ABSTRACT

MASON, CHERYL LARAY. An Analysis of Patterns of Computer Mediated Communication Within the Social Studies Student Teaching Experience. (Under the direction of Dr. Peter H. Martorella.)

The purpose of this research has been to examine the computer mediated communication (CMC) among a cohort of middle school social studies student teachers and their university supervisors. CMC was facilitated by desktop videoconferencing and web-based groupware. Desktop videoconference sessions were held weekly using CU-SeeMe software, while, web-based groupware messages were posted voluntarily with NetForum software. The two modes of CMC provided the student teachers the opportunities for professional collaboration from their field placement. A qualitative design was used to identify patterns of discourse and to describe the participants' uses of technology. As a result of the participants' active participation in an online learning community, opportunities for peer collaboration and reflection were enhanced. Data from online conversations, interviews, and observations suggested that the intervention of CMC in the student teaching experience allowed the participants to engage in self-directed professional dialogue. The findings suggest that the participants translated the use of technology from the personal context to the classroom context. As a result of this, they acquired perceptions of themselves as technology users. Desktop videoconferencing as a mode of CMC provided more immediate and satisfactory feedback for the participants than the web-based groupware.

AN ANALYSIS OF PATTERNS OF COMPUTER MEDIATED COMMUNICATION WITHIN THE SOCIAL STUDIES STUDENT TEACHING EXPERIENCE

by

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BIOGRAPHY

Cheryl LaRay Mason was born in Richmond, Virginia. She attended Chesterfield County (Virginia) Public Schools. Ms. Mason earned a Bachelor of Arts in History, with secondary social studies certification, from Meredith College in 1991. Following completion of her undergraduate degree, Ms. Mason served as a secondary social studies teacher in Nash-Rocky Mount (North Carolina) Public Schools. She completed the requirements for a Master of Education in Curriculum and Instruction, social studies education, at North Carolina State University in 1995.

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Dissertation's done . . . time to run the Shamrock!

TABLE OF CONTENTS

List of Figures

Page

CHAPTER I

INTRODUCTION

Background to the Study

Thomas Jefferson introduced his "Bill for the More General Diffusion of Knowledge" to the Virginia legislature in 1779. This legislation declared that the state had the responsibility to inspire an educated and literate citizenry. "If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and will never will be" (Ornstein & Levine, 1984, p.155), Jefferson said.

Jefferson's plan called for the development and support of public schools to educate America's citizens. The notion of public schools assumes that our nation will take all steps necessary to develop and sustain the most effective education system for all citizens. For generations, Americans have attempted to heed Jefferson's clarion call to provide its children with the education they deserve.

Over two centuries later, the desire of Jefferson, a forefather of public education, has gone unheeded. In 1983, *A Nation at Risk* rung a fire bell in the night. The frightening proclamation: American schools were drowning in a "rising tide of mediocrity." American schools were not providing its students with the education they needed or deserved. Countless proposals for educational reform followed the publication of this report. School reform initiatives focused attention on new resources such as textbooks, curriculum packages, testing, and television (Goodlad, 1991).

But the proposals fell short. They ignored improving the education of teachers. Goodlad (1991) argued that little attention has been paid to

teacher education reform because the school reform movement and the teacher education reform movement have not been connected. Decades ago, Sarason (1962) labeled teacher education reform as the "unstudied problem", an assertion appropriate to today.

To address teacher education, an essential ingredient of school reform, the National Commission on Teaching and America's Future (1996) developed a strategy for school reform centered around the classroom teacher. Emphasizing the key role the teacher plays in school reform, the Commission's blueprint for change is based on three basic tenets:

1. What teachers know and can do is the most important influence on what students learn.

2. Recruiting, preparing, and retaining good teachers is the central strategy for improving our schools.

3. School reform cannot succeed unless it focuses on creating the conditions in which teachers can teach, and teach well (p. 6).

Recognizing these principles will help our nation meet the overall goal of this initiative: to provide all "students what should be their educational birthright: access to competent, caring, and qualified teachers" (p. vi). This is the education that Thomas Jefferson envisioned in 1779. To effectively pursue this goal, colleges of education must challenge their traditional teacher education programs and "reinvent" them.

The National Commission recommended that teacher education programs structure their curricula around standards. Specific standards to focus on include, but are not limited to, (a) preparation for collaboration

with colleagues and parents, (b) technological skills for supporting student learning and professional learning in the Information Age, and (c) strong emphasis on reflection and inquiry as means to continually evaluate and improve teaching (p. 76).

This study was designed to examine these three specific standards through the voices and actions of a six-member middle-school preservice teacher cohort during the student teaching experiences. Two modes of computer mediated communication (CMC) were used, desktop videoconferencing and web-based groupware. CMC provided the opportunities for the participants to collaborate and develop reflective teaching skills.

This chapter provides an overview of some of the relevant issues concerning preservice field experiences and CMC used to generate the guiding questions for this study. Definitions of terms, a discussion of the purpose of the study, the research questions that guided the study, and an outline of the organization of the dissertation follow.

Definition of Terms

Since many of the terms used in this study may be new to the reader, the definition of terms are placed early in Chapter I.

CU-SeeMe - software that supports the exchange of real time text, audio, and video over the Internet

Cohort - a group of students that progress through the teacher education curriculum together

Cooperating Teacher - a classroom teacher who is responsible for the guidance of student teachers' field experience

Desktop Videoconferencing - synchronous communication between personal computer users over the Internet

Electronic Mail (email) - text that is sent from one computer user to another over various types of networks

Field Experience - time period that a preservice teacher spends in the public school classroom either observing or teaching

Ethernet - a local area network which supports connections to the Internet

Internet - the sum of all global connected networks

Modem - a device used to connect a computer to the Internet over the telephone line

NetForum - software that allows users to read and post text on the World Wide Web

Preservice Teacher - an individual who is in the process of earning a teacher licensure

Online - the act of a computer user being connected to a network or computer system

Supervisor - a university official who observes and evaluates preservice teachers' professional teaching skills over an extended period

Telecommunications - the exchange of information over the Internet; sometimes referred to as electronic exchanges

Videoconference - Synchronous exchange of audio and video using telecommunications links

World Wide Web - the sum of thousands of high-powered servers connected to the Internet

Teacher Education

For many preservice teachers, student teaching is the culminating and paramount component in their preparation to teach (Clift, Meng, & Eggerding, 1994; Schlagal, Trathen, & Blanton, 1994). The goal of the field experience is to foster within preservice teachers an inquiry orientation which empowers them to become "autonomous and analytical professionals rather than technicians" (Cohn & Gellman, 1988, p.8). The experience offers the preservice teacher the opportunity to apply theory and learn practical concepts. Student teachers are "integrating the theoretical frameworks with classroom realities and . . . negotiating between the differing norms of the university and the school site" (Grossman, 1990, p. 133).

Nonetheless, the time that a preservice teacher is placed in the field is often a period of disequilibrium and isolation (Fuller, 1969; Goodlad, 1984; Scott & Smith, 1990). There is a well-documented gap between university-based methods courses and the ability to teach (Cochran-Smith, 1991; Lanier & Little, 1986). A number of researchers have discussed the inadequacies of the traditional student teaching models (Feiman-Nemser & Buchman, 1987; Goodlad, 1991; Schlagal, Trathen, & Blanton, 1996; Zeichner, 1980). They question the weak link between the university and the school, and encourage colleges of education to rethink their traditional teacher education programs.

Preservice teachers' first experiences in the classroom are often characterized by stress and self-doubt (Katz & Raths, 1992; Odell, 1986). They experience personal and professional isolation during their student

teaching experience (Onosko, 1991). The isolation contributes to the gap between their university methods courses and classroom teaching experiences. This gap is a barrier which restricts the preservice teacher from engaging in the kind of discourse among professors, teachers, and students that is vital to the development of reflective, inquiry-oriented teachers (Blanton, Thompson, & Zimmerman, 1994).

The conflict between theory and practice leads to the omission of two of the National Commission's declared standards for teacher education. The two omitted standards are: (a) preparation for collaboration with colleagues and parents, (b) a strong emphasis on reflection and inquiry as means to continually evaluate and improve teaching. Kickbusch's (1987) study revealed social studies teachers during their field experience emphasize the transmission of factual knowledge, rather than critical thinking skills. The weak links between social studies content and pedagogical skills are evident, as the student teachers in his study did not incorporate social issues or multiple perspective-taking of topics into their teaching.

In 1904, John Dewey (1965) declared that the ultimate intent of teacher education programs should be to prepare teachers to reflect upon the relationship between theory and practice. He cautioned against a technocratic approach to teacher preparation and encouraged reflection upon the theoretical issues and their practical implications. Dewey (1933) defined reflection as "the active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and further conclusions to which it tends" (p.9). The application

of his definition to colleges of education redefines the role of the university in teacher preparation.

If we accordingly conceive of the education of teachers not simply as the training of individual classroom performers, but as the development of a class of intellectuals vital to a free society, we can see more clearly the role of educational scholarship and theoretical analysis in the process. Building on this belief, Zeichner (1980, 1983) called for the development of a reflective teacher. The reflective teacher analyzes classroom situations and develops as a professional in his or her decision making. The development of critical reflection in teachers is "characterized by wide ranging skepticism as well as grounding in logical argument and empirical data. It entails probing beneath surface appearances and questioning claims, evidence and proposals" (Cornbleth, 1987, p. 516). Colleges of education preparing their students in this vein positively shape the lens through which preservice teachers construct their own teaching methods.

Zeichner (1983) calls for an enculturation process through which "candidates transcend their self-oriented student preoccupations to become more other-oriented" (p.288). To meet this urgent need, Goodlad (1991) recommends the development and nurturing of cohort groups for teacher education students.

A cohort group is a cluster of preservice teachers who stay together throughout the duration of their preservice teaching experience. Knowles, Cole, and Presswood (1994) have identified three key benefits of cohort collaboration during the preservice teaching experience: (a) serving as sounding boards and mirrors on emerging practices, (b) helping to make

sense of classroom participation, and (c) creating a safety net as new methods are tried. Cohort groups that are structured to provide intellectual guidance and support hold the potential of developing teachers who are active agents in the learning of others, rather than being passive learners (Goodlad, 1991).

To best prepare social studies educators for today's children, Armento (1996) declared that social studies teacher education programs have a responsibility to "build ongoing and stimulating collaborative linkages among social studies educators" (p.497). Intellectual cohort groups may serve as a step in the right direction for teacher education reform. Time and geographical obstacles, however, restrict the group members' interactions once they are in the field. Developments in telecommunications offer the potential of reducing the impact of these barriers. Telecommunications allows individuals to communicate with others in geographically disparate locations.

Computer Mediated Communication (CMC)

Telecommunications are revolutionizing the way we teach and learn. No longer are we limited by our geography in accessing resources or individuals. Martorella (1996) declares that the advent of telecommunications is spawning a significant restructuring of our society:

> Our society has undergone fundamental changes in its character and composition, and social, economic, and political forces already in motion portend continuing dramatic changes. These ultimately will affect everything from how we worship to how we conduct our financial affairs...These trends are fueled by rapid advances in

emerging technologies and they have profound implications for the nature of schooling and teacher education in the next century (p.35).

New technologies have found their way into many of our schools. Schrum (1991) argues that telecommunications hold the potential of restructuring preservice and staff development. CMC can be used to optimize preservice education by "enhancing meaningful preservice experiences and giving teachers knowledge and confidence about using these tools in their classrooms" (p. 42). However, Brooks and Kopp (1990) report that integration of technology into teacher education programs lags behind other fields of education. The use of CMC in teacher education programs is relatively new (Merseth, 1991; Schlagal, Trathen, Blanton, 1996). A majority of these studies focus on the effects of email on the preservice teacher/university supervisor relationship (Merseth, 1991). Researchers have discovered that CMC is used primarily as a conduit for social and emotional support, rather than reflective inquiry (Schlagal, Trathen, & Blanton, 1996). A review of the literature reveals the most widely used mode of CMC being used by teacher education programs is email.

Casey (1997) has found the major benefits of using email during the student teaching experience to be increased:

(a) reflectivity;

(b) feeling of rapport and support from university supervisor, access to to their supervisors and university personnel;

(c) team support; and

(d) self-esteem due to mastering technology and receiving positive

support through email messages.

Thomas, Clift, and Sugimoto's (1996) research, however, revealed that student teachers in the field found email discussions to be a "cool, impersonal medium." The student teachers in this study missed the social presence found in face-to-face interactions and the rapid response they received from either face-to-face or telephone conversations. According to the media richness model, new technologies such as video conferencing may enhance electronic communication. The media richness model (Daft & Lengel, 1986; Trevino, Daft, & Lengel, 1990) implies that communication media differ in their ability to facilitate understanding and reduce ambiguity.

Face-to-face is considered the richest way to communicate (Daft & Lengel, 1986). It allows timely mutual feedback and the simultaneous communication of non-verbal gestures. Desk-top video conferencing is less powerful than face-to-face communications, but has greater information than the telephone. It supports both verbal and nonverbal language, feedback is rapid, and natural language is used (Daft & Lengel, 1986). Fetterman (1996) agrees that these benefits are highly desirable:

> Electronic communication is a little more personal and a lot more effective when you hear the nuances of tone and see nonverbal language such as gestures and expressions, cues you normally depend on in face-to-face interactions (p. 23).

Videoconferencing systems, however, are often restricted to those who can afford elaborate expensive software and infrastructure. The complexity and high cost of videoconferencing systems cause many

educators to view them as futuristic. The advent of desk-top videoconferencing is changing this. Desktop videoconferencing now permits faculty, students, and practitioners to participate in online dialogue, enhanced by audio and video (Fetterman, 1996). With relatively inexpensive software and hardware, they can do this from an Internet-connected computer in their office, classroom, or home.

Purpose of the Study

The purpose of this study was to examine the online dialogue of a cohort of six preservice teachers during their field experience. Desktop videoconferencing and web-based discussion software programs were used to maximize the electronic dialogue among the participants. A qualitative design was used for this study in order to gather descriptive data of the CMC and to conduct an analysis of the participants' patterns of communication. An interpretation of the dialogues may generate valuable guidelines for teacher educators as they attempt to meet the standards set forth by the National Commission on Teaching and America's Future.

Research Questions

The following questions were used to guide this study:

1. What were the patterns of CMC among the cohort members?
2. To what extent did CMC facilitate reflective discourse among the cohort members?
3. What were the patterns of CMC between the members of the cohort and its supervisor?
4. To what extent did the student teachers use the different forms of CMC?

5. To what extent did the intervention of CMC affect the student teachers' perceptions of classroom instruction?

Overview of the Study

This dissertation has been organized according to the format described below:

Chapter I, Introduction: provides a background to the study, definition of terms, an overview of the study, the purpose of the study, and the research questions.

Chapter II, Review of Literature: reports the most relevant research in the areas of CMC and teacher education.

Chapter III, Pilot Study: describes the pilot study and reports its findings.

Chapter IV, Research Design: describes the research methodology and procedures of this study.

Chapter V, Report of the Study: reports the themes/patterns that emerged from an analysis of the data.

Chapter VI, Discussion and Conclusions: discusses the findings as they relate to the literature, summarizes the research findings and gives the implications for future research.

CHAPTER II

REVIEW OF THE LITERATURE

This review of literature includes relevant and current theory and research in the fields of teacher education and computer mediated communication (CMC). The teacher education literature includes a selected review of the following areas: 1) theoretical frameworks, 2) field experience, and 3) characteristics of the reflective teacher. The CMC literature includes a selected review of the following areas: 1) telecommunications, 2) media richness, and 3) CMC and teacher education.

Teacher Education

Theoretical Frameworks

Zeichner (1983) has identified four paradigms of teacher education: behavioristic, personalistic, traditional-craft, and inquiry-oriented. Each of these approaches seem to share basic ideals. Fundamental differences, however, exist between each model. The most widely practiced approach to teacher education is the behavioristic paradigm. The primary concern in this model is "fostering the development of skill in an actual performance of a predetermined task" (Zeichner, 1983, p. 4). Underlying the behavioristic model is a metaphor of the assembly line. Teachers are produced by colleges of education with little interest in individual differences.

The second most influential paradigm is personalistic teacher education. Psychological maturity is the objective in this model (Fuller, 1969). Preservice teachers focus on their own growth and development,

rather than on teaching others how to grow and develop. "Success within the personalistic orientation is measured primarily in terms of effects upon individuals and not in terms of effects upon social systems" (Zeichner, 1983, p. 5).

The traditional-craft model of teacher education creates novice and expert roles for the preservice teacher and the teacher educator. This paradigm has been identified as the "modal" approach to teacher education today because of the traditional student teaching model (Zeichner, 1980). Novices learn from the experts, much like the apprentices learn from tradesmen.

Inquiry-oriented teacher education emphasizes the teacher as an active learner (Zeichner & Teitelbaum, 1982), who can "help initiate and sustain a process of critical inquiry" (Berlak & Berlak, 1981, p. 252). Zeichner (1983) promotes this paradigm of teacher education, arguing that "the fundamental task of teacher education from this point is to develop prospective teachers' capacities for reflective action and to help examine the moral, ethical and political issues, as well as the instrumental issues, that are embedded in their everyday thinking and practice" (p. 7).

Field Experience

The student teaching experience is often cited by new and experienced teachers as the paramount component of their teacher education program (Cruikshank & Armaline, 1986; Rust, 1983). The beliefs about education that student teachers develop during their field experience are the beliefs that will undergird and shape their actions as teachers (Feiman-Nemser, 1985). The significance of student teaching has prompted

some education reformers to call for added field experiences in teacher education programs, emphasizing their significance (Berliner, 1985).

Current research, however, prompts us to be cautious. The transition for many student teachers from the university to the school is often disjointed and difficult (Applegate, 1986). Two weeks into the field experience, a majority of preservice teachers abandon the pedagogy studied at the university and adopt the practices of their cooperating teacher (Richardson-Koehler, 1988). This may be attributed to the discovery that classroom realities often differ from those imagined prior to the field experience (Clift, Meng, & Eggerding, 1994). It may also be a result of the isolation they experience. The field experience places preservice teachers in an unfamiliar environment without the support of their university supervisor or peers. They are left with limited opportunities to discuss and reflect on their experiences with someone (Schlagal, Trathen, & Blanton, 1996).

This disconnection restricts discourse that is essential to the development of reflective teachers (Blanton, Thompson, & Zimmerman, 1994). Mehan (1981) argues that student teachers are denied the opportunities to participate in reflective practices and professional circles. Alone, they develop an isolated construction of meaning, which may lead to professional growth in an idiosyncratic and uncritical manner (Goldenberg, 1992).

Increasing the quantity of field experiences does not necessarily increase their quality (McIntyre, Byrd, & Foxx, 1996). Teacher educators, therefore, must search out methods of making field experiences significant.

These experiences should be strange or problematic in order to prompt reflection and analysis among preservice teachers (O'Loughlin, 1992). To insure that these experiences are effective, they should embrace an inquiry-oriented framework. An inquiry-oriented framework, much like contructivism, respects the individual learner's prior experiences and encourages the development of reflective thinking (McIntyre, Byrd, & Foxx, 1996). Further reinforcing the call for meaningful experiences, Exum (1977) concluded in his research that the time invested in an experience does not equal a better quality of the experience. Rather, he concluded that guided reflection did enhance the quality of the experience.

Reflective Teacher

Ginsberg and Clift (1977) define reflection as "the systematic and concerted synthesis of theory and practice - praxis" (p. 454). Joyce and Showers (1995, p. 164) believe it to be the crux of educational reform, "no change is more needed than the development of social arrangements that enable educators to work supportively together, help one another reflect on teaching, and help one another make sensible changes."

Sprinthall and Thies-Sprinthall (1983) argue that too often teacher education programs do not support the development of reflective teachers:

> Apparently the general educational enterprise rarely teaches anyone how to reflect upon real experience...If preservice or in-service teachers are asked to keep a journal, the results are usually meager at best. As a stimulus to growth, teaching how to ask questions, how to examine experience from a variety of views, and so forth, seem at least equal to providing real experience (p. 29).

Cruikshank and Metcalf's (1990) research revealed that reflection produces higher order thinking about teaching. Teacher education programs which foster reflective thinking provide the novice with opportunities to use personal experiences as a framework for assessing and revising existing actions to construct more effective strategies (Schon, 1983). These programs should integrate "personal knowledge, craft knowledge of skilled practitioners, and propositional knowledge from classroom research from the social and behavioral sciences" (Doyle, 1983 , p. 6).

Investigating the links between theory and practice are the crux of the reflective approach. Rudney and Guillaume (1990) argue that requiring preservice teachers to participate in reflective activities will lead to their development as a reflective teacher. It is essential, then, to consider Van Manen's hierarchy of reflectivity in teacher education programs.

Van Manen's (1977) first level of reflectivity is concerned with the technical issues of classroom teaching. The second level calls upon teachers to compare and contrast their education principles with their practice. Finally, critical reflection encourages teachers to consider the moral and social implications of their practice. Gore and Zeichner (1991) argue that these levels should not be viewed as independent stages. Teacher education programs should not try to "move" students from one level to the next. Rather, the methods and technical issues should be embedded in the critical reflection.

Seminars or discussion groups designed for student teachers during their field experience have been found to contribute to critical reflective thinking (Rust, 1993). These sessions may be defined as "places where

students can interact in an informal environment conducive to creative problem solving, relate educational theory to practice, develop insights into themselves and their student teaching experiences" (Goodman, 1984, p.9). Thies-Sprinthall and Gerler (1990) found that participation in such a group void of assessment contributed to the professional development of teachers. Schunk (1991) argues that self-efficacy is encouraged through peer support.

Vygotsky (1978) describes dialogue within a community of peers as essential for the internalization of thought and action. Plato (1961) declared that discourse was the ultimate mode of teaching. Piaget (1970) believes the importance of peer discourse to be the cognitive conflict which emerges. The phenomenon which binds members of a shared discourse together has been called "heteroglossia" (Bakhtin, 1981).

The National Commission on Teaching and America's Future (1996, p. 15) reported that schools are currently structured for failure because "teachers are isolated from one another so they cannot share knowledge or be responsible for overall student learning." Hence, it is critical that teacher education programs seek measures to build a community of teachers in which a shared language is spoken, and reflective activities are practiced.

In summary, teacher education has been found lacking in promoting reflective practice on the part of novice teachers. However, research studies about ways to encourage this exists in the computer mediated communication literature.

Computer Mediated Communication (CMC)

Telecommunications

Schrum and Berenfeld (1997) define telecommunications as the "transfer of information or messages at a distance, using electricity and electromagnetism." The primary goal of telecommunications is communication. Electronic communication is a two-way exchange of information which can be accomplished in a variety of ways. The most popular modes of telecommunications include: email, world wide web, and videoconferencing (Schrum & Berenfeld, 1997).

Telecommunications enables learners to access a wide array of resources and people. Electronic networks have made it possible for individuals to collaborate locally and globally with experts, teachers, and students. Traditional methods of teaching and learning are being altered, additional materials are integrated into our classrooms, and teachers accept the shift in working relationships. The essential goal of telecommunications, according to Dede (1991), is "to widen the bandwidth of communication" among individuals despite their location.

Over two million global citizens are telecommunications users; and at least a hundred thousand more log-on for the first time each month (Stoll, 1996). Jones (1995) draws parallels between the current growth of the information highway and the 1950's development of the interstate highway system. Both of these projects connect individuals and create a new sense of community. Jones (1995) contends that "CMC, it seems, will do by way of electronic pathways what cement roads were unable to do, namely connect us rather than atomize us, put us at the controls of a

vehicle and yet not detach us from the rest of the world" (p. 11). We will be linked in ways that will collapse the walls of school buildings, globally connecting teachers and students with the world at large. Rheingold (1993) compares online communities to other forms of community:

> It's a bit like a neighborhood pub or coffee shop. It's a little like a salon, where I can participate in a hundred ongoing conversations with people who don't care what I look like or sound like, but do care how I think and communicate. (p. 66)
>
> Virtual communities might be real communities, they might be pseudocommunities, or they might be something entirely new in the realm of social contracts, but I believe they are in part a response to the hunger for the community that has followed the disintegration of traditional communities around the world. (p. 62)

As computers are used less and less for "computing" and more and more for communicating, we are being called upon to develop new literacy skills (Fontana, 1997). Weiser (1991) has identified different psychological functions for CMC and for face-to-face communication. Among these differences is the void of context and explanation in CMC. As he points out -- a walk in the woods is not overloading, despite there is more available information than in any computer system. The void of social context cues fosters online learning communities.

The collaborative learning that may take place electronically prompts the development of online learning communities. Online learning communities may be defined as "a body of individuals who use computer networks to share ideas, information, and insights about a given

theme or topic to support the ongoing learning experiences of all the members" (Fontana, 1997). These electronic networks are connecting students and teachers in a highly interactive fashion. Levin and Thurston (1996) report the most meaningful result of online learning communities may be the "flow" of information between society and our schools.

One of the examples cited by Levin and Thurston with respect to online communication (1996) is a project that engaged students in California, Illinois, Japan, Israel, and Mexico to study a local water problem. Each group of students studied their community's dilemma and tapped local and global resources to help address it. They shared their problems with one another and pooled together their resources. The collective effort helped each group of students to resolve their community's dilemma. In each case, the students shared information, analyzed it, and specified steps that local officials had not discovered.

Online learning communities have been found to entrust participants with greater control and responsibility toward their learning (Rohfeld & Hiemstra, 1994). Shrum (1993) argues that "the world of electronic communication assumes and demands that people take initiative for their own learning and growth (p. 193).

Several research studies have looked at the reported increased sense of responsibility. Rohfeld and Hiemstra (1994) concluded from their research that participants in an online learning community found the demands for reflection to be greater as compared to the traditional class setting. Barrett (1994) argues that communication among participants in an online learning community increase because CMC "acts as a heuristic

device -- it encourages student to assess their own work first" (p. 120).

Information exchanged via CMC has been found to emphasize the message content rather than the social or personal characteristics of the messenger (Dubrovsky, Kiesler, & Sethna, 1991). This communication shift dubbed the "equalization phenomenon" has been found to promote collaboration and flatten hierarchies.

To illustrate the differences between conventional face-to-face conversation with the "panoramic open spaces of computer conferencing" Blantern (1993) cites a poem by Philip Larkin:

> To put one brick upon another,
> Add a third, and then a fourth,
> Leaves no time to wonder whether
> What one does has any worth.
>
> But to sit with bricks around you
> While the winds of heaven bawl
> Weighing what you should or can do
> Leaves no doubt of it at all. (p. 233)

Media Richness Model

Members of online learning communities may choose from an array of tools to engage in CMC. These tools include: email, videoconferencing, and groupware. Selecting which mode of CMC to use should be based on different factors. One of these factors is media richness.

Media richness is "the extent to which media are able to bridge different frames of reference, make issues less ambiguous, or provide opportunities for learning in a given time interval" (Daft & Lengel, 1986). The media richness model (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987) argues that communication media differ in their ability to increase

understanding and minimize uncertainties. These differences are a function of a medium's richness. "In a sense, richness pertains to the learning capacity of a communication (Daft & Lengel, 1986, p. 560)." The richer the media, the more efficient individuals can process equivocal messages.

Daft and Lengel's (1986) media richness model is based on four standards: (1) feedback, (2) multiple cues, (3) language variety, and (4) personal focus. Feedback is the spontaneous response that encourages interaction. Multiplicity of cues suggests cues such as voice inflection, non-verbal language, graphic symbols, and physical presence are significant to communication. Language variety involves communicating with language symbols, such as numbers. Personal focus is the perceptions and sentiment that are essential to effective communication (Daft & Lengel, 1987).

Face-to-face interaction is considered the richest mode of communication because it permits timely mutual feedback and the simultaneous communication of non-verbal gestures. Face-to-face allows one to observe and process smiles, eye-contact, hand gestures, head nods, and other non-verbal gestures. It also supports high variety natural language. The telephone is placed second on the media richness continuum because it does not allow for the communication of non-verbal behavior. It does, however, support personal communication, feedback is synchronous, and natural language is used. Addressed documents are third on the scale in which interaction is limited to written information; yet they are personalized with a name and address. Unaddressed

documents are fourth on the scale. They do not permit feedback and non-verbal language, and do not provide for personal information or natural language (Daft & Lengel, 1987).

Daft and Lengel's (1986) media richness scale was developed prior to the wise-use of telecommunications. The advent of telecommunications requires us to adjust the media richness model to include new technologies. For example, email would be placed in between the telephone and addressed documents because it allows for prompt feedback, but not for non-verbal gestures (Schmitz & Fulk, 1991). Email is asynchronous, meaning that information is exchanged over the network by participants who are not online at the same time. Videoconferencing would be placed in between face-to-face and telephone. Although some nonverbal gestures would be restricted, it has the capacity for rapid feedback, and natural language (Valacich, Paranka, George, & Nunamker, 1975). Figure 2.1 illustrates my interpretation the adjusted media richness model:

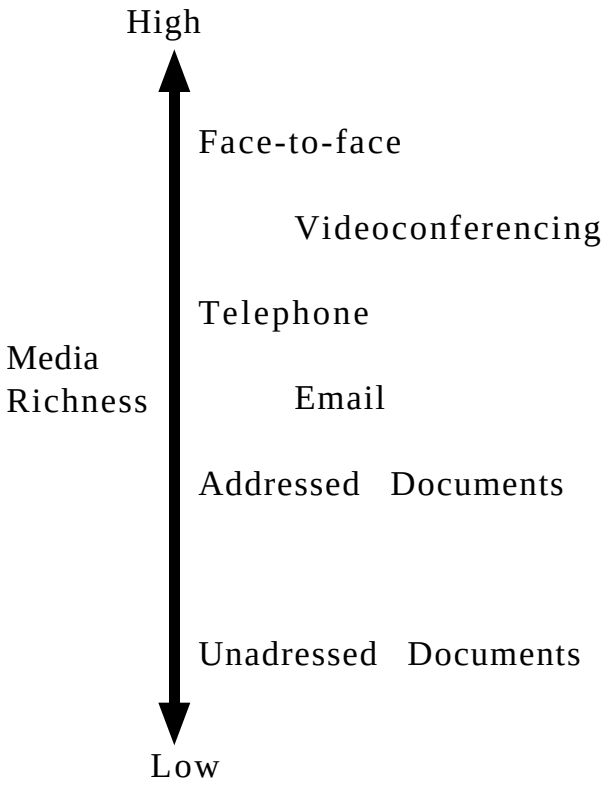

Figure 2.1
Media Richness Hierarchy, Including New Technologies

Desktop videoconferencing. Videoconferencing involves the exchange of audio, video, and text over a computer network or the Internet. That is, one may communicate across a private network or across the world wide web. Desktop videoconferencing has the advantage that it may take place from a personal computer connected to a network. This feature eliminates the need for expensive infrastructure and equipment required by traditional videoconferencing systems.

CU-SeeMe is one of the many desktop videoconferencing software products available, and prices vary. For example, a camera/digitizer package is available from a number of retailers for under $100. One of the advantages of CU-SeeMe is that it runs over a TCP/IP connection (Sattler, 1995). This is the same type of connection used by most email and world wide web prgrams. It has the further advantage that it is free software that may be downloaded from Cornell University's web page. Software versions are available for both Macintosh and Windows computers.

CMC and Teacher Education

The integration of telecommunications into teacher education programs is in its early stages (Merseth, 1991; Schlagal, Trathen, & Blanton, 1996). White (1997) cites a U. S. Congress report, stating that only one in ten recent recent graduates of teacher education programs felt that they could use CMC for collaborative learning. This is ironic, in that electronic networks seem to hold the potential of addressing a number of identified weaknesses of many existing teacher education programs. Lack of time and support to develop reflective thinking because of student teachers' placement in geographically disparate schools may be overcome

via different methods of telecommunications.

The National Council for Accreditation of Teacher Education (NCATE) reports a need for two million new teachers over the next decade for our public school classrooms (1997). These two million new teachers will be teaching in classrooms profoundly affected by technology. Computer to student ratios have declined from 50:1 in 1985 to 20:1 in 1990 to an estimated 9:1 in 1997 (NCATE, 1997). Teachers must have an understanding of the impact technology is having on classroom instruction. The NCATE Task force on Technology and Teacher Education (1997) has declared:

> Technology will transform the role of the teacher as thoroughly as did the introduction of printed textbooks. More than in the past, teachers must become advisors to student inquirers, helping them to frame questions for productive investigation, directing them toward information and interpretive sources, helping them to judge the quality of the information they obtain, and coaching them in ways to present their findings effectively to others (p. 5).

LeBaron and Bragg (1994) argue that the gap between teacher education programs and public school classrooms will become even wider if preservice teachers are not prepared to use emerging technologies:

> The failure of teacher preparation institutions to reform their curricula in response to an anticipation of changes occurring in schools may render them irrelevant to the educational transformations predicted for the coming decade. (p. 5)

At this time, a majority of telecommunications efforts in teacher

education connect preservice teachers in the field with their university supervisor (Merseth, 1991). In these situations, researchers have discovered that CMC is used primarily as a conduit for social and emotional support rather than for professional discussions (Schlagal, Trethen, and Blanton, 1996). An exception, Schlagal et al. (1996) used email to link preservice teachers with their university supervisors. The dialogue was intentionally structured to facilitate the development of joint construction of meaning. An analysis of the email conversations revealed an increase in the quality and quantity of contacts between the supervisors and students.

Teacher education programs are beginning to extend the applications of CMC. Once limited to online dialogues between student teacher and university supervisor, links are now evolving to create professional electronic communities. Member of professional electronic communities may include, but are not restricted to preservice teachers, supervisors, cooperating teachers, students, classroom teachers, university faculty members. Turner's (1993) research conlcuded that students who conscientiously used email to communicate with faculty and fellow students develop a greater conceptual understanding of the content.

Listservs sponsored by the National Council for the Social Studies and National Council of Teachers of English, which connect teachers and preservice teachers via email, are an example of professional electronic communities. A listserv is an automatic email program that distributes email to a list of subscribers. Open University's (Leach, 1996) experiment with an online teacher education program attempted to create an

electronic community of learners. This program, FirstClass, replaced university-based meetings with electronic conferencing. From the students' evaluations of FirstClass, benefits of CMC in teacher education include:

(1) Support within the course itself: 'I use FirstClass because it's something related to the course which I can accomplish in 3 -20 minutes (not normally a useful block of study time)."

(2) Study support: 'I have drawn some relief from finding that others are in the same boat with regard to overload.'

(3) Personal relationships: 'I like private chat for meeting peers. Sometimes it is hard to have a strong sense of accomplishment or humor when you're working alone.'

(4) Direct teaching: 'I find direct contact with people like the course team is very helpful. They have been very supportive.' (p. 70).

This review of the literature identified issues related to teacher education and CMC. In addition, the literature and research support the need for the integration of CMC into teacher education. The following pilot study and dissertation study drew from the selected review of the literature.

CHAPTER III

THE PILOT STUDY

Researchers have examined the effects of computer mediated communication (CMC) and the preservice teacher. The majority of these studies examine the use of email by student teachers and their supervisors (Anderson & Lee, 1995; Merseth, 1991; Schlagal, Trathen, & Blanton, 1996; Schrum & Berenfeld, 1997; Thomas, Clift, and Sugimoto, 1996) . Most researchers of CMC and the preservice teacher have looked at the type of electronic messages being exchanged. In these studies, the high volumes of individual email messages are time consuming to organize and respond to.

The pilot study for this dissertation was an attempt to use the groupware, NetForum, instead of email as a tool for CMC among preservice teachers. Groupware is telecommunications software that supports and encourages collaboration among individuals in geographically disparate locations. Research on the uses of groupware by teacher educators is in an "embryonic stage" (Schrum, 1997). The central focus of this study was to examine the efficiency of NetForum's interface in the facilitation of reflective discourse among preservice teachers.

The pilot study for this dissertation was conducted during the Spring 1997 semester. Twenty-seven students and one instructor participated in this study . Pseudonyms have been assigned to each of the participants. The research methodology and the findings from from the pilot study are presented in this section. They are presented in this section because the research experiences gained from collection and analysis of the data informed the research design of the dissertation.

The Virtual Seminar

Participants in this study were both undergraduate and graduate middle school preservice teachers enrolled in a required course, Reading in the Middle School. There were two sections of the course; both were taught by the same instructor. Within each section of the course, there were students in language arts education, social studies education, math education, and science education. The class met twice a week, for the duration of the semester. Two class meetings out of the semester were held in the computer lab to explore methods of integrating telecommunications in the middle school classroom.

During one of these class meetings, the students and the instructor were introduced to NetForum. This groupware is world wide web-based and accessible from any computer with an Internet connection. The interface of the Web Forum allows participants to view an unlimited number of topics and replies. The participants were given a guide to using the groupware and allowed class time to practice posting topics and replies. The topics and replies were entered by the instructor, the students, and invited guests. The communication was asynchronous, in that students did not have to be online at the same time to engage in the CMC.

NetForum has an option to either allow anyone on the Internet to access the page or to restrict access by requiring a password. This option was presented to the students and they discussed the consequences of both options. The students unanimously decided to allow free access to their page. They wanted the liberty to invite classroom teachers or other students to join their dialogue. This freedom meant that they were

opening themselves to the world and uninvited guests may read their reflections or enter inappropriate messages. This consequence was worth the freedom to the students. They believed if they did encounter an unwelcome guest it would allow them the opportunity to "practice what might really happen in a classroom when middle school students access an inappropriate web page."

After using the groupware, NetForum, the class members named it the "Virtual Seminar." They chose this nickname because to them, the NetForum was much like the Paideia seminars they had learned about in class and experienced. The Virtual Seminar became their "place to have a virtual conversation with one another about issues related to the middle school and reading."

The instructor discussed with the students how best to evaluate their participation in the seminar. Together, through online dialogue, the classes decided that their participation in the virtual seminar should be included in class points designated for class participation. The instructor assessed each student's participation in the seminar by the substance and number of entries posted.

Pilot Study Design

Data for the pilot study consisted of the archived electronic messages, available to the researcher, transcriptions of classroom discussions, and individual interviews with participants. The data were examined for evidence of reflection, peer support, and comprehensive dialogue. The following criteria guided the analysis: postings had to address a specific topic, involve two or more students, and include three or more entries.

Among the categories of uses were for a student to: ask for advice from their peers, share an idea, express their concerns , discuss issues related to their class time, to reflect upon what they experienced during their time in the field, and to support one another.

Four primary strands emerged from the analysis. *Technology talk* included dialogue about students' uses of the computer and their reflections on computers and education. *Pedagogy talk* encompassed student reflections on specific teaching methods and materials. *Socioemotional talk* included students' personal reflections on their excitement and fear of becoming a classroom teacher. *Housekeeping talk* included queries and comments about students' class assignments and responsibilities.

Results

In the early stages of the semester, technology talk dominated the electronic dialogue. Participants frequently discussed ways that technology could be integrated into the curriculum. These discussions ranged from students who were just learning to explore the world wide web and had a fear of the unknown, "This is my first time using the web and I do not feel very comfortable yet." Immediately, another student responded, "I understand how you feel. I am still working on getting used to the computers at school. If you need help, write me here or at my email address."

The technology talk also included numerous dialogues that served as information sharers. Students shared web pages that they found helpful, and they asked for specific help, "I have a project due . . . using

HyperStudio. If anyone is familiar with HyperStudio, please leave a message."

As the semester progressed, the virtual seminar served as an electronic forum for a variety of topics and purposes. Students initiated new topics on issues such as mainstreaming, classroom management, ESL students, and "finding our place among experienced teachers." In the following message, Melanie seeks pedagogical advice from her peers, "Currently I'm tutoring several ESL students with very limited English ability. I don't know how to communicate with these children. I'm interested in hearing your ideas, strategies, etc. and the implications you think this has on the teaching profession."

Following this message, a number of her peers responded by sharing their own ideas and experiences. David, an Internet user for just three weeks, shares:

> Hi Melanie: Teaching ESL students can be very rewarding, but fun. Here is a website that might help: http://members.aol.com/Jakajk/ESLLessons.html - I've had a chance to browse this site and it looks interesting. I hope it's also helpful. Take Care - David."

Another student posts a message with pedagogical help and peer support:

> Melanie, I kind of know what you might be going through. Last semester, I had an assignment to be a teacher's assistant. I didn't know until my first day that it was an ESL classroom. I have to admit that the first couple of days were challenging . . . One good

suggestion I have is that you have to learn to communicate through pictures. I found myself doing that a lot. You have to find something that they like and use pictures to get through to them. I even asked the Korean student to write my name for me. This showed her (i guess) that she could teach me something as well. Another thing that I noticed was that whenever they do have a problem, they are reluctant to raise their hand. You have to look for facial expressions . . . Melanie, I know that this is kind of long but I have so much else to say. I guess I'll save it for another message. I hope this is helpful.

Virginia, the class instructor, responded to Melanie later that week:

Did you see the article in the N&O this week? I cut it out but haven't brought it to class yet. Like other students with special needs, you (as a teacher) will need to adjust your assignments and expectations for ESL students. Let's discuss this. As a tutor, I would find out what mainstream classes the students are in. Ask them to bring their homework assignments . . . Good resources to have when tutoring: anything with lots of pictures, even those funny Bernstein Bears children's books . . . Do lots of talking, pointing, identifying. Ask lots of questions. You could ask to be taught some of their primary language in return too. Good luck! You are perfect for this hard job, Melanie. Please keep me updated.

The socioemotional talk weaved its way throughout many of the messages. The students found strength and encouragement in one another and felt a sense of togetherness by sharing similar experiences. One of

these strands was sparked by a poem posted by Carl. He recited a piece that had significance to him as a preservice teacher, *The Cold Within* by James Patrick Kinney. Immediately, a number of fellow students identified with Carl:

> Thank you for sharing that beautiful poem with us. It's funny how something so brief and simple can have such an impact and promote so much soul-searching and thought. I can honestly say that after reading the poem I had to think for a minute and examine myself and my biases . . . it was an excellent choice and a very appropriate piece to share with prospective educators. Self-knowledge is something we should constantly strive to increase; and I can't think of a better tool than the poem I just read.

Throughout the semester, the participants found NetForum to be an effective way to enter housekeeping queries. The instructor began one of these threads by posting "An Advance Look at the Rubric for the Project." Her entry listed potential requirements for the class project and asked for student feedback. The students appreciated not only the clear expectations for their class project, but felt valued by the solicitation of their opinions. "Thank you for getting the rubric to us so soon . . . it sounds so overwhelming . . . I like Ann's idea of working in groups or giving a specific number of bibliographies."

The online dialogue continued throughout the semester, and the topics varied from the instructor asking for feedback on the class project rubric to students sharing quotations about teaching. The participants modeled reflection and critical thinking about difficult teaching situations

and offered support and advice to one another. Issues were viewed from several perspectives, and a variety of solutions proposed.

The Virtual Seminar appears to have been a valuable experience for preservice teachers. One indication is the students' interest in continuing the dialogue after the initial introduction to the NetForum. Another indication is the instructor's desire to use the NetForum with future classes of preservice teachers. An analysis of the discourse suggests that the most important advantage of the CMC may be the peer support. The preservice teachers found that the ability to "reach out and touch" someone in a similar situation to be comforting and informative. The comments of two participants observe the value of CMC:

> The Virtual Seminar allows learning and colleague interaction to continue outside of the regular classroom. One of the major benefits I would see here, is the essence of continued learning from and with one another . . . we have decided to take ownership of our "continued learning". I think that's awesome!
>
> I was wondering if perhaps the website may be continued, once class is over, especially when some of us may be teaching in the near future. I think an open NetForum would be useful to beginning teachers, so they can express concerns get encouragement and support from people they know. A web forum would be useful also, because many teachers feel isolated from other adults in the classroom, and if they had a way of communicating outside of school, they would feel like they had a support group, if there was one missing in the school.

Discussion

Using NetForum as an integral component of this teacher education course appeared to contribute to the participants' development as reflective future teachers. The professional exchanges among the students created an effective online learning community. Students were provided the opportunity to engage in dialogue with colleagues outside of their course section, which widened their professional network. They were free to discuss and debate a wide range of topics that were not addressed during class time, expanding their opportunities for discourse. Telecommunications allowed for an increase in quality and quantity of professional dialogue which is believed to be essential in the development of reflective teachers. While at the same time, it provided the students with the opportunity to experience an effective integration of technology into the classroom that may be helpful to their professional development.

Although participation of all students was encouraged by the instructor, it was difficult for some students to access the NetForum. All students had access to the Internet from the campus computer labs; however, not all students had access to the Internet from home. Participants who either had an Internet connection at home or who had time in their schedules to regularly visit the campus computer lab were more involved with the virtual seminar than other classmates. Students also found it difficult to access a computer with an Internet connection from their field placements. Some of the students reported that in their middle schools there was only one Internet connection and it was either in

another teacher's classroom or it often was being used by other teachers and their classes. Others reported there was not an Internet connection from their school. Yet, others were able to easily access the Internet from their classroom.

Another challenge of using NetForum was the amount of time the instructor devoted to each message. At the beginning, she responded to each and every electronic posting. This was critical in the success of using NetForum, as it helped to jump start the conversations. The instructor carefully responded to each message with care and expertise, while also trying to connect student comments with other students' messages or posing a question to entice active dialogue. As the students assumed more responsibility for interaction and responded to one another in a colleagial manner, the instructor gradually weaned the students from her responses. Her participation still required an extensive amount of time as she read and assessed each entry.

The results of this pilot study demonstrate that NetForum is a more timely mode of telecommunications than email for this sort of discourse. Listservs or distribution lists of this nature often require the users to exhaust an excessive amount of time opening and responding to numerous single email messages. NetForum threads topics and their replies, along with the times and dates they were entered. This organization feature of the software allows the user to more easily follow a thread of conversation or to join a conversation at a timely point. This attribute not only conserves the time of all participants, but also helps to focus the discourse.

Conclusions

The investigation reported here demonstrates a potentially effective use of technology in preservice teacher education. According to the students, their participation in the virtual seminar not only enriched their preservice experience, but also gave them a new confidence about integrating technology into the classroom. NetForum provided a user-friendly interface for the participants. The participants classified it as user-friendly because it was easy to navigate through the threads of conversations and easy to read and post messages. The contribution of CMC in teacher education is only beginning to be considered as teacher educators take advantage of the unlimited opportunities available through advances in telecommunications.

This pilot study addressed issues related to CMC and the preservice teachers' field experience. In addition, it underscored the importance and complexity of utilizing emerging technologies to develop inquiry-oriented teachers. Therefore, an investigation of their online dialogues seems merited. The next chapter describes the research design for this dissertation.

CHAPTER IV

RESEARCH DESIGN

This qualitative case study examined a large collection of data to tell the story of six student teachers interacting with each other and their university supervisor through the Internet. Desktop video conferencing and group-based world wide web software was used to facilitate the computer mediated communications (CMC). Through their words and gestures, their story is told. As the storyteller, I designed this study as Meredith Cherland (1994) framed her book, *Private Practices*:

> I am the person who has chosen the events that comprise the story. I have arranged them and shadowed them with my meanings . . . In this way, I have done what every researcher and storyteller does: I have seen people and events in the light of my own belief systems, experiences, and discourse, and I have told what I hope is a compelling and authentic story that is consistent with what I believe about the world. (p. 2)

Saveyne and Robinson (1996) define qualitative research as "research devoted to developing an understanding of human systems" (p. 1172). The aim of this descriptive study was to capture a variety of online interactions among the participants. Sherry Turkle (1988) argues that it is essential to conduct descriptive research to best understand the ways in which "the computer can be a partner in a great diversity of relationships" (p. 57). The intent of this report is to show that the student teachers' stories reveal rich and descriptive dialogue that is trustworthy and generalizable.

Bogdan and Biklin (1982) have identified three categories of case

studies: historical, organizational, and life history. This study involved two of these categories. It is historical because it includes data for the duration of the preservice teachers' entire field experience. It is organizational because I have studied and interpreted the preservice teachers' patterns of computer mediated communication (CMC).

A miscellany of purposes and audiences propel educational research. We can classify the research into one of two types: basic or applied (Bogdan & Biklin, 1992). Basic research's intent is to extend our general knowledge base. The purpose of applied research is to generate practical implications from investigations in the real world. This study assumes the purpose of applied research, in a pedagogical sense. Bogdan and Biklin (1992) characterize the pedagogical researcher as one who may use research to be a more effective practitioner. This person uses qualitative research to document immediate changes in an existing program. The beneficiaries of change are the immediate participants. In this study, the cohort of middle school preservice teachers were the beneficiaries. The analysis of their stories hold the potential of translating results into practical changes for teacher education.

Description of the Study

The informants in this study, a cohort of middle grades social studies preservice teachers, enrolled in a "professional semester" during which they participated in a methods course followed by the school placement. The student teachers engaged in online dialogue periodically throughout their eight week student teaching experience with the intent of developing reflective inquiry skills.

Throughout the eight-week field experience, the preservice teachers had the opportunity to communicate with one another via two forms of telecommunications. The CU-SeeMe software allowed the cohort group to participate in desktop videoconferencing. Weekly, at an established time, the student teachers participated in a required online seminar with the university supervisor.

NetForum software permitted the cohort to communicate with one another via the world wide web. A web page was created to support voluntary online dialogue for the participants. This software allowed the participants to discuss a variety of topics. The nature of the online discourse is addressed in the report of the results.

Participants

Participants were selected purposefully because they met two criteria: a) an established preservice social studies teaching cohort, and b) placement in schools which were over thirty minutes from a central location. The strength of using purposeful sampling is the ability of selecting information-rich cases from which detailed data can be collected. The logic of criterion sampling is one in which the researcher develops a list of necessary attributes and identifies participants that match (Patton, 1987). Six preservice teachers and their university supervisor were selected as the participants for this study.

The six preservice teachers were all enrolled in the Fall, 1997 course, Middle School Language Arts and Social Studies Methods Course (ECI 435). The class met daily for seven weeks until the full time field placement commenced. The students were assigned to three different schools. These

assignments were made by the College's Teacher Education Director. Pseudonyms are assigned to provide anonymity for each informant and school. The schools are referred to as Tuxford Middle School, Farnham Middle School, and Woodburn Middle School. The course instructor and university supervisor is referred to as Caroline. The preservice teachers are referred to as Daminga, Melissa, Charles, Laura, Eleanor, and Pam, five women and one male. A middle school language arts university professor who taught these students a previous semester joined one of the CU-SeeMe sessions and posted a number of NetForum entries. She is referred to as Betsy. A clinical instructor from the university observed three of the student teachers. She is referred to as Anita. She voluntarily did not participate in any of the CMC. Initial participant and school descriptions are presented below:

Daminga. Daminga is an African-American female. As a preservice teacher, was placed in eighth grade social studies and language arts at Woodburn Middle School. She described her prior computer experiences as, "challenging, stressful, and helpful."

Melissa. Melissa is an African-American female. As a preservice teacher, her placement was seventh grade social studies and language arts also at Woodburn Middle School. She described her prior computer experiences as, " fun, easy to learn, and learn by doing."

Charles. Charles is a white male. As a preservice teacher, he was assigned sixth grade social studies and language arts at Tuxford Middle School. He described his prior computer experiences as, "game oriented and communication oriented."

Eleanor. Eleanor is a white female. As a preservice teacher, her placement was sixth grade social studies and language arts at Woodburn Middle School. She described her prior computer experiences as, "frustrating, exciting, and stimulating."

Laura. Laura is a white female. As a preservice teacher, she was assigned sixth grade social studies and language arts at Farnham Middle School. She described her prior computer experiences as, "creative, hard, and challenging."

Pam. Pam is an African-American female. As a preservice teacher, she was also placed at Woodburn Middle School in eighth grade social studies and language arts. She described her prior computer experiences as "confused, disaster, and getting lost."

Caroline. Caroline is a white female. She was the instructor for the participants' methods course (ECI 453). She is the former assistant principal of Woodburn Middle School and is currently a doctoral student in the Department of Curriculum and Instruction. She describes her prior computer experiences as, "frustrating, foreign, necessary."

Woodburn Middle School. Woodburn Middle School is located in a rural community approximately thirty miles from the university campus. The population of the school is grades six through eight. The computer made available to the participants was a Macintosh 5200, which was connected to a local-area-network (LAN). This machine was located in a corner of the school's Media Center

Tuxford Middle School. Tuxford Middle School is located in the suburbs, approximately fifteen miles from the university campus. The

population of the school is grades six through eight. The computer made available to the participant was an IBM ThinkPad, which made a dial-up connection to the Internet through a modem. This machine was located in the school's computer lab.

Farnham Middle School. Farnham Middle School is located in a rural community approximately twenty miles from the university campus. The population of the school is grades six through eight. The computer made available to the participant was an IBM, running Windows 3.2. This machine made a dial-up connection to the Internet through a modem. It was located in the school's Media Center.

Prior to the Field Experience. To prepare for the online dialogues, I visited the participants' methods class three weeks into the course, and presented a two-hour telecommunications workshop. This hands-on workshop took place in one of the university computer labs. CU-SeeMe and NetForum software were demonstrated and time was allowed for individual exploration of each program. I wrote a step-by-step users' guide for each of the software programs and distributed them during the workshop. (The complete users' guides can be found in Appendix 1.) These directions were also placed online, and the URL was distributed to the participants. (http://www.forum.edu/cgi/netforum/eci454/a/1).

Prior to the commencement of the student teaching experience, I visited each of the three middle schools where the students were to be located. There, I secured the use of the computer and network resources by the preservice teachers and installed the required software and hardware on each the school's computers. To install the equipment, I contacted the

technology coordinators in each of the middle schools. I introduced myself and the study to each of them over the telephone and scheduled a time to visit them. During my initial visit, I installed the hardware and software and demonstrated it to the technology coordinators. I provided the coordinators with copies of the users' guides for the software which had been created for the student teachers, and encouraged the technology coordinators to use the new equipment with the teachers and students in the school. To further encourage their use of the telecommunications, I offered to conduct staff development workshops in the schools.

Role of Researcher

As the researcher, I visited the participants' methods class during the third week of the semester. At this meeting, the students each briefly introduced themselves and I introduced myself and the proposed study. I described the different modes of telecommunications that they would have an opportunity to use during their field experience and explained that I would like to record their online conversations as data for my dissertation. The students were excited to have the opportunity to participate in this research project and eagerly agreed to learning the new technology and using it during their field experience.

Technical Consultant. I acted as the participants' technology consultant both prior to and after their student teaching experience. Prior to the student teaching experience, I developed a users' guide to using the different modes of CMC used in this study. I presented a telecommunications workshop for the participants to introduce the software and hardware to them and to allow them the opportunity to

practice online communication. Once the equipment was properly installed in each of the four middle schools, I arranged individual sessions with each participants. These sessions were held in their assigned middle school. During these sessions conducted pilot online seminars and discussed different trouble shooting strategies.

My role as technical consultant continued throughout the semester. Periodically, as their student teachers had questions or problems with their telecommunications equipment, they would send an email or make a phone call. The participants were given the phone number in the campus computer lab from where I participated in the online seminars. Each one of them called at some point to ask a question about their equipment or the network. The student teachers also turned to me for technical assistance when they were designing instructional materials or methods for their students.

Participant Observer. Originally, I had not planned to actively participate in the online dialogues. Rather, my role was that of a complete observer (Bogdan & Biklin, 1992). As the complete observer, I intended to observe the online interactions "through a one-way mirror." The preservice teachers, however, called for this to change during the first CU-SeeMe session. As the informants logged into the server for the first time, they all saw each other, but did not see my picture. They questioned where my video was. I reminded them that my role was as observer, and that they were to interact with one another. The informants responded with a clear message: "NO LURKERS ALLOWED!". A lurker is one who participates in a videoconference, but does not send a video. They followed

this posting with the rationale that I should join their online community to add to the conversation and be more readily available for technical support if needed. Hence, my role evolved to that of participant observer. As a participant observer, my video was included in the online seminar and I regularly posted messages in response to the preservice teachers' questions or to prompt reflectivity among the cohort.

Data Collection

Data Sources

Five major data sources were used in the study: (a) observations, (b) interviews, (c) documents, (d) online focus group, and (e) reflexive journal.

Observations. Observations were conducted of each of the eight video conferences held during the students' field experience (once a week). Verbal and non-verbal observations were recorded. Attempts were made to videotape the videoconferences. However, recordings of the CMC was of such poor quality this form of data collection was discontinued. Careful field notes were taken to replace the recording of non-verbal gestures. Audio use was restricted to the four participants at Woodburn Middle School. The computers at Farnham Middle and Tuxford Middle did not have the appropriate extensions to support the sending and receiving of audio. Cassette recordings were made of the two audio conversations and transcribed. The typed text from the chat window was saved and copies were made.

Observations were also made and recorded during the telecommunications workshop and four class sessions held during the

professional semester. These class sessions included: a class period prior to the field experience, a class dinner at a local pizza restaurant during the field experience, a visit by one of the University Career Center counselors during the field experience, and the participants' portfolio presentations after the completion of their field experience.

Interviews. Formal interviews were held with each of the informants in September, prior to the field experience, and in December, after the completion of the field. These interviews were audio taped and transcribed for analysis. The interviews addressed the participants' experiences in the classroom and their experiences with the different modes of telecommunications (The complete protocol can be found in Apendix 2). The intent of these interviews was to gather meaningful description of the participants' CMC interactions. Informal interviews were conducted with individual participants periodically throughout the study.

Documents. Documents collected for the data analysis included: postings to the NetForum, email sent to me by the participants, and lesson plans created by the participants. The NetForum entries were printed from their web page and organized according to the participant and the topic. Two of the participants voluntarily communicated with me at times throughout the study by sending email messages. Printouts of these messages were made and included in the data analysis. Each of the informants integrated instructional technology into their classroom lesson plans. The preservice teachers readily shared their lesson plans with me and examples of student work. These documents have likewise been coded

and categorized.

Online focus group. The focus group session included an online meeting of the cohort group members and their supervisor which was held during the last week of the participants' field experience. Its purpose was to gather quality data in a social context where the participants can reflect and respond their own in the context of the others (Patton, 1987).

Reflexive journal. I made entries into a reflexive journal throughout the study to document my own biases and reflections. This practice of self-reflection provided not only raw data, but also served as a means of insuring the validity of this research.

Data Analysis

The constant comparative method was used to analyze the data collected from the various sources. Strauss and Corbun (1994) refer to this method as "a general methodology for developing theory that is grounded in data systematically gathered and analyzed" (p. 273). The data collection and data processing occurred simultaneously, in a "pulsating fashion" (Bogdan & Biklin, 1992).

Glaser's (1978) steps to analyze the data in the constant comparative method were followed:

1. Collect preliminary data,

2. Identify categories of focus,

3. Continue data collection,

4. Begin writing about the emerging themes, while continually searching for new themes,

5. Work with the data and the preliminary analysis to reveal basic

social processes and relationships, and

6. Code and write, while focusing on the core categories.

A running list was kept in my reflexive journal of emerging themes. As the research evolved, new patterns were added to the list and revisions made. With the completion of data collection, the list of patterns were clustered, yielding five main themes. These were:

1. Peer collaboration for professional development.
2. Computers as a mode of communication.
3. Conflicts between theory versus practice.
4. Personal development and personal issues.
5. Instructional methods and materials.

Components of the qualitative data analysis for this study are illustrated in the following flow chart (Figure 4.1).

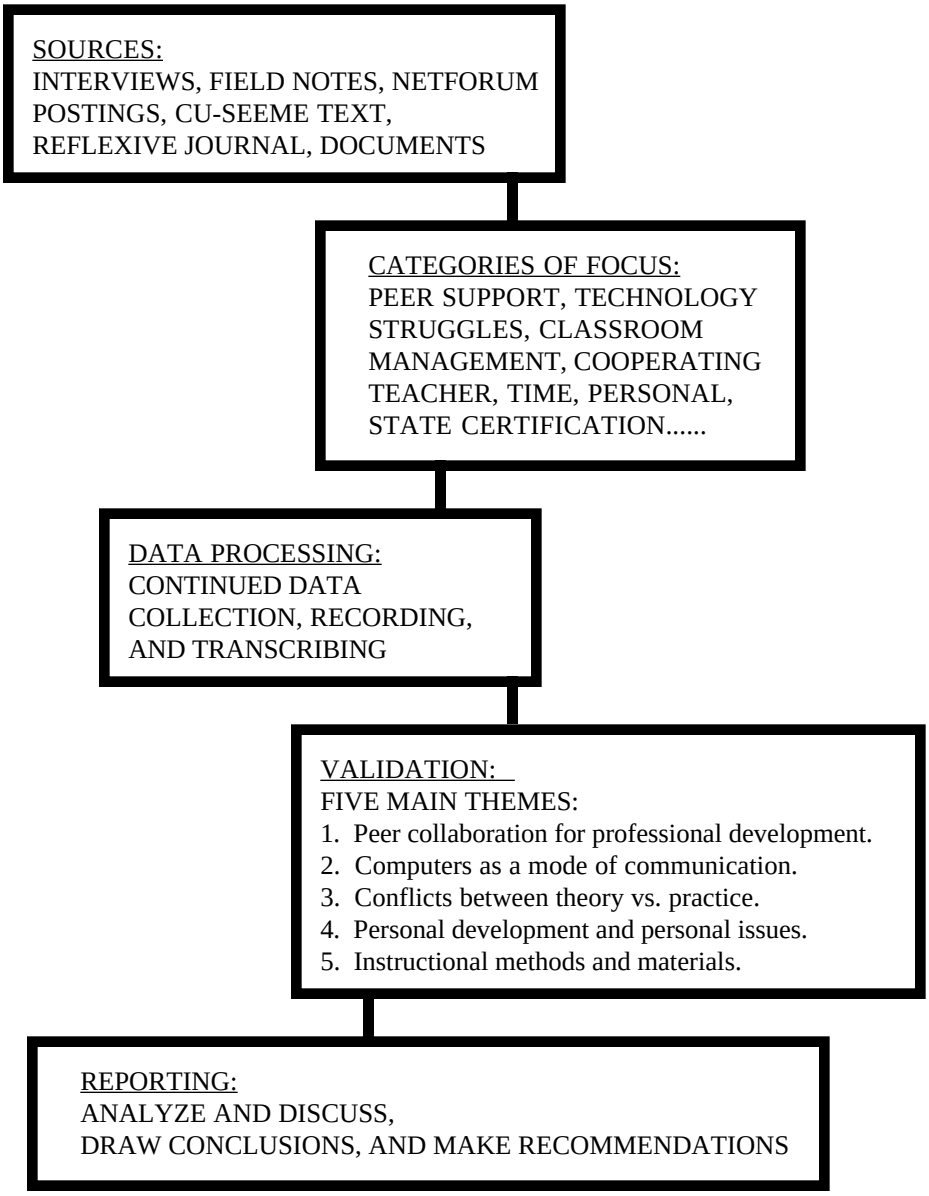

Figure 4.1. Qualitative Data Analysis Components Flow Chart

Validity

The objective of this qualitative study was to provide a trustworthy and generalizable representation of the online dialogues of the selected preservice teachers during their field experience. Scwhandt (1997) has defined trustworthiness as "the quality of an investigation (and its findings) that made it noteworthy to audiences" (p. 164). It is my intent that by providing ample details about these particular interactions and the participants, this study will be deemed trustworthy and generalizable. This will allow readers to draw inferences and make connections from this study to their own situation.

Criteria

Lincoln and Guba (1985) have established four criteria to judge the trustworthiness of a qualitative study (a) credibility, (b) transferability, (c) dependability, and (d) confirmability. This study has been designed to meet each of these criteria.

Credibility (internal validity) has been established by the multiple number of online dialogues and by member check. A total of eight CU-SeeMe sessions were held and a total of thirty-three NetForum entries posted. Member check allowed the informants to assume a more "participative and dialogical undertaking and less the monological activity" (Schwandt, 1997, p. 89). The university supervisor served as the member check in this study. We corroborated weekly to verify my findings. This insight served a two-fold purpose. It confirmed my data analysis and also provided beneficial insight.

Transferability or generalization (external validity) has been

established by the inclusion of sufficient background information on each of the informants and the context in which the CMC occurs. Triangulation was possible because of the numerous data sources. Miles and Hubberman (1984) refer to this approach as modus operandi. This technique allowed me to triangulate independent datum, "by seeing or hearing multiple instances of it from different sources, and by squaring the finding with others it needs to be squared with" (p. 234).

To establish *dependability* (reliability), I maintained an audit trail. It consists of the collection of raw data and the reporting of my findings. This record keeping not only helped to organize the sum of data, but also prompted entries into my reflexive journal. The audit trail demonstrates that the study is logical, traceable, and documented (Schwandt, 1997).

To establish *confirmability* (objectivity), I have linked the evidence in a logical style. Multiple data sources, member check, and the keeping of a reflexive journal all contribute to the confirmability of this research. This step has been taken, not to insure replicability of the study, but objectivity of the study. The data and their interpretations are presented in this dissertation not as static truth, rather, they are presented as accurate findings.

Ethical Electronic Qualitative Research

Qualitative researchers are expected to adhere to ethical frameworks that protect participants from harm. Electronic qualitative researchers, however, must be in tune with emerging ethical issues. Just as telecommunications has altered the ways that we communicate with one another, telecommunications is changing the way we may conduct

research. As data may now be collected virtually, a new dimension to data collection has emerged. This means electronic messages, such as email, digital video, and postings on a web page may be collected and analyzed as data. The implications of conducting research in cyberspace must be seriously considered, as Schrum (1995) emphasizes:

> Moving into an electronic community is even more invasive than joining a face-to-face organization or taking notes at a meeting. Participant rights and copyright issues must be considered at the moment a researcher decides to become an electronic ethnographer (p. 317).

Schrum (1995) has developed procedures to inform ethical electronic research. This study was designed in consideration of these guidelines. Among the "Ethical Electronic Research Guidelines" (1997), the following items most influenced this study:

> -Researcher must consider the respondents and participants as owners of the materials that are created; the respondent should have the ability to modify or correct statements for content, spelling, substance, or language.
>
> -Researchers should strive to create a climate of trust, collaboration, and equality with electronic community members, within an environment that is non-evaluative and safe.
>
> -Researchers should treat electronic mail as private correspondence that is not to be forwarded, shared, or used as research data unless express permission is given.

The CMC among a cohort of social studies preservice teachers has

been systematically documented. The participants' narratives were analyzed and revealed recurring themes and patterns. This qualitative study was designed to tell the story of a cohort of student teachers connected via CMC. Through their verbal and non-verbal language, they share their stories with us in Chapter V.

CHAPTER V

REPORT OF THE STUDY

The focus of this study was on the use of computer mediated communication (CMC) among the cohort members of six middle school social studies preservice teachers during their student teaching placements. The six preservice teachers used telecommunications to connect with one another during their student teaching experience. Telecommunications enabled the participants to connect regularly online to discuss issues and concerns that grew out of their teaching experience. This analysis of the data is a description of their online dialogue and the role CMC played in their field experience. The following research questions guided the collection and analysis of the data:

1. What were the patterns of CMC among the cohort members?
2. To what extent did CMC facilitate reflective discourse among the cohort members?
3. What were the patterns of CMC between the members of the cohort and its supervisor?
4. To what extent did the student teachers use the different forms of CMC?
5. To what extent did the intervention of CMC affect the student teachers' perceptions of classroom instruction?

The data that was collected from the CMC and the interviews to answer these questions has been organized into two main categories: emerging themes in communication and uses of technology. The results have been further sorted out within each category. Emerging themes in

communication, which address research questions one, two, and three, include the following six themes:

- school environment,
- cooperating teacher relationships,
- need for support,
- questions about the future,
- personal concerns, and
- evidence of reflection.

Uses of technology, which addresses research questions four and five, include the following two themes:

- integrating the curriculum, and
- characteristics of hardware and software.

Following an overview of the context of the cohort, the experiences of the preservice teachers are discussed as they relate to the themes mentioned above.

Context of the Cohort

This section presents the context of the cohort to the reader. It is important to note the established bond among the participants prior to their student teaching experience. This established bond is significant because it encouraged their enthusiastic participation in this study.

My first encounter with the cohort of preservice teachers was during a visit I made to their methods class, the third week of the semester. The intent of this meeting was to introduce myself and to discuss my proposed study. I immediately observed a unique bond among the members of the cohort. In my field notes that day I made this entry:

> The class has a 'friendly-feel' to it. Sitting around the table, waiting for class to start -- students talking. Talking about 'friend' things -- plans to see a boyfriend next weekend, family member with illness, job at nearby grocery store.

My perceptions were supported by the participants' direct statements about their cohort members. "We're a lot more intimate than any other class I've been in," confessed Eleanor during my initial interview with her. Melissa echoed these feelings in her initial interview, "I feel like they're the greatest friends that I've had through my college semesters . . . I feel like I can call them up and say this is what happened to me -- and that they will care."

Pam's reflections the cohort during her initial interview include the participants' opennes to contructive criticism:

> It's been good being with someone with the same experiences. We see each other every day. And we share a really close friendship -- a bond. You criticize each other, and tell what you're doing right and what you're doing wrong. But, we can do that, we're close.

Caroline, the university supervisor, believed the unique bond among the students to be a direct result of the time they spent together everyday as colleagues. She reported that their time together five days a week for three hours a day was valuable, emphasizing the opportunity to share similar concerns and experiences:

> We meet together for almost three hours -- every day. But its not just the time. We're a small group. We do a lot of talking about their anxiousness about student teaching. They are all really open

about their fears and anxieties . . . Plus, they share ideas and help each other . . . They're a good group and build on each others' strengths.

During their initial interview, the participants showed concern for how they would feel not having daily interaction and support once the student teaching experience started. Eleanor expressed it this way, "I wish I was going to be able to run to chat, or have lunch with them [class mates]. It will be weird to not see everyone every day. I guess we'll be on our own." Eleanor shared these feelings, despite the fact that she was placed at Farnham Middle School -- the same school where Daminga, Pam, and Melissa were placed. These four participants experienced an unexpected amount of isolation, in spite of teaching in the same school. The first week into the student teaching experience, Daminga offered an explanation for their isolation, "We don't really see each other. We're all on different teams. None of us have the same lunch. And Melissa , she's way out in the trailer . . . For one reason or another, car pooling hasn't worked for us."

The context of the cohort has been presented to illustrate the established relationship among the group prior to their field experiences. The participants recognized their unique bond, and were concerned about the isolation they experienced once they began student teaching and ceased their daily class meetings.

Emerging Themes in Communication

Each of the preservice teachers who participated in this study experienced a conflict between theories they had learned in their university courses and practices they observed in their field placement. They were

frustrated with the important gap between theory and practice. A considerable amount of the CMC was focused on their frustrations and on the methods they used to deal with this gap with respect to the school environment and relationships with cooperating teachers. Concerns also included need for support, personal issues, and questions about the future. Throughout their CMC, evidence of reflection is also apparent.

School Environment

One of the questions posed to the student teachers during the online focus group session was, "If you were to write a book about your student teaching experience, what would the title of your book be?" Daminga, the first to respond, declared her book would be entitled, "Ten Things That All Student Teachers Should Know When They Go Out and Student Teach." Her response was met with smiles and head nods by the other participants. I asked Daminga, "Why this title?" She smiled, raised her eyebrows, took a deep breath, and responded:

> Because there's so much to know that nobody told me. I mean we learned about and talked about what middle schools are *supposed* to be like. But Farnham Middle was another story! It just is not like the middle schools we studied in class. Like, some of the teams aren't even teams, they're just groups of teachers that have planning period the same time.

Melissa built on Daminga's comment, expressing frustration with the schools' dependence on the bell system for order, "What I have noticed is the big thing with bells here. . . everyone is so programmed for bells." Melissa explained that there was not a school-wide bell system. Rather,

there is a school-wide homeroom and end of the day bell. Throughout the day, "different teams changed at different times, different hallways changed at different times. . . I like this flexibility, its designed for those integrative lessons we learned about in class." Although Melissa appreciated the versatile school schedule, she lamented how "programmed" the school was in reality. "Despite the freedom there should be for flexible scheduling, most of the teachers are still stuck doing fifty minute lessons. And the students will hear a bell ring for another hall and just stop and pack up . . . I've just stopped trying to explain it and go with it now."

Charles chimed in with Daminga, "Yeah, what happened to all of the studying of the mind of middle grade learner, like we learned in our classes?" The student teachers were frustrated by the gap between what they had learned in their course work and what they were experiencing in their schools. They were unsure how to respond. During one of the weekly videoconferences, Pam expressed frustration from a conflict over how to handle classroom discipline problems:

> One of the teachers asked me if I had put a strike on the board yet? I didn't know what she was talking about, A STRIKE? She meant putting strikes by a kid's name if they act up. This is supposed to keep them from acting up...But we learned in school how to get them [students] more involved so they won't have time to get into trouble.

Cooperating Teacher Relationships

When asked to share her list of "top ten things all student teachers should know" during the online focus group, Daminga emphasized the

important role of the cooperating teacher/student teacher relationship during the field experience. "Number five: Try to have a good relationship with your cooperating teacher -- it can make or break you!"

Daminga counted herself as one of the fortunate ones when it came to her cooperating teachers.

> I consider myself to be one of the luckier ones [student teacher]. Because I have two different teachers, so I see two different perspectives. Both of my teachers were wonderful. I learned a lot from them -- they helped me so much. . . they also let me try things that they had never done before. Like, the Internet activity we did. That was new. I think he [cooperating teacher] learned from me too!

Pam's cooperating teacher was interested in learning more about desktop videoconferencing. She reported that a few times he came to the media center during her weekly online seminars to see how CU-SeeMe actually worked. Her cooperating teacher asked her the specifics about purchasing and using the software and camera. Pam seemed to enjoy sharing this information with her cooperating teacher, "It was interesting to know that other people were interested in what we were doing as well, not just us. And I actually could tell him about the technology specifics!"

Not all of the cooperating teachers were as open to new activities as Pam and Daminga's cooperating teachers. Eleanor experienced an usually high amount of frustration between theory and practice. She expressed the first signs of this conflict during the initial interview:

> I'm a little scared about student teaching. I'm nervous of my

> cooperating teacher. She's very different than me, like with a really strict style. Doesn't really seem to follow up with anything I've learned here in my classes. Things seem to be run more like a junior high than a middle school . . . I hope I will be able to teach and do things the way I've learned, and believe they should be.

Unfortunately, Eleanor's initial concerns over her cooperating teacher's instructional methods remained an issue throughout the entire field experience. During one of the videoconference sessions, Betsy, one of the university professors, asked Eleanor, "Are you having a chance to do any Language Arts/Social Studies stuff?" Eleanor, frowned and responded, "NO interdisciplinary stuff! In fact, my cooperating teacher told me yesterday that I cannot do my unit with my first block because they can't handle it."

Betsy quickly responded with suggestions of how to make the most out of the decision made by Eleanor's cooperating teacher,

> Hmmmmmm -- Eleanor, how are you doing the "noun stuff"? Remember there are ways to integrate the G.U.M. with writing; e.g. having them write a poem and then pick out the nouns. . . or even do some pantomimes have them write down the nouns they see enacted. . . or use some of the social studies readings to identify and discuss nouns.

Need for Support

Each individual member of the cohort shared a number of fears and apprehensions about their field experience. They openly shared these concerns with one another. I first noted their high anxiety levels and

desire to discuss their concerns during my initial visit to their methods and materials class. On the wall was a piece of chart paper, covered with a number of pieces of sticky-paper. On each of the pieces of sticky-paper, a different fear or concern was written. Examples of the listed concerns were: getting up on time every morning, grading all of the papers, getting along with my cooperating teacher, overload of work, getting a job, knowing the material, having a life, paying my rent without my part-time job, being strict enough. Before class began, I asked Charles what the collage on the wall meant. He responded:

> One day in class we were all talking about all of those things that worry us. We each wrote our concerns on a piece of sticky-paper and put them up on the wall. Then we each talked about the things we were most worried about. Then we grouped them together into clusters like you see now.

Each of the student teachers experienced varying degrees of support from the university; and each responded to the amount of support they received in an individual manner. Caroline served as the supervisor for three of the student teachers: Daminga, Pam, and Melissa. Anita served as the university supervisor for Charles, Laura, and Eleanor. Anita is a trained clinical instructor and has prior experience supervising student teachers. She, however, spent very little time with the participants prior to their field experience. Her interaction with the student teachers was limited to a visit to one class session in September for brief introductions and the four visits she made to the middle schools for observations and evaluations. Betsy, a university professor, had taught each of the student

teachers in previous semesters. Although she did not have an official supervisor role with the cohort, she periodically posted comments on the NetForum and once participated in a CU-SeeMe session. It is most significant to note that Betsy lives over two hours from the university campus, yet, telecommunications helped to bridge the distance between her home and the participants' schools.

Betsy posted the following message after the participants' first week in the field:

> Hi Everyone! I've been thinking about you this past week, aware that all kinds of mixed emotions, happenings usually occur during the first day disequilibrium. Disequilibrium is a word that describes the state we're in when we're confronting a new situation, stressful circumstances, a new paradigm for operating in the world. Surely student teaching must be one of the most obvious examples of disequilibrium. . . we're discovering a new self within the context of our 'old' selves. . . plus we're developing, expanding our view of ourselves. I'll never forget my first week of student teaching -- just about 32 years ago (can it possibly be that long? seems like just a few years ago the experience is so vivid to me). I thought I was pretty connected to who I was at the time, but I certainly found another part of me in that situation. . .plus I've never been so tired or stressed out in my life as I was then. If there is any way I can help or support you, please don't hesitate to contact me. Take care. And here is my email address: betsy@unity.ncsu.edu.
>
> Melissa summarizes the student teachers' responses to Betsy's

NetForum entry, "Thank you, Betsy, for your words of encouragement. I think we are all starting to get over the first day jitters. I think we will all learn from this experience."

Charles found himself frustrated with the support he received from the university:

> I felt a little alienated. I mean I'm not resentful of that, but I felt like the university's supervisory role was pretty superficial. . . I'm a little apprehensive about receiving a grade from somebody who's only observed four hours of my class time. . . But there were some individual professors who I had in the past who were there [for me]. I always felt like I could call them up and ask them a question or just talk a little about what was going on. . . Mostly my contact to the university was with our CU-SeeMe times.

Charles' frustrations were echoed by Laura, who said she felt "disconnected from everyone at the University except the other student teachers." When asked during the online focus group about support she received from the university, she commented, "I didn't really get any while I was student teaching. But I felt the support while I was there, because I had been pretty well prepared to be a teacher, right?" Laura sought out support from her cooperating teacher. She counted herself very fortunate to be placed with a supportive cooperating teacher. "My cooperating teacher made all the difference! She was so supportive and helped me work through everything from discipline problems to handling the work load."

Laura also sought out advice from the university electronically. She used the NetForum to send questions to her advisor, Betsy, concerning her

licensure and class registration:

> Laura: Hi Betsy! Thanks so much for all the help getting my registration number. Registration went fine, and I got all the classes I needed. I still need to meet with you and make sure everything is covered and correct. I would like to get a copy of my transcript too; what do I need to do to get it?

Betsy promptly followed up with the information in question and encouraging words, "Just remember that student teaching is a 10-week growth time. . . Keep a positive thought. . . be flexible and compliant at this stage. . . I'm with you in spirit -- Betsy."

Eleanor, who was also supervised by Anita, did not feel that she received adequate support by her supervisor. She did, however, feel as though she received exceptional support from Caroline and Betsy. "Caroline was always there when I had a question, or one of those days. I could call her at home anytime and she was always helpful." Betsy also proved to play an instrumental role in Eleanor's student teaching semester. This was evident in one of their CU-SeeMe discussions:

> Betsy: Hi Eleanor. . . I can see that discipline can be a real challenge -- I think its the first time we (as teachers/human beings) have to learn where our parameters are and how to set them and follow through.
>
> Eleanor: Yes! yesterday one of them [student] asked me where I was from and when I was going back where I came from. She also said I talk too much.
>
> Betsy: HA!! Kids do say the 'darnest things. . . Actually I think that's

a sideways compliment the student paid you. . . she's thinking of you and the teacher, the guide, the 'urger' in the classroom

Eleanor: (Smiles, but does not comment)

Caroline served as the university supervisor for Daminga and Pam. Daminga commented, "I guess I had support from campus. Like Caroline was out here about once a week, so I always knew I could ask her a question. She also came to all of our CU-SeeMe sessions, so that was always a good time to touch base." Pam echoed Daminga's sense of support but added, "But it was always good to have the CU-SeeMe conferences to look forward to, because you got support from someone who was doing the same thing you were doing." Pam elaborated on this comment when reflecting on her "worst" day student teaching:

> It was a day we were going to watch a video. The video in this school is programmed by the library, so I had it on the wrong channel, so there was like idle time, and the kids knew, they were talking and I didn't have any thing else planed. So, from then on I had an extra sense when it came to things being messed up. It was terrible. I felt like I had made such an easy mistake which then snowballed into ruining the class. I was feeling pretty upset. Then, when I was telling everyone about it during one of the CU-SeeMe's it sounded funny -- and we all laughed. I felt much better and got over it.

Melissa felt as though her supervisor's support was adequate, as expressed in her follow-up interview, "I pretty much got what I needed. Because you're [Cheryl] here, and you have the cooperating teacher , and

the CU-SeeMe's helped, and then there's Caroline, who you can call any time." Melissa felt, however, that the university should have played a more active role in her field experience:

> No one from the university really kept in contact with me. That's kind of keeping me back, too, because now I have to go on Friday, get all my stuff together. Licensure and all that, and take it in. It would have been easier if someone helped us along the way with all that paper work stuff.

Questions About the Future

Questions about the students' perceptions of themselves as classroom teachers weaved their way throughout the cohort's dialogue for the duration of the semester. Pam shared in her initial interview:

> Well, I'm kind of anxious, too, you know because, at first I didn't know I was going to be able to do it [student teach]. They [university advisor] made me meet with the board [teacher education committee], about grades and things like that. . . sometimes it makes me wonder if they all thought I would be a good enough teacher. I wonder if they are trying to make me stop.

During one of the videoconferences, Pam also shared:

> Well, I think I'm finally getting the hang of it. My lessons are going pretty well. But it really scares me to think about doing this all by myself without Mrs. Clay [cooperating teacher] or without you guys. . . I mean who will ask all of these questions to? And who will share all these great plans with me? I just don't know.
>
> Number 10 on Daminga's "Top Ten List of Things Student Teachers

Should Know" was, "Thank God you're not a teacher yet so you still have the decision you can make, whether you want to become a teacher or not." Two members of the cohort made the thumbs-up signs across the Internet when Daminga shared her tenth insight into student teaching. When I asked Daminga why she included this item on her top ten list, she responded, "You know, some days you just feel like saying, I just don't want to be in this profession. You just sometimes feel like giving up, just throwing up your hands and saying forget it!"

Shaking her head in agreement, Laura asked Daminga, "I know just how you feel, what kept you from walking out." Daminga smiled and responded:

> Because there are the days, where, everybody is wonderful. The kids all come and love you, you're the best teacher, and they do everything you say, and I mean the lesson goes well, they discuss, and you're just like, at the the end of the day, you're like WOW. I really made a difference in somebody's life. Those are the days that keep you here.

For two members of the cohort, the student teaching experience was their final semester as an undergraduate. These two students graduated in December, while the other four students plan on a May graduation. The two graduating participants spent a good deal of time thinking about and discussing what it would be like as a classroom teacher.

Eleanor asked Betsy during one the videoconferences, "Is it normal to feel like I cannot wait for student teaching to be over?" Betsy promptly responded,

> Yes, Eleanor, I think that is a healthy response to this challenge. . . because what it probably means is that you're ready to have your own class, make your own decisions as a professional within the context of the school. . . in fact, I'd hope that you would begin to feel that way now.

Eleanor paused and then replied, "Yeah, I guess you're right. But if I don't find a job here in Kane County or close by, I'll have to move back home and I guess just sub for a few months. . . I don't know, there's so much to consider."

> Eleanor's angst continued during one of the videoconferences: I feel like I'm just turning into this big control freak. I mean I don't get to spend quality time with my students. There are so many of them and there isn't any of the child-centered curriculum stuff going on in my cooperating teacher's classroom. I really want to be able to provide personalized instruction! Is this what I want to do the rest of my life?

Charles somewhat agreed with Eleanor, "Yeah, like one of the outdoor schools, where everyone is laid back and you get to teach what the kids want to learn about and do fun things with them." Eleanor, who evidently had done some research in this area, knew of several schools that fit her ideal. She enthusiastically shared this information with Charles and the other cohort members, "How about one of the snow board schools out west. I think I would rather get a job recreating with kids this age and helping them learn, not re-creating the facts for some test at the end of the week."

Personal Concerns

The tight bond among the cohort that existed before the student teaching experience began, meant that the participants knew some things about each other's personal affairs. They used the online seminars to stay connected with each other on a personal level.

When there was news for everyone to hear, someone typically announced it at the beginning of the seminar. Such as in the case when Pam was the first person online, "Hi everyone. Looks like we're all here. . . before we get started, just wanted to let you know that Caroline can't be here today. Her dad is in the hospital. She left some instructions for us. But let's just all try to remember her in our prayers."

This message immediately concerned the participants. They started asking Pam why he was in the hospital, which hospital, how Caroline was doing. Their strong sense of compassion moved them to ask the group to keep everyone posted on the progress of Caroline's father. The group exchanged phone numbers and decided that whoever heard any news would call the other members.

Laura had car troubles the first morning of student teaching. Once she arrived at school, she checked in with her cooperating teacher and then went to the Media Center. There, she turned to the NetForum. This entry was posted 8:26 a.m.:

> Guess what, Charles, you were worried about your car not being reliable for student teaching, but I'm the one who had a flat tire on the way for my first day. Talk about having a rough month. Well, by the grace of God, I am here and making it through. Keep

in touch on the forum.

Before lunch time, Melissa promptly responded to Laura, "I am happy you made it to your school, Laura. My first day is good. The morning came too soon though." Charles likewise posted encouragement the same morning:

> Laura, I hear you stole a car and still made it on time. I have always had confidence in your resourcefulness. My cruiser ran on fumes this morning. Thinking about y'all. take it easy. over and out.

The participants' compassion also shined through as Laura endured a very difficult experience within her family. When asked what the title of a book that describes her student teaching semester would be. Laura answered, "The Winter of My Life." She explained this choice of titles:

> Winter as a season is cold, yucky, and tough. But there are good parts to the winter like fireplaces . . . after winter there is always a spring. Well, I just feel like a lot of things have been cold, yucky, and tough this semester. I've had everything going on with my family, my move, and the tough days with the kids . . . but there have been fireplaces too! There's my cooperating teacher, my parents, the Lord, and you guys! And spring is coming. I'm really looking forward to getting my son potty trained and graduating in May!

Laura's fellow cohorts periodically showed concern by asking, "How are things going? I know I'm about dying with all we have to do. How are you holding up?" Laura always showed appreciation for her cohorts' compassion and asked them to just keep her in their prayers.

The personal support shared among the participants reflected their

comfort in sharing like experiences. Repeatedly, they discussed the changes in their daily schedules and how tiring student teaching could be. "I am sooooo tired. This has been such a long week!" Daminga commented in her final interview,

> I think all of my family and friends got tired of me always complaining about how exhausted I was and how many papers I had to grade . . . but I knew I could always talk to these guys about it -- because they were probably feeling just the same thing.

Evidence of Reflection

Caroline's primary role as the student teachers' university instructor and supervisor in this study was to provide the scaffolding for the student teachers' reflective thought and action. To provide this scaffolding, Caroline often prepared probing questions. Caroline and I routinely discussed these questions prior to the weekly online sessions. When she was unable to attend or arrived late, I assumed the responsibility for posing the reflective prompts. Examples of these prompts included:

a) If you were to write a book which describes your student teaching semester, what would the title be? Why?

b) Describe an effective teacher.

c) How long does it take to become an effective teacher?

d) Describe the best thing about your classroom experiences this week and the worst thing about your classroom experiences this week.

e) What has been your most significant experience at this point of your student teaching?

f) Has your philosophy of teaching changed throughout your

student teaching experience? Why or why not?

These prompts were typically presented a few minutes into the CU-SeeMe sessions. The first few minutes of the sessions were always open to the student teachers to "touch base" with one another. This unstructured time was often when they would exchange personal information. Sometimes, a student teacher would have a story or question for the cohort which provided a springboard to reflection. For example, Charles queried his cohorts during one CU-SeeMe session:

> You guys should have seen the great puppet shows my kids put on this week! Man, they were great! I had everyone working in groups, and they wrote the scripts, designed the scenery, and presented the shows for the class. Things were a little wild but it was really fun learning. . . I think these performance-based activities are the most effective, but in some ways the hardest to evaluate quantitatively. And it's hard, although I've seen kids over the course of my time here become more comfortable working in a group and expressing their own opinions, that's something hard to measure. A kid might speak more clearly and with more volume now, but at the same time that's hard to assign a grade to.

Charles' question provided an excellent opportunity for me to prompt reflective thought among the cohort. I responded to Charles by asking what his objectives of the puppet show were and then asked the entire group for their suggestions on appropriate ways to assess student success at meeting the objectives. The responses led to a discussion concerning: assessment of individual learning styles, content area

standards, and qualitative versus quantitative evaluation.

Often, the student teachers found themselves reflecting upon similar problems. Laura shared her frustrations over classroom discipline during one of the CU-SeeMe session and asked for suggestions from her peers: "Sometimes I feel like I've tried everything to get them do what they're supposed to. Does anyone have any secret tips to share?" Eleanor was the first to respond, "Laura, all I can say is that I'm right there with you. I have days just like that when it seems nothing goes right - even though you're doing what you think you're supposed to be doing. To tell you the truth I'm not quite sure what the answer is." Pam and Melissa then added some suggestions they had used in their classroom.

I asked Laura during her final interview to share her reactions with me to the responses she received to her question. She admitted a feeling of relief to know Eleanor shared her frustrations. Laura elaborates on her reactions:

> It was a comforting feeling to know that I wasn't the only one having some tough times with discipline. It helped just to be able to say it and then to know I wasn't alone. Once I knew that, I could focus on what to do about it -- and the tips everyone gave me were a big help.

Interviews with the participants revealed online interactions encouraged reflection both during and after engaging in CMC. Daminga found herself preparing for the CU-SeeMe session the prior to joining the her peers online:

If it was a morning CU-SeeMe meeting, I would think about it in

> the car on the way to school -- what I was going to say about how the week had been going. If it was an afternoon CU-SeeMe meeting, I found myself thinking about it, too. Sometimes, something would happen during the day and I would think how I really wanted to share it with the group and get their feedback. I looked forward to the CU-SeeMe sessions and tried to organize my thoughts a little before we started. They [CU-SeeMe sessions] gave me a chance to sit back and just think about being a student teacher and talk about being a teacher with other student teachers.

The emerging themes of communication described in this section provide an insight into the human aspect of learning to teach. The participants' narratives served as a medium for sharing their experiences and as a tool for reflection. Through the voices and gestures of the preservice teachers, a variety of issues and concerns have been addressed. Their daily experiences of the student teachers served as starting points for reflection, discussion, and inquiry. The student teachers' need for support was clearly woven throughout their conversations about their cooperating teachers, personal concerns, and professional concerns. Using CMC as a reflection tool seemed to help meet the student teachers' need for support. Embracing the concept that growth is a result of reflection and experience, the narratives shared among the participants led to professional and personal growth.

Use of Technology

The research questions for this study focused on the participants' experiences as student teachers and on their uses of technology throughout

their student teaching semester. Therefore, their words and actions have been sorted out according to their uses of technology. To tell the participants' complete stories, it is necessary to consider the technology that served as the discourse tool. CU-SeeMe and NetForum software programs provided the means for the student teachers to communicate from their field placement. How the participants used these tools as well as how they perceived them are essential components to this study. The emerging themes sorted into two categories: instructional uses and mechanics of use.

Integrating the Curriculum

Pam responded to the question about the title of a book about her student teaching experiences with, "Climbing the Ladder." She explained her answer, "Because I feel like its been a lot of steps of my career . . . I've learned so many new things -- and I feel pretty good about them." I asked Pam to share with us what some of the "things she had learned" were.

> Well, look at me right now. I'm talking to you with CU-SeeMe. I had never heard of this a few weeks ago. I was so scared when you told us about it. I was scared I would mess your whole research up, because I wouldn't be able to do it. Now, I want to know how we can all do it next year when we are teachers in our own classrooms!

Pam continued with a description of the different "rungs" she had climbed throughout the semester. She paused and asked the group if technology only meant computers. Laura told her she didn't think so, that VCRs, films, and overheads could be considered technology. Pam, then proudly announced that she did consider herself "techno-literate." Her proclamation was met with laughter by her fellow cohort members. "You

go, girl!" cheered Charles. Pam quickly qualified her statement:

> Well, I know I still need a little more work. But I can hook up with CU-SeeMe by myself, use NetForum, work with spreadsheets and databases. I'm not perfect at it or anything, but before this year, I didn't know any of this.

Daminga spoke up, "Can you call yourself 'techno-literate' if you use the 'super-VCRs' they have here at Farnham Middle?" I asked her to clarify what a "super-VCR" was. "The video here [Farnham Middle] is programmed by the library. So you have to coordinate the library VCR with the tape and TV in your room -- it's not as easy as it sounds!" Laura answered Daminga's question, " Of course it is! Look on the competency check-list and you'll see all kinds of stuff like that. They [the State Department] consider VCRs, satellite TV, even cable TV technology." Charles responded to the question about the title of a book which would describe his student teaching semester with, "Let Me Count the Ways." He explained his choice of book titles, "Well, I just tried to present the information to the students in as many ways as I could think of and had time for . . . you know see what worked best for me and for this group of students." All of the members of the cohort in this study likewise commented on the different methods they had used. They enjoyed sharing their creativity online about different methods they had tried during the week or asking for suggestions for how to fully develop a lesson for an upcoming the week. A number of the lesson plans discussed involved technology.

During the computer training session, when the participants were

learning how to use CU-SeeMe and NetForum, Eleanor asked if she would be able to use "this software with her classes?" I told her, and the rest of the participants, that of course they were welcome to use the equipment at any time during their field experience. I then asked Eleanor if she had any ideas in mind. She responded to my question, "Well, my brother is a middle school teacher in the state of Washington . . . wouldn't it be neat if my classes could do CU-SeeMe with his classes?"

Eleanor's idea was met with strong enthusiasm by the other participants. Together, we all brainstormed lessons she could develop that would involve a desktop videoconference with her brother's class. Some of the ideas included: "having email pen pals and then having them meet with CU-SeeMe, they could keep a journal of 'the day in the life a seventh grader' and compare journals with the class in Washington, conducting research on the climate and how it influences their communities and then sharing the data and results, they could create virtual field trips of their communities."

The ideas were exciting and Eleanor was excited about linking her class with her brothers. She asked me to send her brother email with CU-SeeMe instructions. I sent these to her brother and answered a few of his questions. Unfortunately, Eleanor's brother had difficulties with the software and the virtual connection was never made between the two schools. Eleanor was disappointed that this idea did not work, but she decided, "It's ok, because the time-zone factor would have been tough to work around. We're about ready to get out of school when they are just getting their day started!"

Eleanor, however, was not deterred. The first full unit that she was assigned to teach was Russia. Once again, she emailed me, asking for ways to get in contact with Russian students either via email or videoconference. I provided her with a few resources of places and people to contact. Enthusiastically, Eleanor sent out a call to connect with Russian students. There was quite a delay in any sort of response. Eleanor did receive some information eventually. These contacts, however, came too late in her field experience to see the project through.

Despite Eleanor's unsuccessful attempts to integrate the telecommunications software into her classroom, she says:

> I would definitely try it again. You know when I have my own classroom and would have the whole year to do a project like this. I'm just so glad to know about it now. I know how to use it and have thought about ways to use it in lesson plans that I never would've thought of before. It's just so amazing to think about connecting all around the world like that -- from a classroom!

During my on-site visit to her school, Laura asked me about ways, in addition to CU-SeeMe that she could use the QuickCam. I briefly showed her how to make movies or take snapshots with the camera. Together, we brainstormed a few ways she could use the movies or snapshots in her classroom. Six weeks later, during one of the online sessions, she mentioned she had used the camera to create individual passports for each of her students. This idea immediately caught everyone's attention. The other participants questioned how she did this. Laura explained:

> We were having a country fair on our team. Every student was

assigned a country. They were to research it and fix up a little booth around the room on their country. Well, part of this was the passport activity. First off, I took every students' picture with the CU-SeeMe Camera.

Charles interrupted and asked her how she took the picture. Laura continued:

Cheryl showed me how when she was out at my school. You just open the quickcam software and select the picture option. I promise it's really easy -- and the kids went crazy over it! Next, I made up this little form to resemble a passport. Then, I used MicrosoftWorks at my house to cut and paste their pictures onto the passport and printed them out. The students then filled out all of the personal information on their own passport . . . During our country presentation day, I had each student visited the different booths. They had to write down three facts about a country and then they could get a stamp from that country!

Laura's cohorts were intrigued by this lesson and the instructional materials she had created. Following her lesson summary, the student teachers asked her a number of specific questions about the mechanics of this lesson and then followed with a discussion of spinoffs they could do on the passport lesson.

During one of the desktop videoconferences, we asked Melissa what topic she was focusing on in her classes. She said the Middle East and North Africa. I commented on the timeliness of the unit and asked her if she had seen the cover story of the most recent *Time.* She replied, "No, I

haven't really done much with current events. They are doing a research project on specific countries using HyperStudio." I'm sure Melissa could see the smile on my face over the network as she described her planned project:

> They will do research in the library and on the Internet in groups to learn more about the country that they are assigned to. The kids seem to really want to get into the computer lab and get started . . . only one person in the class knows HyperStudio, so I did an introduction for them that will be on their computer disks -- its a kind of a getting started tutorial. I think they will learn as they go, working in groups should help them out.

I shared a helpful computer lab tip with Melissa, which was to have empty plastic cups next to each computer. As students have questions, instead of raising their hands, they should put the cup on top of the computer monitor. The cup on top of the computer will signal the teacher to come and help out the students, but while the students are waiting for the teacher, their hands are free to continue problem solving themselves -- and they may even answer their own question. During her final interview, Melissa commented, "The cup idea you had was really helpful. Actually, I used index cards instead of cups, but I think it worked just the same. Picking up suggestions during the CU-SeeMe sessions really made a difference!"

There was such a high interest in Melissa's planned project, we asked her to post the times and dates of her class time in the computer on the NetForum. This way, anyone who was interested and able to visit

Melissa's class while they worked on their HyperStudio projects would know the best times to do so. I visited Melissa in her classroom to view the HyperStudio projects and was thoroughly impressed. Most of the students had done an excellent job of presenting quality content material in a most creative and unique style. The students had accessed current and key information from the Internet and had arranged it most attractively within the HyperStudio stacks. As I shared with Melissa how impressed I was with the students' work, she confessed:

> It wasn't as easy as I expected. Teaching them HyperStudio took a lot more than the tutorial -- and the group work was a challenge too. But once we got past all that, they came alive! They really had fun learning this way.

Melissa would have liked to have integrated the telecommunications software and equipment into her classes, but found it difficult to schedule time in the networked computer lab. She believes, however, that in the future she would use both CU-SeeMe and NetForum for her own professional development and in her own class one day. Melissa described the ideas she has for using both of them in the future:

> I would use the chat window in CU-SeeMe to talk to other teachers. Because with the chat window, if you told the kids, like with reading and writing workshops, they are sitting there silently reading or writing, and if no one needs you then could just go to the computer and talk to a teacher, without disturbing anyone else. We could talk about a unit that we're both teaching or share ideas, discuss problems. It would be nice . . . If I was using it with one of my classes,

> I would use CU-SeeMe with the camera. Because they would think that was more fun, to see each other. And to take pictures of each other with the camera.

Characteristics of Hardware and Software

Video. What the participants were actually "seeing" was another recurring topic of discussion during the videoconferences. The participants often responded to one another's smiles and gestures. Pam shared in her final interview, "I loved being able to watch people's reactions. It made it so much better than just typing. Like, you could see if they thought something was funny or if they were being interrupted by someone in the background."

If there was activity taking place within the camera's scope, either the participant would volunteer what was taking place, or without fail, someone would ask that person what was taking place at their school. Laura explains one morning who the students are gathered around the camera:

> Sorry guys, but I need to interrupt you for a minute to introduce some eighth graders to you. A class has just come into the library and they are in awe of the camera . . . Do you see them? They have been parading around behind me since they came in, so now I'm going to let them give it a shot . . . everyone smile!

One morning, we could see Laura eating something during the desktop videoconference. Eleanor asked her what she was eating. This sparked a dialogue about how much everyone's eating habits had changed since they started student teaching, "Who has time to pack a lunch in the

morning? And the cafeteria food here is nothing to write home about, YUK! I'm lucky if I'm able to find time to use the restroom during the day, much less eat."

The participants used the video to send one another images that were fun and lighthearted also. For example, one morning, Daminga and Pam detailed for the cohort their experiences chaperoning a school dance the weekend before. Their description was enhanced by an online demonstration of how they had danced at the school dance! Standing up, the two performed the latest dance steps online.

The local newspaper interviewed Charles about his experiences using CU-SeeMe during his student teaching experience. When asked about using the desktop video conferencing, Charles responded, "It's very intriguing to see other people." Charles believes CU-SeeMe to be intriguing also to send images of his puppets across the Internet. He believes, "The puppet is my personal piece of technology that helps me get my message across to the students." Often, Charles would bring his puppets to the cohort's online meeting to demonstrate a lesson he had done in class. The local newspaper reporter described Charles as being "caught between a piece of felt and a hard drive."

Asynchronous vs. Synchronous. The NetForum software was the asynchronous mode of CMC in this study. It is asynchronous because the text was posted on the web page and was available for the participants to read and respond to their convenience. The CU-SeeMe software was the synchronous mode of CMC in this study. It is synchronous because the participants responded to each other's video, audio, and text in real time.

All of the student teachers, except for one, preferred the synchronous CMC over the asynchronous CMC. Pam shares her preference for the CU-SeeMe:

> I liked knowing that someone was going to be on the other end of network to talk to. Like, if I had a question or something to say, with CU-SeeMe, there was always someone there to talk to. But with NetForum, it wasn't like that. Sometimes I would go to the web page and there wouldn't be anything new -- or if I typed in a question, sometimes nobody would write back for a long time. I pretty much stopped using it [NetForum] because it seemed like a waste of time if there wasn't anything new.

At the beginning of the student teaching experience, the participants regularly posted questions and responses to the NetForum. As the semester progressed, their postings declined. The student teachers reported that this was due to their increasing classroom responsibilities and the lack of their cohorts to post new messages. Eleanor expressed her frustration with NetForum:

> It was ok when we started, because all we were doing was observing then. It was pretty easy to take a few minutes to go to the Media Center to write to everyone -- but then I just got so swamped with everything that I was doing. There just wasn't time to go check the web page, especially if there weren't going to be any new messages.

Charles also found it difficult to make the time to check the web page with all of his student teaching responsibilities. He shared in his post interview, "Time was just so valuable. If I'm going to spend the time

doing something like that, I want to know that someone is going to be there to talk to -- like in CU-SeeMe."

Laura was the one student teacher who preferred the asynchronous CMC over the synchronous CMC. She clearly states why she preferred the NetForum over the CU-SeeMe:

> I just got so frustrated with CU-SeeMe. There are still so many technical things with it that need to be worked out. The problems I had with my computer got in the way of being able to talk to everyone. I never had to worry about something not working with NetForum. All I had to do was pull up the web page -- and I could do that at anytime from any computer connected to the Internet. . . Sometimes it just made me feel better to be able to type in what was going on -- even if nobody was going to read it and write back for a day or so. I wish everyone had used it more.

Technical Difficulties. The technical difficulties experienced by Laura were a source of frustration for her and the other participants of the study. "The days that we did CU-SeeMe first thing in the morning were always hard for me. I found the seminars to be very frustrating . . . my computer always seemed to get knocked off the network and it made me feel so tense . . . it was a very hard thing to do before a day of teaching." Laura's reflections on the CU-SeeMe seminars summarized how all of the participants felt at times during the semester about using the new technology. There were a variety of technical difficulties that the participants experienced during their online sessions.

The computer at Laura's school that was connected to the Internet

was an older model IBM. This machine was running Windows 3.2, which meant that she had to use an older copy of the CU-SeeMe software. Because she was using this version of the software, her machine would not support the audio component of the CMC, and her machine often voluntarily disconnected her from the server. This proved to be very frustrating for not only Laura, but for the other participants. Their frustrations can be felt from the following CU-SeeMe text excerpts:

> Daminga: Where's Laura this morning?
>
> Cheryl: She was online just a moment ago, waiting for everyone to log-on and then she was bounced off the network.
>
> Daminga: I hope she comes back on. Why don't they get better computers at her school? Then we could all actually TALK to each other instead of TYPE to each other.
>
> (after about 3 minutes Laura logged back into the network)
>
> Laura: I'm back. Sorry about that guys. This thing aggravates me so much sometimes. Why don't y'all send me a smile!
>
> (all of the participants smiled into the camera)
>
> Laura: Thanks! :) Now, what were you talking about while I was gone?

Besides the technical difficulties faced by Laura, Charles had his own assortment of technical obstacles to overcome. He sent out a message at the beginning of one of the desktop videoconferences, "I'm a lurker today guys -- can't get the camera to work -- but at least I'm here!" The machine that was made available to Charles was an IBM ThinkPad. This laptop computer ran Windows '95, so we were able to load the most recent

version of CU-SeeMe software onto his school's machine. The drawback with the machine, however, was that it did not have speakers, so it did not support the audio component of CU-SeeMe. Also, because it was a laptop, it was often being used by other teachers. These teachers were understanding in that the computer was always in the lab for Charles the days that he would need it; however, the camera was usually disconnected. This meant that Charles was required to reconnect the camera in order to send video. This proved to be too cumbersome some mornings , so Charles was forced to participate as a lurker.

Despite his frustrations, Charles remained interested in the desktop videoconferences:

> You know I really liked the idea and I'm still very intrigued by the idea of videoconferencing. There's obviously some barriers to successfully getting everyone on at the same time. And, I was frustrated a lot of time when it didn't go just right. . . I don't really have the expertise to know exactly what the breakdown was -- But the times that everyone was connected, the delays and the camera, and the audio, to me that didn't matter much. It was real enjoyable and helpful -- I was actually disappointed that we didn't get to do it more often. I think if we had, then I would become more fluent in addressing some of the problems with it."

The computer at Farnham Middle, a Power Macintosh, was able to run the most current version of the CU-SeeMe software. This meant that the participants at this school were able to send and receive audio and they did not have any problems with being cut off of the network. Their

frustration with the CMC was simply that the entire cohort members were sometimes unable to fully communicate with each other. Daminga shares her opinion on the best and worst of using CU-SeeMe:

> The best - Getting to see each other more often than we normally would have; even for the four of us here at Farnham Middle - and talking about things that really seemed to help.
>
> The worst - Laura's computer at her school and Charles' camera on his computer. It was so disappointing to sometimes not always have us all there!

Besides the obstacles created by the hardware in the middle schools, the campus network and scheduling also proved to be sources of frustrations. Prior to one of the afternoon CU-SeeMe sessions, the entire campus network temporarily shut down. Throughout the university's campus, computer users were unable to access their email, the WWW, or print on networked printers. Because the participants connected into one another through a campus reflector site to use the CU-SeeMe software, they were also unable to access anyone in the Internet. One-by-one the participants called me on the telephone in the computer lab to see why they were unable to login to the network. I explained to them that this was a technical problem that was out of our control and we would have to reschedule our online session.

Scheduling proved to be an obstacle in two ways. One was with reserving time to use the school computer. In each of the three middle schools, there was only one computer available for the student teachers to connect to the Internet. These computers, all centrally located, were shared

by teachers, administrators, and students throughout the school. When I met with the technology personnel at each school prior to the beginning of the student teacher's field experience, I provided them with the dates and times of the CU-SeeMe conferences. This allowed us to "reserve" computer time once a week throughout the semester. Teachers at each of the three schools were very cooperative and respected this "reserved" time.

There was one instance, however, when a teacher at Farnham Middle, inadvertently began to download a large file moments before the student teachers arrived in the media center for their online session. The participants at the school called me in the computer lab and explained the situation, "Mr. Levine is downloading a huge file. He says its going to take probably about forty-five minutes. Can we reschedule this CU-SeeMe? We don't want y'all to do it without us!" We coordinated schedules and the session was rescheduled for the next morning.

Coordinating the schedules of six student teachers, placed in three different schools proved also to be an obstacle. This obstacle, however, thanks to the participants' enthusiasm for the desktop videoconferences, was easily overcome. When the student teachers first began their field experience, finding time for everyone to meet online was relatively easy. All of the participants were observing, and found it easy to meet online during the school day. As they began to teach different periods of the day, CU-SeeMe sessions had to be coordinated around the different school schedules. Each of the three schools started and ended at a different time of the day, so the initial before school or after school suggestions for meeting were not feasible.

I asked each of the student teachers to post their daily schedules on the NetForum to help us identify a common meeting time. They each posted their school's bell schedule, their planning periods, and any additional responsibilities they had which may interfere in the desktop videoconferences. Within three days, all of the participants had posted their schedules. I looked over their entries and then posted my own suggestion. "Laura's school starts the earliest, but she has first period planning. What do you think, Laura, about having a CU-SeeMe session once a week during your planning period? And to the rest of you . . . What do you think about coming into school a little early in the morning once a week. How does 7:45 sound to everyone?" One-by-one the participants responded that once a week at 7:45 worked with their schedules.

In summary, the data that emerged from this study tells the story of one cohort of middle school social studies student teachers. Their CMC included topics ranging from classroom lessons to network connections. The preservice teachers in this study all grew as individuals and as professionals from their student teaching experiences. Their growth has been documented through an analysis of their words and gestures transmitted across the Internet. A discussion of the results and these findings is given in the next chapter along with conclusions about the study and recommendations for future research.

CHAPTER VI

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This research explored the middle school social studies student teaching experience of six students. The study investigated how computer mediated communication (CMC) can be used to enrich this period of professional development. I was interested in the extent to which the telecommunications software, CU-SeeMe and NetForum, would provide the student teachers with opportunities for reflective discourse. Of particular concern was how the telecommunications software was used by the participants and which of the two telecommunications software programs (CU-SeeMe and NetForum) was most effectively used by them.

As reported in earlier chapters, the data revealed a rich description of the study's participants and their student teaching experiences. Their stories have been presented in the form of a qualitative case study. In Chapter V, an analysis of the participants' CMC and interviews yielded eight themes related to their student teaching experience. In this chapter, I draw the following four inferences from these themes:

1) As a result of the participants' active participation in an online learning community, opportunities for peer collaboration and reflection were enhanced.

2) CMC allowed the participants to engage in self-directed and self-inintiated professional dialogue.

3) The participants translated the use of technology from the personal context to the classroom context. As a result, they acquired perceptions of themselves as technology users.

4) Desktop videoconferencing as a mode of communication provided more immediate and satisfactory feedback for the participants than the web-based groupware.

In the following discussion, I describe how I derived these four inferences and place them within the context of the professional literature.

Discussion

Inference 1. As a result of the participants' active participation in an online learning community, opportunities for peer collaboration and reflection was enhanced.

Griffin (1992) has concluded that the, "development of the student's capacity for independent reflection is the school's special contribution to the democratic way of life" (p. 20). Social studies educators have long embraced reflective inquiry as the overarching goal of the social studies curriculum. Reflective inquiry, defined by Dewey (1933) is: "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (p. 9). Teacher education programs that model reflective inquiry provide preservice teachers with the opportunity to "develop images of what classroom inquiry is, as well as what it is like to experience such inquiry from the perspective of the learner (Adler,1994, p. 57).

The weekly CU-SeeMe sessions and the constant availability of the NetForum provided the opportunities for peer collaboration and reflection. The student teachers in this study were each placed at least thirty minutes from the university campus. The weekly CU-SeeMe

sessions allowed the participants to regularly interact from their field placement, requiring no travel time. NetForum was available on the Internet at any time of the day, from any networked computer. The accessibility of NetForum provided opportunities for interaction atypical to the professional semester.

Charles' reflections on the online sessions illustrate the benefits of using CMC to connect a cohort of student teachers:

> There are so many things we have to do during these weeks of student teaching. . . it can be overwhelming sometimes. It was really nice to be ale to just walk over to the Media Center in my school to talk to everyone instead of having to drive back to campus. We were able to talk to everyone more than if we had to wait for a class on campus.

Compared to the tool of collegial journals, CMC is more effective because it allows for more immediate feedback. Collegial journals are often used by teacher education programs to encourage reflection (Reiman &Thies-Sprinthall,1993). Collegial journals foster reflection through self-evaluation and collaboration (Kusnic & Finley, 1993). The drawback of using collegial journals is the lapse of time in receiving feedback (Holmes, 1997). Prompt response to journal entries is especially difficult if student teachers have to physically exchange journals with their peers in different schools. The synchronous CMC supported by CU-SeeMe was found to encourage reflection among colleagues, while providing spontaneous feedback. The data suggest that the timeliness of using CMC as a tool for reflection makes CMC a more effective tool than collegial journals.

Excerpts of the participants' CMC presented in Chapter V are consistent with Frances Fuller's work (1969) on reflection and the development of beginning teachers. Fuller's research has examined the developmental concerns-based stages of novice teachers with personal aspects of classroom instruction. Fuller argues that teacher educators should acknowledge the developmental conceptualization of student teachers' concerns to best meet their needs as students and as professionals.

Fuller has identified three stages of concerns (Fuller, 1969): survival, teaching, and student. Her research shows that beginning teachers move from the personal stage to management provided they have ample time for reflection and appropriate support and scaffolding from their learning community. Reflection is the key component of the process that promotes their progression through the developmental stages (Fuller & Brown, 1975).

For this study, an analysis of the participants' discourse revealed their development from personal to management as they engaged in conversations about classroom methods and materials. The participants' development corroborates the professional literature, in that there is data to support the three stages for each of the participants. It is important to note that the CMC provided the context for this type of reflection and peer support to take place. Figure 6.1 illustrates examples of the participants' concerns as they correlate to Fuller's Stages of Concern:

Concerns of teachers	Description	Data
Survival Concerns	Concerns about class management, knowledge of the content, evaluation	Social studies is so fact oriented. I spent the whole weekend in the library - just trying to learn what I was going to teach th week. (Daminga)
Teaching Concerns	Concerns about non-instructional duties, time management, and materials	I'd really like to be ab to take my class to th computer lab so that we could use the Internet. They could search for different resources on the web. (Melissa)
Student Concerns	Concerns about the social and emotional needs of the studen	Parent conferences ar one of the most valuable things I've done. They gave me the chance to understand the studer in the context of thei life outside of my clas -- the big picture. (Charles)

Figure 6.1 Fuller's Stages of Concern

It is obvious that the quantity of opportunities for reflection was increased since students had continuous access to NetForum. The participants were able to post comments to the NetForum web page at any time of the day, from any Internet-connected computer. The participants were also able to meet online from the convenience of their field placement. Because travel time to the university was not a factor, the online sessions were held at convenient times before, during, or after the school day.

The quality of reflections in this study was also enhanced by CMC. However, the case for quality is more difficult to make since this is not a comparative case study. The synchronous nature of the CU-SeeMe software contributed to the participants' reflective discourse. Thomas, Clift, & Sugimoto (1996) reported email to be a significant communication tool for student teachers and university supervisors. Yet, they also reported the asynchronous nature of email supports a very low social presence and media richness. Thomas, Clift, & Sugimoto (1986) define low social presence and media richness as the absence of face-to-face communication and automatic feedback. In this study, on the other hand, there was a high social presence since the CU-SeeMe software supported synchronous communication. Eleanor reflects on the spontanaeity of CU-SeeMe:

> It was just really nice to be able to count on everyone being there when you logged on. I liked being able to tell them [cohort] about what had happened that day and hearing what they had to say about it right then -- and not have to wait until later for them to respond [as with NetForum] .

The student teachers were motivated to discuss their classroom experiences because they could depend on peer responses. Also, the student teachers were online together which contributed to the collaborative nature of their discourse.

Inference 2. CMC allowed the participants to engage in self-directed and self-initiated professional dialogue.

Three reasons that the technology context promoted self-directed dialogue are: the participants' shared language, the inherent nature of the technology, and the limited role of the supervisor.

The participants displayed a high level of openness with one another. Whether discussing personal or professional issues, honesty and trust was always implicit in their communications. The trust they felt for one another is one characteristic of shared language among community members (Rogoff, 1994).

As noted in the previous chapter, the student teachers' conversations about future plans highlights this shared language. Topics of conversation related to post-student teaching were conversations about: whether or not they really wanted to be a classroom teacher, other careers they may pursue besides teaching, how to apply for teaching jobs in local school systems, and how to interview for a teaching position. As some of the student teachers had interviews with school systems, they shared their experiences with one another. Each of the cohort members expressed at some time a hint of uncertainty in the choice they had made to become a teacher. They shared these doubts very comfortably with one another. Pam summed her feelings about this in her post-interview, "I worked so

hard to get this far, my mom would think I was crazy if I hinted at not being a teacher. . . but they [cohort] all understand."

These patterns of discourse support what the literature reports about a shared language among community members. Rogoff (1994) describes learning through the lens of the social constructivist as a "transformation of participation." According to this model, growth occurs from the participation in the socially relevant activity of a group. Burbles (1993) argues that the foremost initiative of teacher education programs should be to involve students in the discourse of the profession. Participation in professional dialogue leads to membership in a community of learners. Gee (1990) defines the dialogue shared within a community of learners as:

> A socially accepted association among ways of using language, of thinking, feeling, believing, valuing, and of acting that can be used to identify oneself as a member of a socially meaningful group or social network (p. 143).

The shared discourse, made possible by the CMC, among the cohort helps to combat the "lone-wolf" paradigm. Huberman (1995) observes that our schools force teachers to operate in isolation, as a "lone-wolf." This paradigm does not support community building or community language. Rather, educators work in professional isolation. He claims the architectural and social structure of public schools contributes to the absence of colleagiality.

The intervention of CMC in this study made it possible for the participants to engage in professional dialogue with a community of learners from their various field placements. The inherent nature of CMC

motivates individuals to take more responsibility for their learning. The quality of the reflective discourse among the participants in this study was enhanced by the technology. One student teacher, Daminga, commented:

> The CU-SeeMe sessions are different than regular seminars in a classroom. For example, we usually start off just venting about what has been happening the past week. Someone usually had a situation to tell us about or someone had a question to ask. It wasn't like we walked into a classroom and waited for a teacher to ask a question. As soon as two people were logged on -- we were talking.

Daminga's reflections on CMC are consistent with the literature in that CMC works to encourage collaboration and participation by all online users. Harris (1993) reports that CMC fosters the building of strong communities, but also encourages collective problem solving. The collective problem solving is done so in a democratic manner, void of hierarchies (Zuboff, 1998).

The university supervisor's role was limited in this study. As described in Chapter V, Caroline's limited experience with technology and limited access to technology may have contributed to her diminished participation. Despite repeated encouragement to play a more effective role in the CMC, Caroline's role in this study was much like the role of the electronic supervisor in the literature. Thomas, Clift, and Sugimoto (1996) conducted research which linked student teachers via email. Their study revealed the majority of the electronic messages focused on course requirements. Blanton, Trathen and Moorman (1996) similarly report the need for the supervisor to structure the online dialogue to encourage

pedagogical dialogue. They structured their study to engage their student teachers in pedagogical dialogue in which the supervisors who participated entered electronic messages related to the social constructivist perspective. That is, they entered thoughtful questions and probed students to engage in the dialogue of professional teachers.

It is interesting to note, in this study, even though the supervisor's dialogue centered primarily on course requirements, the student teachers' dialogue primarily focused on classroom instruction and student concerns. This is a key point because in essence what happened is the online learning community served the function of a typical supervisor. That is, the CMC facilitated the student teachers' progression through Fuller's (1969) developmental stages.

One possible explanation for the supervisor's limited role in this study may be that that the student teachers felt more control and assumed more responsibility for their learning. Schrum's (1993) research findings support the shift of learner responsibility from supervisor to student teachers, "the world of electronic communication assumes and demands that people take initiative for their own learning and growth" (p 193). Caroline commented on the student teachers' initiative and enthusiasm during an interview, "They have just taken off with the CU-SeeMe! By the time I get to the Media Center, they are already gathered around the computer, connected with one of the other schools. Sometimes, I just watch and listen to them -- they almost teach themselves!"

Another possible explanation for the supervisor's limited role may be her lack of computer availability and prior experiences with technology.

The literature tells us that the use of telecommunications is directly affected by its access (Honey & Henriquez, 1993). Lack of access to a computer was an obstacle for Caroline. Hoping to encourage an increase in her NetForum participation, I made arrangements for Caroline to have a networked computer in her campus office. There was no change in her CMC with the computer in her office. Perhaps a network connection from her home would have overridden the accessibility obstacle.

The student teachers, however, were not deterred by Caroline's lack of participation in the CMC. Rather, they engaged in self-directed communication. The contribution of CMC to the learning environment of student teachers is significant, as it facilitated their professional growth. But it is not clear whether their self-directed learning is a result of Caroline's lack of participation or the inherent nature of CMC.

Inference 3. The participants translated the use of technology from the personal context to the classroom context. As a result of this, they acquired perceptions of themselves as technology users.

The literature reports that individuals communicating online use technology for two main purposes. The first purpose (Boston, 1992) is that of technology as repository, in that it simply stores information to be exchanged. The second purpose (Dede, 1995) is that technology actually encourages a paradigm shift so that it becomes the environment for learning. The findings from this study support the notion that technology prompted a paradigm shift in the way the participants viewed technology as a tool.

"YES! I would consider myself techno-literate!" exclaimed Daminga

during the online focus group session. As described in Chapter V, techno-literate is the term the participants coined to help express their new-found technology confidence. Prior to the onset of this study, none of the participants had used CU-SeeMe, and only one had used NetForum. Their telecommunications experience was limited to sending text-only emails and occasional web surfing.

Each of the student teachers included evidence of technology integration in their professional teaching portfolios. However, three of the six participants in this study, made a self-described shift from technology novices to techno-literates. This shift, encouraged the student teachers to attempt to integrate technology into their own classrooms. In her initial interview, Laura described her previous computer experiences as "creative, hard, and challenging." To the same question in her post interview, she responded, "exciting, fun, and frustrating." Laura's self-described shift to becoming techno-literate may be explained by her experiences in an online learning community. She reflected on the role technology played in her professional semester:

> The passport activity I did with my students was one of the best. I am really proud of that -- because the kids really liked it and seemed to learn from it; and because it was one of the most creative activities I did all semester . . . the idea just came to me one morning during one of our CU-SeeMe sessions. I was waiting for everyone to log on and was trying to come up with a way that I could use CU-SeeMe or at least the digital camera in my class.

Eleanor described her computer experiences at the beginning of the

professional semester as: "frustrating, exciting, and stimulating." To the same question at the end of the semester, she answered: "cooperative, frustrating, and empowering." Eleanor explained why she choose these last three words:

> Cooperative because that's how we used it this semester -- to talk to each other and to work together. Plus, I've learned to just ask for help when I have technology problems. Frustrating because it doesn't always work. Sometimes the network wasn't working or someone's camera wasn't plugged in right. Empowering because sometimes I would stop and realize that I was actually talking over a computer line -- and that I could connect my students with people all over the world from the Media Center. Amazing!

Casey (1997) identified similar shifts in attitude toward technology with student teachers. She reported an increased use of the computer for classroom instruction and professional development by student teachers who used email during their field experience. Shrum's (1992) research concludes that this phenomenon is due to the presentation of theory and application within the context of technology use. In other words, once individuals have the opportunity to use new technologies in a personal context, the technology integrates seamlessly into the learning environment.

Inference 4. Desktop videoconferencing as a mode of communication provided more immediate and satisfactory feedback for the participants than the web-based groupware.

As suggested by the media richness model (Daft & Lengel, 1984;

Trevino, Daft, & Lengel, 1990), tools for CMC differ in their ability to facilitate communication. Some tools have great ability and are considered to have more media richness, while some are low in media richness and have less ability to facilitate communication. Two modes of CMC were included in this study. The CU-SeeMe software represented the richest mode of CMC as it allowed for the synchronous exchange of video, text, and audio. The NetForum software represented the lowest mode of media richness in that it supported the asynchronous exchange of text.

The desktop videoconferencing software, CU-SeeMe was the most often used medium for CMC. Each of the student teachers used the CU-SeeMe at least once a week for the duration of their field experience. Despite the limitations of using this software, CU-SeeMe was the most effective form of CMC. The fact that desktop videoconferencing is synchronous proved to be significant to the participants. They found it the best use of their time to engage in online dialogue because of the prompt feedback they received.

The unique aspect of the data presented in the previous chapter is the importance of spontaneous feedback. The literature supports the participants' desire for timely CMC. Posner (1993) reports the significance of timeliness to encourage reflective inquiry and to "keep up" with the immediacy of classroom teaching (Posner, 1993). Schrum and Berenfeld (1997) highlight the significance of spontaneous feedback in their citation of student teachers during the Gulf War:

> When fighting broke out in one part of the world, the students and their advisors discussed how to handle it in the classroom, what to

> teach, and how to answer questions from their students. They did not receive relevant print materials for almost month, which would have hardly helped in the urgency of the moment (p. 89).

The transmittal of realtime video was not as important to the participants as the realtime exchange of audio and text. The NetForum did not provide the same spontaneous feedback. Despite the fact that the NetForum could be accessed at any time of the day, from any computer, the majority of the participants felt they benefited the most from the desktop videoconferences. Laura was the only participant who felt the NetForum to be most helpful for her. She explains her reasoning:

> I just always got so frustrated from trying to connect in to CU-SeeMe early in the mornings and having it not work sometimes. It was much easier for me to just pull up the (Net)Forum web page, look to see what was new, and put in my questions or thoughts. . . The web page was good at first, then everyone got too busy to post things. so I even stopped checking it as much because there were too many days when there weren't new things.

Laura's reflections on the different modes of CMC remind us that the social and personal environment of online communication is significant to its effectiveness. Harasim (1993) asserts that we cannot only focus on the technical aspects of CMC, but also on the environmental aspects:

> Lessons gained over the past two decades of experience in network communication highlight the importance of designing the environment. Networlds are the intersection of social and

technical systems; design involves both technical and social considerations" (p. 29).

Conclusions

Communication among cohort members and university personnel was facilitated by the CMC, especially the desktop videoconferencing software. Weekly CU-SeeMe sessions provided opportunities for the participants, to interact with one another and with their university supervisor. These sessions were effective because they increased the quality and quantity of the participants' opportunities for peer collaboration and reflection.

The student teachers exhibited high levels of trust and openness with their communication. Their collegial discourse provided the scaffolding for reflective inquiry. As a result of their participation in the CMC, the participants assumed more responsibility for their learning during the CU-SeeMe sessions.

The student teachers also developed a new confidence to integrate technology into their classrooms. They found the effective use of technology in the personal context translated to the classroom context. The technology-infused lessons developed by the student teachers and described in this report highlight their new confidence.

It appears that the findings of this study are consistent with Casey's (1997) research. The student teachers in her study were linked via email. Casey found the major benefits of using email during the student teaching experience to be increased: reflectivity, feelings of rapport and support from their university supervisor, and increased team support. She also found

that their self-esteem increased due to mastering technology and receiving positive support through email messages.

The characteristics of the CMC software in this dissertation study, however, distinguish the results from others in the field. CU-SeeMe allowed synchronous dialogue and the exchange of video. NetForum organized the postings into threads of conversation. These software features contributed to increased reflectivity among the participants. Although not conclusive, the data suggest the spontanaeity of the CU-SeeMe sessions insured prompt feedback and encouraged spontaneous reflection. Desktop videoconferencing among student teachers is a relatively unexplored phenomenon. As new technologies emerge, teacher education programs should continue to explore ways to enhance teacher education through the use of instructional technology.

Limitations

Limitations of the study related to the student teaching placements and the available technology infrastructure at the school sites. First, three of the participants' student teaching placements were in the same middle school. Although each of these four student teachers reported that they interacted on a limited basis with one another, having each of the participants in a separate school would have added different data to this study. As the study has been reported, the cohort used CU-SeeMe synchronously from three school sites. The four participants at Farnham Middle School all had to share the one computer with an Internet connection in the building. These four student teachers were required to rotate opportunities at the key board and in front of the camera. However,

the student teachers' field placements were beyond the researcher's influence and were unable to be revised once they had been assigned.

The technology infrastructure at the school sites proved to be a second limitation of this study. Two of the middle schools' computer equipment did not allow the participants to take full advantage of the software's features. Woodburn Middle School's laptop computer was not able to support the audio component of CU-SeeMe. Tuxford Middle School's Windows 3.2 machine did not support the updated version of CU-SeeMe or the audio component CU-SeeMe. Therefore, the participants were limited to exchanging video and text. The audio feature would have added additional data with regard to the participants use of telecommunications. It also may have provided an easier exchange of information for the participants. This study, however, was limited to using the computers that existed in the schools.

Recommendations

This case study linked a cohort of middle school social studies student teachers via telecommunications to explore the nature of their discourse during online weekly seminars. Their voices and stories have provided a rich description of one teacher education program attempting to apply new technologies to the student teaching experience. These student teachers used technology to enrich their professional experience.

The data, however, provide more than an interesting glimpse into student teachers' use of CMC. New insights into the infusion of instructional technologies into teacher education have emerged. From an analysis of the data, and through reflection on my own experiences, I have

recommendations for future applications and research.

First, teacher education programs should continue to incorporate and pioneer the integration of newly refined and developed technologies. As new technologies emerge, they should be explored for applications to the professional development of teachers. Second, the structure of student teachers' online discourse should be considered as it compares to student teachers' face-to-face discourse. Research should be conducted to investigate the differences between online reflective seminars and traditional campus-based reflective seminars. Third, research should investigate which student teachers have the greatest success in using the different modes of CMC. Individual's learning styles should be correlated with their communication styles to insure the best match of CMC for each individual. Fourth, teacher educators should not attempt to work independently towards the seamless integration of CMC into their programs. Alone, teacher educators can not take full advantage of emerging technologies. Rather, teacher education community should work collaboratively with the computer science, instructional technology, and business communities.

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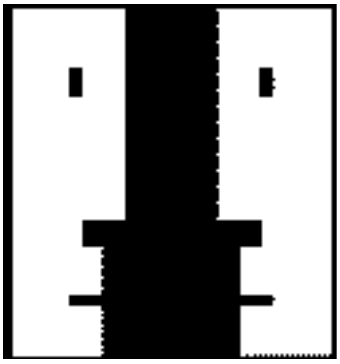
APPENDICES

APPENDIX 1

Users' Guide: CU-SeeMe and NetForum

Desktop Videoconferencing With CU-SeeMe

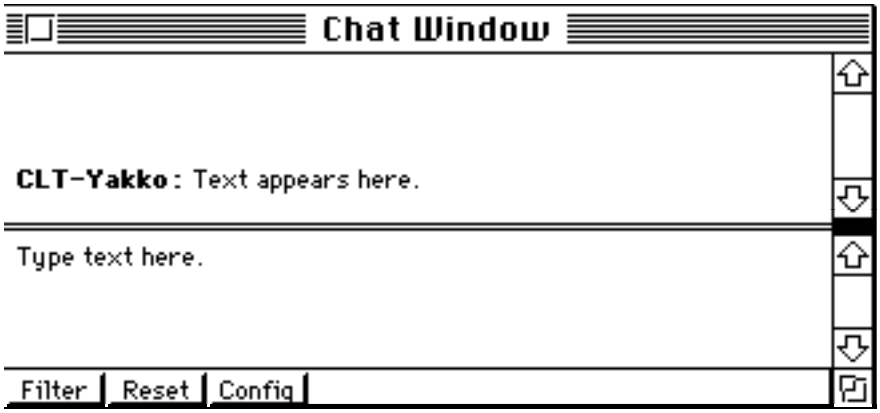


Connecting to the NC State Reflector :

1. Double-click the CU-SeeMe folder, then double-click the CU-SeeMe icon.
2. Select *Call* from the Conference menu.
3. Select *NC State* from the Phone Book.
4. The status will change to "Connecting" in the local video window.

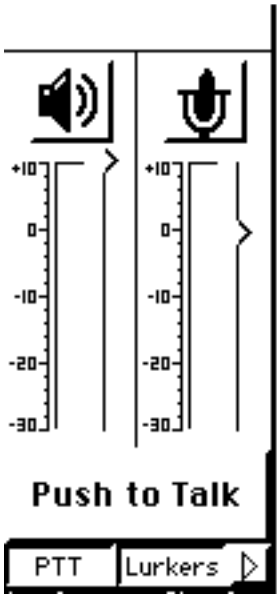
To Chat online:

1. Select *Chat* from the Conference menu.
2. Type text in the lower area of the Chat window.
3. Press *return* to enter your text.



To Receive Audio:

1. Select *Audio* from the Window menu.
2. The audio indicator will rise as a person talks from another station.



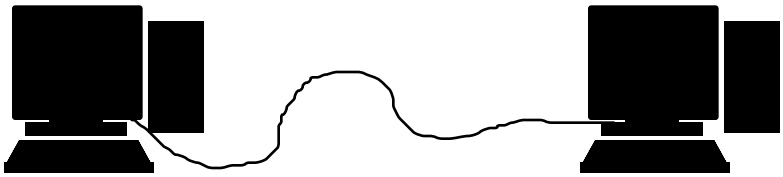
To Send Audio:

1. Click and hold the *Push To Talk* button in the Audio window.
2. To send audio to a single conference participant, click on the *microphone* in the participant's video window.

To Add Overlay Text To Your Video Window:

1. Click on your local video window.
2. Type the message you would like to appear.
3. To remove the text, click on your local video window and press *Enter*.

Web Conferencing with NetForum



- **Connect:**
    1. Locate the class conference page:
       http://www.forum.edu/cgi/netforum/eci454/a/1

- **To View Entered Topics and Messages:**

    1. Click on a topic from the list of topics. The most recent messages will appear at the top.

    2. The *compressed button* allows you to view the topic name, author, and date it was posted. The *expanded button* allows you to view optional information, such as the author's email address and web page.

    3. To return to the list of topics, click on the *view topics button*

    4. To view all of the replies to a specific topic at one time, select the *all replies button*

- **To Create A New Topic:**

    1. Click on the *add topic button*

2. Enter the required information: your name and topic name

3. Select HTML formatting option

4. Select the *preview button* to preview the information you have entered

5. If you'd like to make some changes, click the *edit button*

6. When you are redy to submit your topic, select the *submit button*

- **To Post A Message To A Topic:**

1. Click on the *add message button*

2. Enter the message subject and your name

3. Enter your message in the large text area

4. You may enter your email address and personal web site (this is optional)

5. Select the *preview button* to preview the information you have entered

6. Select the HTML formatting option

7. If you'd like to make some changes, click the *edit button*

8. When you are ready to submit your topic, select the *submit button*

- **Posting Replies To A Message:**

1. Each message has a reply button.
   Reply

2. Click on this to respond to a specific message.

3. Follow the same procedures listed above for adding a message.

APPENDIX 2

Interview Protocol - Pre-Interview, October

1. Which school have you been assigned to as a student teacher? What grades / classes will you teach?
2. What are three adjectives that describe your experiences as a student teacher at this point of the semester? Why did you pick those three?
3. When you think about student teaching, what concerns you most?
4. What are three adjectives that describe your prior computer experiences?
5. When you think about the online seminars that you'll participate in this semester, what concerns you the most? What do you most look forward to?
6. What have I not asked you about your student teaching experiences that you would like to add?

Interview Protocol - Post-Interview, December

1. What are three adjectives that describe your experiences as a student teacher? Why did you pick those three?
2. Describe your best day of teaching. Your worst day. Why did you pick these days to describe?
3. What stands out as the most significant experience you had with the online sessions?
4. Did you prefer the CU-SeeMe software or NetForum software? Explain.
5. What were the best/worst characteristics of CU-SeeMe?
6. What were the best/worst characteristics of NetForum?
7. How did the online sessions impact your perceptions about professional development?
8. Do you envision yourself using CMC as a classroom teacher? Tell me how.
9. What have I not asked you about your student teaching experiences that you would like to add?