjacency" -- messages are posted with regard for what they are responding to (Herring, 1999).

We do not suggest replacing traditional ways of class interaction with a class web discussion but rather supplementing them (Bonk, 1998). A discussion web can supplement other ways of communication and instruction, providing additional channels of comfort for some students, and thus facilitating pedagogical innovations (Bonk et al., 1999). Jaffee (1998) contrasts a traditional college classroom with a classroom involving Asynchronous Learning Network (ALN):

> The classroom institution has historically centralized power and influence in the hands of the instructor. When faculty walk into the classroom the learning begins; faculty are the source of knowledge; faculty communicate information and influence the students; faculty determine what will be taught, who will speak and when; faculty determine the correct or incorrect answer; and faculty determine when it is time for students to "stop learning" and leave the classroom. ALNs, in contrast, shift a considerable amount of power, authority, and control from the faculty to the students.

Implications

We do not assume that web discussions are either a necessary or sufficient pedagogical tool to determine development of a community of learners. There are many different ways of developing an academic community of learners around subject matter with and without using web discussions. Our study was designed to investigate whether a class discussion web in and of itself can support the development of an "academic community of learners." We argue against "technological determinism" according to which ALN by itself, without a specific pedagogical design of its use provided by the instructor and supported by the students, leads to a reform of class instruction (Bonk et al., 1998). As Putnam and Borko put it, "Simply providing new media and access to communication with a much wider circle of colleagues and experts is, in itself, unlikely to change the nature or form of teachers' professional interactions" (Putnam & Borko, 2000, p. 11).

Pena-Shaff and Nicholls, in their discussion of the largely monologic nature of the web discussions they analyzed, concluded that the technology alone is not enough to produce dialogic interaction, but that the teacher's integration of these discussions into the course is a crucial aspect of the success of these discussions (2004). In our class, where students met virtually on the Web and also physically in class every week, discussions initiated on the web often continued in the physical classroom space and vice versa, and the instructor often mediated and encouraged this process. Therefore, we agree with the argument that teachers are responsible for facilitating the development of dialogic interactions as they emerge on the web. The instructor's role in this practicum class, like the moderator's role in any on-line learning community, consists of "encouraging critical reflection on workplace practices and group identity" (Gray, 2004). One study based on simply counting the number and length of postings and threads determined that instructors who post more frequently and initiate threads more frequently actually tend to elicit fewer and briefer students postings (Mazzolini & Maddison, 2003). We think these results point to the importance of further qualitative analysis of the strategies of instructor participation on the web.

One instructor/researcher working in a class similar to ours describes that her students' internet-based class discussions achieved a new degree of critical reflection on their practicum experiences when she brought these virtual free discussions into the classroom. In class she helped them to frame questions around their reported experiences based on classroom readings and encouraged them to take these critically-framed discussions back to the web for further discussion (Whipp, 2003). We refer to our own similar strategy as bring "hot topics" that emerge in web-based discussion into the class and structuring our curriculum loosely with these emerging hot topics always taking priority over previously scheduled activities (Matusov, St. Julien, & Hayes, 2005).

As we begin the next step of our investigation of instructional contributions of class web discussions, it is important to examine institutional constraints, students' backgrounds, overall classroom pedagogical design, and properties of the webs to define conditions that allow interactive webs to support the development of an academic community of learners. It is also important to address limitations, drawbacks, and expenses of using discussion webs for the students and instructors as well as to examine their attitudes and perceptions of the class web discussion. Finally, many instructors considering using web discussions in their classes are interested in defining "developmental phases" of unfolding a "typical web" to distinguish a normal development of a discussion web from web failures. They are also interested in the instructor's role in supporting a class web discussion. This study also did not focus on distinguishing characteristics of individual students as evidenced in the nature of their participation on the Web Talk, but again this is a direction for further research. Finally, we have been collecting data from students concerning their attitudes toward using the Web Talk, in an effort to advance future research in this direction.

We see our research as a beginning, not a conclusion. We feel that one of the most important contributions of this study was in developing a new methodology (e.g., deriving coding categories from the theory and from instructors' concerns; defining and operationalizing concepts like Piaget's "collective monolog" (Piaget, 2002); and Latour's concepts of raising and lowering modalities inherent in scientific academic discourse). We designed these coding schemes and raised these particular questions based on our experiences in practice, as part of an ongoing attempt to design and redesign our own practice and share ideas with other researchers.

Acknowledgements

Parts of the paper were presented at the International Conference on the Learning Sciences, December 1998, Atlanta, Georgia. We would like to thank David Blacker and John St. Julien for discussion of the research and providing feedback on the paper. This research was supported by a Spencer Small Grant.

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