Analysis of the Content and Purpose of Four Different Kinds of Electronic Communications Among Preservice Teachers

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Abstract:

This study examines the content and purposes of four different types of electronic exchanges among a cohort of preservice elementary education majors across three semesters. Messages were exchanged (a) student to peer, (b) student to keypal, (c) student to instructor, and (d) student to group of peers using Web-based software that supported asynchronous, threaded discussions. The major purposes electronic communications served included opportunities for personal reflection, sharing teaching activities, and offering support. However, the peer-to-group messages fostered more reflective exchanges than other forms of one-to-one electronic communication studied. (Keywords: discussion, e-mail, electronic communication, peers, preservice teachers, reflection, threaded discussions, TopClass.)

Many instructors use a variety of electronic communications as an integral part of their teaching (e.g., Thomas, Clift, & Sugimoto, 1996). However, the purposes and the relative value of using electronic communications, such as Internet mailing lists or electronic bulletin boards, are not always evaluated. Furthermore, selection of a particular method of electronic communication may not be based on available data or tied to the goals of the program, the course, or the instructor. More likely, the selection of electronic methods of communication to be used in courses is based on availability or familiarity.

This study reports findings based on a content analysis of four different types of electronic communications exchanged among undergraduate teacher education majors at a university in the southeastern United States. The types of communication were: (a) student-to-peer e-mail journal entries exchanged between self-selected pairs in the cohort group, (b) student-to-keypal e-mail exchanges with a teacher candidate in another state, (c) e-mail exchanges between students and their university instructor/supervisor, and (d) student-to-group messages exchanged as part of an asynchronous, Web-based, threaded discussion group using a program called TopClass (1996).

This article describes the content of the topics discussed and the purposes these exchanges served for preservice teacher candidates across three semesters. Two basic research questions focused the data gathered for this study:

1. What is the content of various types of electronic communication used by preservice teachers?

2. What purposes are served by these electronic communications?

Analysis of the content and the purposes served by these electronic exchanges is reported, and implications for the potential impact on the development of reflection in preservice teacher education is discussed.

BACKGROUND
PROFESSIONAL DEVELOPMENT SCHOOLS

In recent years, the field of teacher education has moved away from apprenticeship models with single student teaching experiences toward professional development school (PDS) models (e.g. Darling-Hammond, 1994; Holmes Group, 1986; Lieberman & Miller, 1992). In most PDS programs, prospective teachers spend significant amounts of time in a variety of practicums or internships and other field experiences prior to student teaching, hence increasing their time in actual classrooms. They take their foundations and methods courses at the university concurrently with their field experiences, and they progress through their programs in cohort groups for mutual support. The cohort group concept also increases opportunities for preservice teachers to discuss what they are learning from their coursework and field experiences with peers who are at approximately the same stage of development.

In addition, some PDS programs, such as the one at the University of North Carolina at Greensboro (UNCG), are activity-oriented, inquiry-based programs that engage prospective teachers in a variety of reflective practices over the course of two years in the teacher preparation program: (a) developing case studies of individual children, (b) conducting regular peer observations using a peer coaching model, (c) discussing and then writing their own dilemma-based cases, (d) participating in group and individual action research projects, and (e) developing teaching and technology portfolios.

The philosophical and theoretical perspective of the teacher education program at UNCG is constructivist (Ammon & Levin, 1993; Brooks & Brooks, 1993; Fosnot, 1989, 1995; Henderson, 1996; Levin & Ammon, 1992; Zemelman, Daniels, & Hyde, 1993); the program is based on the belief that prospective teachers construct their own understandings of teaching and learning based on their prior knowledge and beliefs, their current and past experiences related to learning to teach, and focused reflection on these experiences. In addition, the program provides a variety of inquiry-based and reflection-oriented experiences for preservice teachers to help them gain a better understanding of teaching and learning, which will make them better teachers.

As members of a PDS cohort, our teacher candidates submit reflective dialogue journals about their field experiences every few weeks during the three semesters prior to their full-time student teaching semester. Topics for these electronic exchanges are not restricted, although the preservice teachers are asked to write about what they are seeing, doing, and learning in their field experiences. Two of the entries in these journals are written directly to the instructor and are usually submitted by e-mail. One entry is also submitted by e-mail to a peer who also responds by e-mail. One other journal entry is sent by e-mail to a keypal, another preservice teacher in a different state. During the third semester of our teacher preparation program, teacher candidates chose whether to con tinue the regular journal assignments or to participate in an asynchronous, threaded discussion using a Web-based program called TopClass (1996).

JOURNALING AS A REFLECTIVE ACTIVITY

Numerous studies in the teacher education literature attest to the potential value of using dialogue journals to promote reflection (Beach, 1994; Guillame & Rudney, 1993; Hoover, 1994; Kasten & Ferraro, 1995; Lerner, 1993; Surbeck, Han, & Moyer, 1991; Zulich, Beane, & Herrick, 1992), and thus to promote the development of teachers (e.g., Ammon & Levin, 1993; LaBoskey, 1994). In addition, different formats for reflective journals are described in the literature, and attributions are made about the value of various kinds of journals for promoting reflection (Beach; Guillame & Rudney; Hoover; Lerner; Scherr, 1993; Zulich et al.). In general, the use of journals in teacher education programs is thought to encourage and promote reflection during the process of learning to teach (e.g., Ammon & Levin; LaBoskey; Valli, 1992). However, the level of reflection seen in journals varies with the individual's propensity for reflection (LaBoskey; Surbeck et al., 1991), time in the program (Zulich et al.), and focus of the teacher education program (Zeichner & Liston, 1987).

TEACHER DEVELOPMENT AND REFLECTION

Early work by Fuller (1969) and Fuller and Brown (1975) about the connection between reflection and teacher development predated other research during the past two decades that also studied this connection (e.g., Henderson, 1996; Huberman, 1993; LaBoskey, 1994; Norton, 1994a, 1994b; Ross, Johnson, & Smith, 1992; Zeichner & Liston, 1987). Among the activities and data sources typically used for promoting and studying reflection are (a) various kinds of journals, (b) written reflections on videotapes of teaching events, (c) analysis and/or creation of case studies, (d) exploration of metaphors for teaching, (e) creation of art or writing about images of teachers and learners, (f) action research projects, and (g) the composition of one's educational philosophy.

Certain kinds of activities designed to encourage reflection and metacognitive thinking in preservice teachers appear to focus the reflections on personal concerns (Hoover, 1994), which Fuller and Brown (1975) called "survival" concerns. Other kinds of written reflections encourage preservice teachers to reflect on the teaching situation, including curriculum and instructional strategies, and eventually on one's teaching decisions based on the needs of the students. Other scholars, such as Zeichner and Liston (1987), write about the importance of not only encouraging reflection per se but also fostering reflection that goes beyond personal concerns and technical issues to educational principles and practices, including critical issues in education and the moral, political, and social implications of curriculum and education.

In this study, four different forms of electronic communication provided opportunities for analyzing what the participants were writing, and hence thinking about, during their teacher preparation program--what Harrington (1995) calls "performance of thought." However, following Clark's (1983, 1985, 1994) line of reasoning, the level of reflection, the content of the communications, and whether electronic communication encourages reflection on personal concerns, technical concerns, or critical issues is not inherent in the medium used. Nevertheless, this research was undertaken to shed light on how different kinds of electronic communications may affect the content and purpose of electronic messages sent to different audiences and the development of teacher candidates into reflective practitioners.

E-MAIL AS A REFLECTIVE ACTIVITY

Earlier studies of the use of e-mail among teachers, such as Merseth's (1991) survey of first-year teachers who used e-mail to keep in touch with their peer group, showed us that their electronic communications were used mainly for peer support. Other studies (Anderson & Lee, 1995; Souviney, Saferstein, & Chambers, 1995), indicate that the messages exchanged focused on social, emotional, and moral support (personal concerns) rather than on curriculum and teaching concerns (technical concerns) or other professional questions (including critical issues).

Studies, such as one conducted by Thomas et al. (1996), provide evidence that one's audience for e-mail communication is likely to influence the content of the message. For example, Thomas and colleagues found that their students selected to read instructors' messages first over peer comments on the same topics related to course content, unless the message from a peer was directed to them personally. In addition, Thomas and her colleagues reported that their students felt that e-mail was a depersonalizing or "cool, impersonal medium" (p. 173) that users chose to ignore in favor of other forms of communication, including telephone or face-to-face conversations in both smaller or larger group settings. These authors suggested that use of e-mail may increase if there is interdependence and an expectation for response in addition to easy access. Schlagal, Trathen, and Blanton (1996) also suggested that the structure and expectations of the e-mail requirements, whether they were structured or unstructured, focused or unfocused, and whether adequate time was allocated influenced the content and level of reflection in e-mail exchanges between faculty and students and among the students themselves.

On the other hand, teacher candidates in the Souviney et al. (1995) study found e-mail to be particularly effective for communicating over voice mail, print messages, and even face-to face conversations. Souviney and his colleagues found that secondary education interns tailored the use of e-mail to their personal needs

based on their existing social networks, problems encountered with using e-mail, and personal time constraints. All of these factors are important to consider when preparing for using and analyzing electronic communication with the ultimate goal of helping preservice teachers develop into reflective practitioners.

METHODS
PARTICIPANTS

Thirty-five prospective elementary teachers enrolled in an undergraduate teacher education program participated in this study during the first three of four semesters in their program. Among the participants were 24 white females, 6 white males, 4 African American females, and 1 Caribbean student. Five of the participants were nontraditional students seeking a second undergraduate degree, and the remaining participants were traditional college-age students. All members of the cohort wrote student-to-peer journals, student-to-keypal messages, student-to-instructor journals, and other unsolicited messages for two or three semesters. During the third semester, 11 members of the cohort selected to participate in peer-to-group discussions using TopClass (1996), while the remaining students chose to continue the regular electronic journal procedures.

All participants were part of a PDS cohort group who took all of their methods courses together, met weekly in a seminar tied to their field experiences, and participated in 10-hour-per-week internships for three semesters prior to full-time student teaching. Each participant interned in two different PDS sites in a large, recently consolidated school district in the southeast. Most participants switched PDS sites each semester and later negotiated a student teaching placement with a cooperating teacher with whom they had interned earlier.

The e-mail journals, keypal exchanges, and Web-based discussion group exchanges examined in this study were among the requirements of the weekly seminars. The goal for using these various methods of electronic communication was to foster critical reflection among these prospective teachers. The author served as seminar leader, university-based supervisor, academic adviser, and instructor of one methods course during this study. However, two research assistants who did not know the participants in this study analyzed the data collected following a coding scheme developed in consultation with the author.

DATA COLLECTION

Data for this study were collected in several ways. First, participants either forwarded electronic copies of their student-to-peer journals and their student-to-keypal exchanges electronically to the instructor or submitted printed copies with their hard-copy journals. Second, student-to-instructor e-mail journal entries and any additional e-mail messages sent to the instructor were saved and printed for later analysis. Third, every entry in the asynchronous, Web-based, threaded discussion on TopClass (1996) was printed by the research assistants for analysis. Additional data related to the usefulness of student-to-peer and student-to-keypal exchanges were gleaned from participants' technology portfolio entries and from specific written reflections solicited about using various kinds of electronic communication at the end of each semester (Levin, 1996). Portfolio reflections were used to shed light on participants' attitudes about e-mail journals and having keypals, but provided no further information about the content of these exchanges. A separate written reflection on the experience with TopClass was also solicited and analyzed for this study.

DATA ANALYSIS

All data were analyzed at the end of the participants' tenure in the teacher education program. These data were analyzed qualitatively using the methods of constant comparative analysis (Glaser & Strauss, 1967) and pattern matching to identify recurring themes suggested by Miles and Huberman (1984). In reading and rereading the e-mail exchanges, 19 themes emerged. These were based on a total of 196 student-to-peer messages, 86 student-to-instructor messges, and 29 student-to-keypal exchanges. Once the categories for coding the purpose of the interchanges were selected, interrater reliability based on separate reading and coding of 25 randomly selected messages reached 85% for content. Discrepancies were resolved through discussion and the identification of exemplars describing each category. Interrater reliability for the use or purpose of the electronic communication reached 95% following the same procedure.

For the peer-to-group discussions, the topics were determined by the participants and the author (who served as a moderator for this asynchronous discussion). Twelve distinct topics were discussed by this group during the semester. However, the purpose of the discourse exchanged was analyzed using the same categories of use or purposes as the other electronic exchanges. A total of 367 codes from 200 messages exchanged while using TopClass (1996) were categorized according to the purpose(s) they served.

Table 1. *Percentage and Number of Topics Coded in Three Kinds of Electronic Communications: Student to Peer, Student to Keypal, and Student to Instructor*

Topics	Student to Peer Percentage (N)		Student to Keypal Percentage (N)		Student to Instructor Percentage (N)	
Relationships	9%	(99)	2%	(4)	6%	(14)
Teacher Development	38%	(439)	36%	(67)	33%	(79)
Personal Issues	3%	(30)	36%	(68)	16%	(39)
Professional Issues	12%	(134)	1%	(2)	4%	(9)
Teaching	32%	(367)	11%	(20)	21%	(49)
E-Mail	3%	(38)	11%	(20)	19%	(44)
Grade Level	3%	(37)	3%	(6)	1%	(3)
Totals(FN*)	100%	(1,144)	102%	(187)	100%	(237)

FOOTNOTE
* Note. Total percentages may exceed 100% because of rounding.

Analysis of all 511 messages often required multiple codings for the content and use of messages. For example, each exchange could receive a variety of purpose codes, and depending on the length, also be coded in more than one content category. In other words, many topics were discussed and several uses were sometimes embedded in a single electronic exchange. The total number of topic codes assigned was 1,568 and the total number of use or purpose codes assigned was 813. Percentages of each content or topic category and for each use were tallied and are reported in Tables 1 and 2.

Table 2. *Percentage and Number of Uses or Purposes Coded in Student-to-Peer, Student-to-Keypal, and Student-to-Instructor Communications*

Uses or Purposes	Student to Peer Percentage (N)		Student to Keypal Percentage (N)		Student to Instructor Percentage (N)	
Decribing	22%	(129)	30%	(31)	33%	(44)
Reflecting	26%	(148)	19%	(20)	13%	(18)
Feedback Not Solicited	5%	(26)	2%	(2)	12%	(16)
Request for Feedback	5%	(30)	20%	(21)	10%	(14)
Support	19%	(108)	11%	(12)	12%	(16)
Evaluation	14%	(82)	3%	(3)	7%	(9)
Problem Solving	2%	(11)	0%	(0)	1%	(1)
Question Asking	7%	(40)	15%	(16)	12%	(16)
Totals	100%	(574)	100%	(105)	100%	(134)

CONTENT CATEGORIES OF ELECTRONIC EXCHANGES

Preliminary themes relating to the content of the e-mail exchanges were reduced to seven categories: relationship, teacher development, personal issues, professional issues, teaching, e-mail and technical problems, and grade-level issues. These categories were based on logical groupings of related themes and subthemes found across all electronic messages and corroborated by a review of the recent literature on coding teacher concerns that are typically found in reflective journals (e.g., Guillame & Rudney, 1993; Hoover, 1994; Koskela & Cramer, 1994; Surbeck et al., 1991) and in e-mail exchanges (Souviney, et al., 1995; Thomas et al., 1996). Content analysis of the TopClass (1996) discussion yielded 12 distinct topics of discussion: first day of school, kids as boss, class and school rules, developing classroom community, white racism, Halloween and other holidays, (g) student teaching concerns, finding jobs, most important thing learned, what I haven't learned, reading instruction, and national testing. These categories were based on a total of 200 individual contributions to the discussion by the 11 preservice teachers who chose to participate in the asynchronous, threaded

discussion rather than continuing the same electronic journal procedures used during the previous two semesters.

PURPOSE OF ELECTRONIC EXCHANGES

Souviney et al. (1995) suggested that when coding e-mail, researchers must pay attention to the complexity of the social network of the participants to be sure the codes reflected their uses of e-mail. Therefore, data in this study were also coded for the use or purpose each message served. Eight purposes emerged across all data collected: descriptive, reflective, unsolicited feedback, request for feedback, support, evaluation, problem solving, and questions.

DISCUSSION OF FINDINGS

CONTENT OF STUDENT-TO-PEER E-MAIL EXCHANGES

As can be seen in Table 1, 38% of the topics coded from student-to-peer e-mail journal exchanges were about the participants' own development as teachers. The content of messages coded as teacher development included (a) discussions by participants about their future plans in education, (b) reflections about their process of learning to teach, (c) reflections on progress in developing teaching skills during their internship, (d) fears about not being respected or competent, and (e) attitudes and opinions about their field placement.

For example, two students reflected about these kinds of concerns with their peers:

however, [I] miss my other class but I think the lower grades is [sic] the place for me. I've already gotten to do a lot with the kids and I'm very excited about the rest of the semester.

I did a lot of observation last Wednesday to see how my semester might go. I have my work cut out for me, but all I need to do is stay confident and be positive.

The next most frequent topic discussed between peers was teaching, which accounted for 32% of all topics coded in their e-mail journals. Entries in the category labeled teaching included (a) general discussions about planning for teaching, (b) discussions of their own lesson plans and their cooperating teachers' lessons, (c) reflections on the effectiveness of their planning and instruction, and (d) comments about the curriculum, including the content and appropriateness of the curriculum for their children. For example, one teacher candidate described her cooperating teacher and what she observed to a peer:

She really wants to make sure that each child gets the knowledge. She will stop class to help a child pronounce a word. She lets them know that they can do the work and does not give them the answer but rather makes them search their past knowledge to get it.

The third most frequent category of discussion between peers, which accounted for 12% of the content of their exchanges, addressed what we call professional issues: (a) problems children face, (b) children with special needs, (c) gender equity issues, (d) questions about the purpose of schooling, (e) concerns about communicating with parents, and (f) school-community relations in general. One example of this category is this participant's description of one of the PDS sites:

You really have to observe and understand the environment and home life of these children. For the most part it is totally different than J-school being that this school is in the center of governmental housing and the population is predominantly minority.

Although the predominant focus of the preservice teachers in their student-to-peer e-mail journals was on their own development as teachers and on their planning for teaching the curriculum, a closer look at the comments coded in these two categories shows that the participants in this study were beginning to develop a reflective stance about these topics. Their comments about teacher development showed evidence of metacognitive thinking about how they are developing as teachers. For example, one teacher candidate wrote to a peer:

My internship is finally starting to pick up. I am starting to feel more comfortable and appreciated. At the beginning of the semester I was feeling out of place and as if I was not wanted or appreciated. Now I feel the students are starting to warm up and realize that I will be there for a while.

Another participant wrote to a peer:

Mrs. W's strongest teaching areas just happen to be my weakest areas (social studies and math). I am certain I will learn a great deal from her.

PURPOSES OF STUDENT-TO-PEER E-MAIL EXCHANGES

Because the tone and purpose of electronic conversations is as important to understand as the content of the messages, all messages were evaluated for their purpose or use. As can be seen in Table 2, the purpose of 26% of the e-mail exchanges between peers was coded as reflective in nature: "When I am a teacher I want to lunch with my students. It gives the teacher time out to have a one-on-one conversation with his/her students. It's real important to know more about your students than just their grades"; 22% as descriptive: "The children worked well and I allowed for the same flexibility of noise that I had witnessed at my last visit"; 19% as supportive "I enjoyed your journal. I hope to hear from you again"; and 14% as evaluative "Nothing but lecture for three solid hours is tiresome."

CONTENT OF STUDENT-TO-KEYPAL E-MAIL EXCHANGES

Discussions about topics of teacher development (36%) and personal issues (36%) accounted for almost three-fourths of the content of the exchanges between the students and their keypals. Student-to-keypal exchanges coded as teacher development focused on the students own development, as can be seen in this example:
I am now in fifth grade. I love it. Last semester I had Kindergarten. I did not have a very good experience with that grade. It seemed to me that I was baby-sitting too much. I believe that I could have done Kindergarten without going to school.

The category coded as personal issues included comments about recreation, coursework, jobs outside of school, and families. For example, one of the teacher candidates described these personal issues to his keypal and requested feedback as well:

The schoolwork is starting to pile up and no matter how late I stay up, there are still a hundred more things to do. How about you?

Another very similar example of personal concerns was shared between this student and her keypal:

This semester I am taking 20 semester hours and working two jobs, not to mention planning a wedding.

PURPOSES OF STUDENT-TO-KEYPAL E-MAIL EXCHANGES

The purpose of e-mail exchanges between keypals included descriptions (30%), unsolicited feedback (19%), question asking (16%), and reflective comments (14%). Descriptive exchanges with keypals included statements such as "I have attended this school for three years now and am scheduled to finish school in the summer," whereas unsolicited feedback offered to a keypal included generally supportive comments such as "I got your message and I'm so glad you shared with me." On the other hand, questions asked of keypals included ones such as "What kind of program does your school have?" Reflective comments found in keypals exchanges included ones like this:

I feel that I have benefited greatly by being able to observe and teach twice a week in an elementary classroom for three semesters before actually having to student teach.

CONTENT OF STUDENT-TO-INSTRUCTOR E-MAIL EXCHANGES

The main focus of e-mail exchanges between the participants in this study and the author (who was their field

superviser, academic adviser, and instructor for weekly seminars) revolved around the topic of their development as teachers (33%) and issues around teaching (21%), including planning lessons and teaching the curriculum. The messages coded for this study were often unsolicited and separate from their journal assignments, and they often started a string of e-mail correspondence between the preservice teacher and the instructor that lasted for several weeks. An example of the types of messages received by the instructor about teacher development included this one from one teacher candidate:

It means a lot to me that you have confidence in my capability and are worried about the outcome of my internship.

And, an example of unsolicited comments received by e-mail related to teaching included this one from a teacher candidate:

I was unaware of Mrs. M's rules concerning this morning ritual so I asked several reliable students and decided to act in accordance with her policy.

Nineteen percent of the content of unsolicited exchanges involved technical issues "I am also having trouble printing our e-mail," or referred to other problems with e-mail in general or their keypal project in particular. Finally, 16% percent of the conversations were about personal issues including their coursework, schedules, and recreation plans.

Table 3. *Percentages and Number of Topics Discussed by Purpose During TopClass Discussions*

Topics Uses	First Day Of School		Kids as Boss		Class and School Rules		Building Community in the Classroom		White Racism		Halloween and Other Holidays	
Describing	31%	(5)	0%	(0)	16%	(3)	5%	(1)	0%	(0)	19%	(5)
Reflecting	86%	(14)	88%	(15)	100%	(19)	90%	(18)	95%	(19)	100%	(27)
Feedback Not Solicited	0%	(0)	6%	(1)	11%	(2)	10%	(2)	15%	(3)	4%	(1)
Request for Feedback	6%	(1)	18%	(3)	42%	(8)	15%	(3)	40%	(8)	11%	(3)
Support	56%	(9)	24%	(4)	47%	(9)	55%	(11)	50%	(10)	26%	(7)
Evaluating	13%	(2)	0%	(0)	5%	(1)	5%	(1)	0%	(0)	4%	(1)
Problem Solving	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Question Asking	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Other	13%	(2)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	4%	(1)

Topics Uses	Student Teaching		Finding Jobs		Most Important Thing Learned		What I Have Not Learned		Reading		National Testing	
Describing	5%	(1)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Reflecting	86%	(18)	54%	(7)	100%	(15)	100%	(12)	100%	(7)	95%	(18)
Feedback Not Solicited	19%	(4)	54%	(7)	0%	(0)	8%	(1)	0%	(0)	16%	(3)
Request for Feedback	43%	(9)	38%	(5)	6%	(1)	8%	(1)	14%	(1)	32%	(6)
Support	33%	(7)	15%	(2)	27%	(4)	50%	(6)	57%	(4)	37%	(7)
Evaluating	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Problem Solving	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Question Asking	10%	(2)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)
Other	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)	0%	(0)

   Note. Percentages in columns (topics discussed) equal more than 100% because of each message may have served more than a single purpose.

PURPOSES OF STUDENT-TO-INSTRUCTOR E-MAIL EXCHANGES

The purpose served by one-third of the messages from the students to their instructor were coded as descriptive; for example, "I have not worked out a schedule with Mr. S- and Mrs. W- yet. I intend on having a set schedule for both places so I can plan specific activities and observations." However, 13% of the messages received from the teacher candidates in this study were coded as reflective (e.g., "I am quite nervous about my internship this next semester but hope that I am not getting in over my head with the TMH class"), with 12% coded as providing unsolicited feedback ("Thanks for taking time out of your busy schedule to give me words of encouragement"), 12% as offering support ("Anyway, welcome back to you also. I hope you have a good semester"), and 12% as question asking ("Mrs. D wanted me to ask you how Lunch Buddies were to work this semester?").

CONTENT OF THE PEER-TO-GROUP DISCUSSIONS

As mentioned earlier, 12 topics were discussed by the 11 preservice teachers who selected to participate in the asynchronous, Web-based discussion group during the third semester of this study. Many of these topics were preplanned by the author, who served as the moderator of the discussion. However, several topics were prompted by the participants' comments or questions, including a mix of personal and technical or instructional concerns, raised during the discussion. These included the teacher's role as the boss in the classroom, concerns about the upcoming student teaching experience, finding jobs after graduation, and concerns about not knowing how to teach reading effectively.

As can be seen in Table 3, most of the Web-based electronic exchanges were about the following topics: (a) ways to teach about Halloween and other holidays, (b) ways to build a classroom community, (c) concerns about student teaching, and (d) white racism. More than 20 messages were exchanged about each of these topics. Discussion about the pros and cons of having a national test and a lively exchange about developing class and school rules also generated much discussion. Apparently, the least engaging topic was about ways to teach reading and the few messages coded as "other" were about technical issues relating to the use of TopClass (1996). The content of these student-to-group discussion topics had potential for promoting and supporting reflection on a range of personal, technical or instructional, and critical issues (Zeichner & Liston, 1987), depending on the tone and the purpose of the participants' messages to the group.

PURPOSES OF THE PEER-TO-GROUP DISCUSSIONS

As can be seen in Table 3, the main purpose that the TopClass (1996) discussions served was reflection. That is, for all topics except finding jobs, between 86% and 100% of the comments were coded as reflective in nature "I have seen myself grow in the areas of communication with other people and also in the area of what my expectations may be for other people," which stands in sharp contrast to reflection used in the other three forms of electronic communications studied. For example, reflection served as the purpose for only 26% of student-to-peer exchanges, 14% of student-to-keypal communications, and 13% of student-to-instructor messages.

Another purpose the student-to-group discussions served was for support (15%-57% depending on the topic), which was defined as expressions of approval or offering moral support to another person "I very much agree with Jennifer. Students do need the opportunity to discuss and share knowledge. I think Sherry made a good point about respect." These discussions also provided a forum for asking for feedback (6%-67% depending on the topic), as many participants concluded their messages by soliciting comments and suggestions on teaching and problems in the classroom: "If you could teach children what you think they should know, what would you teach?"

SUMMARY AND CONCLUSIONS

In this study, more than half of the dialogue in the student-to-peer e-mail was about individual or personal concerns--either relationships or participants' thinking about their development as teachers. However, almost a third of the conversations were about teaching issues including curriculum, instruction, and planning. These topics echo early work by Fuller (1969) and Fuller and Brown (1975) about preservice teachers' levels of concern. Their presence of both individual and instructional concerns, however, also validates more recent

claims by Guillame and Rudney (1993) and Hoover (1994) that the concerns of preservice teachers may include both personal (survival) and curriculum c concerns, that these may be present simultaneously, and that they are not necessarily sequential or discrete.

In contrast with other studies of e-mail messages exchanged among peers (e.g., Anderson & Lee, 1995; Merseth, 1991; Thomas et al., 1996), the content and purpose of student-to-peer e-mail journals in this study was more than just personal and supportive. The participants in this study reflected on and shared issues about their development as teachers and about teaching the curriculum in thoughtful ways. They also served as sounding boards for their peers who sought to share problems "I thought I would write to you and tell you about an exceptionally bright student that I have in my internship at W," or celebrate solutions to problems encountered "I almost forgot, another thing I did that I think went well was the way I complimented the children on their work and behavior."

However, reflection was the predominant purpose (86%-100%) for each topic discussed the peer-to-group communications when using TopClass (1996). Why this method of peer-to-group exchanges served to promote reflective, self-analytical thinking, rather than simple description, is interesting to consider. In analyzing the TopClass participants' final written reflections at the end of the semester, several possible reasons emerged: appreciation of the chance to learn from others, a sense of validation because their feelings and experiences were similar to others, and liking feedback on their ideas from more than one person. Two of the participants expressed their thinking about the Web-based threaded discussions in their final reflections at the end of the third semester:

Using TopClass was an interesting and educational experience because I was able to voice my opinion and read how other people felt about the same issue. This, in my opinion, is more beneficial than just receiving one other person's feedback. Just to hear what other people are thinking and feeling helps.

I felt the online discussions were more valuable than the journal writing because I got to think about different kinds of questions. Plus, it was presented in a forum. I got to hear other people's ideas of different issues. I also got to hear from other people who never speak up in seminar.

In summary, compared to the other kinds of electronic communications analyzed in this study, student-to-group discussions appeared to foster reflection more than the other forms of one-to-one electronic communication studied. Perhaps the fact that participants had a larger audience for their thoughts and ideas when engaging in these discussions prompted the social construction of knowledge about a variety of topics (Vygotsky, 1987). Perhaps the participants in the student-to-group discussion were at different places in their thinking about various topics and thus able to provide alternative perspectives and perhaps even scaffold the learning of others about a particular topic (Vygotsky). However, it is also conceivable that these 11 students were more naturally reflective than their peers (LaBoskey, 1994).

LIMITATIONS OF THIS STUDY
This study of four types of electronic communications among preservice teacher candidates across three semesters has several limitations, including technological and methodological ones. Even though the content and use made of all e-mail exchanges between peers was analyzed across several semesters, only messages sent to keypals and received by the instructor were included. Therefore, the instructor's replies and the messages received from keypals are not included in the analysis. Furthermore, although all messages exchanged during the Web-based, threaded discussions on TopClass (1996) were analyzed, the number of participants was small (N = 11) and perhaps not representative of the rest of the cohort group. Using an experimental research design in the future might elucidate some of the findings described in this article, including some potential gender differences. However, because only 5 of the 35 participants in this study were males, there may have been some gender differences, but the N is too small to test this hypothesis.

In addition, the scope of this project is not necessarily representative of the range of possible uses of e-mail in

teacher education programs. For example, a colleague who works with another PDS team at UNCG uses e-mail to give written feedback to preservice teachers following her classroom observations. Additionally, other teacher educators use other types of electronic communications quite effectively. Also, the student-to-keypal data should be considered preliminary because this project lasted only one semester, because of technical and human problems coordinating the exchange; therefore, the number of these exchanges was relatively small.

Finally, the unstructured nature of the e-mail exchanges in this study likely influenced the content and purpose of these messages. Other researchers who have studied telecommunications among preservice teachers, such as Souviney et al. (1995) and Thomas et al. (1996), suggest that technical issues, the demands of the task, and the existing social network all influence the uses made of e-mail by preservice teachers. The expressed expectation in this study was that participants would communicate with peers, keypals, and their instructor every few weeks about what they were seeing, doing, and thinking about their field experiences. No specific structure and no specific questions to address were provided, leaving the form of these exchanges up to the students. However, all the participants wrote other forms of reflective journals prior to and during this study, so they had other reflective opportunities that may have influenced the nature of their exchanges.

IMPLICATIONS FOR TEACHER EDUCATION

E-mail and other methods of telecommunication have the potential to affect the way we do business in teacher education now and in the future. More and more college and university campuses are providing their teacher education candidates with e-mail accounts and access to the Internet and the World Wide Web. Telecommunications makes accessing, sending, and sharing information almost instantaneous. How we as teacher educators will make the best use of new technologies is important to continue to study. We are especially interested in continuing to study the potential benefits of e-mail exchanges with keypals who are teacher candidates in different states and we are also looking forward to connecting preservice teacher candidates with elementary age children by e-mail. The content and benefits of the communication that takes place in these kinds of electronic exchanges and those available through the various Internet mailing lists and bulletin boards for teachers on the Internet is also of interest to us. However, we must carefully articulate our purposes for using telecommunications in teacher education. As at least one scholar has noted in doing research about learning with technology (e.g., Clark, 1983, 1985, 1994), the medium is not the message. The technology is only a delivery system. However, various forms of electronic communication, especially peer-to-group discussions, do appear to support the development of reflection in prospective teachers. Nevertheless, it is participants' learning and knowledge growth that we want to study, not just the technological delivery system.

Given that the goal the PDS program at UNCG is to provide an activity-oriented, inquiry-based teacher education program that engages prospective teachers in a variety of reflective practices, it seems that student-to-group electronic exchanges are very beneficial for helping our teacher candidates' develop and construct their understanding of teaching and learning. Apparently the chance to participate in student-to-group electronic discussions appears to foster reflection, which is a goal of UNCG's teacher education program. Just as teachers want to build classroom community, so does the PDS program at UNCG seek to foster reflection and community within each cohort group. In this study, asynchronous, Web-based discussions appeared to promote a reflective stance on personal, instructional, and critical issues by providing a community of peers who can be supportive, provide multiple perspectives, and give feedback to each other as they learn to teach.

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