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ABSTRACT

This article examined the teachers' beliefs about the application of e-mail communication (listservs) in the learning and teaching of literacy. The context of investigation was conducted in a graduate-level course attended by pre-service and in-service teachers and educators. By examining the articulated beliefs by teachers and how their beliefs influenced their learning, inquiry and interaction, the study revealed the conditions in which e-mail communication facilitates learning and those in which e-mail communication challenges learning. Central to the argument is that it is the theoretical understandings in teachers about the models, practices, and context that affect learning, and that it is the dynamic process of reflection that influenced teachers' beliefs. Also emphasized were the productive roles that university educators, as modeled by the course instructor in this study, can play in supporting teachers' professional development through challenging their beliefs. Contains 53 references and 3 tables of data. (Author/RS)

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Making Meaning in a Digital Literacy Club:

Teachers' Talk of Beliefs about E-mail Communication in Literacy Learning and Teaching

Abstract: This article examined the teachers' beliefs about the application of e-mail communication in the learning and teaching of literacy. The context of investigation was conducted in a graduate-level course attended by pre-service and in-service teachers and educators. By examining the articulated beliefs by teachers and how their beliefs influenced their learning, inquiry and interaction, the study revealed the conditions in which e-mail communication facilitates learning and those in which e-mail communication challenges learning. Central to the argument were that it is the theoretical understandings in teachers about the models, practices, and context that affect learning that determine the potentials of which technology can be used to mediate learning, and that it is the dynamic process of reflection that influenced teachers' beliefs. Also emphasized were the productive roles that university educators, as modeled by the course instructor in this study, can play in supporting teachers' professional development through challenging their beliefs.

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Introduction

Let's imagine a blind man fumbling along a dark path with his cane. "If he focuses on the place where his cane meets the edge of the sidewalk, then the cane becomes an extension of his arm and it is as if his fingertips are feeling the edge of that sidewalk. But if blind man's focus is on the way he holds the cane, then the cane becomes an awkward piece of equipment" (Elbow, 1981, p. 368, cited in Calkins, 1990. p. 158).

To come closer to the topic of discussion, literacy and technology seems to have such a dialectical relationship. One on one hand, literacy is constantly acquiring new meanings and charting new roles for technology to play in teaching and learning. On the other hand, challenges posed by the increasing use of technology progressively confront learners and teachers by the possible "control and surveillance" in the form of "oppressive and manipulative activities" (Smith, 1998, p. 10). The dialectical consequences of technology for literacy education thus call for perspectives and practices that help mobilize technology as a vital agent for educational change and reflection.

In his keynote address to the Fourth DigitalStream Conference held at California State University at Monterey Bay (CSUMB), Professor Bernd Rüschoff (this volume) drew the attention of the divergence between the theoretical espousal of constructivist theories of learning and the practical affiliation with transmission model of learning in the application of technology. That is, while constructivist theories become a conceptual base for organizing instruction and curriculum, transmission-based approaches continue to dominate the classroom in practice. He proposed to examine the "paradigm of instruction" which affects what is believed about learning and teaching.

It is the interest in exploring the influences of beliefs on the application of technology that motivated me to study teachers' response to the use of e-mail communication as they were engaged in exploring literacy theories and research in an on-line listserv (e-mail group list). In analogy to the notion of "literacy club" as Smith (1988) describes, this on-line listserv which conferred open membership to everyone who identified oneself as a member of the community is referred to a digital literacy club in this article. And the learners/students in this learning community are called as teacher learners because they were pre-service or in-service teachers.

This paper was originally planned to expand on previous research (Zhang, 2000) on the patterns of intertextuality in collaborative learning in the context of e-mail communication. With the rise of a theoretical understanding about the role of technology in literacy, I begin to see the dynamic connections between literacy and technology as reflected in the constantly emergence of new forms and new understandings of literacy as technologies develop and proliferate in classroom. Based on that understanding, I realize that the potentials of which technology can be used to mediate learning (Caverly & Peterson, 2000), to explore multitudes of learning resources (Maker, 2001), and to lead to new perspectives for constructing meaning (Valmont, 2002, 2003).

My work in language and literacy studies has led me to value the power of discovering and reflecting on beliefs and assumptions about literacy and literacy process in learners (Goodman, 1996; Goodman 1996; Goodman & Goodman, 1994; Goodman & Flurkey, 1996) and in teachers alike (Richardson & Anders, 1990; Valmont, 2000). I chose a graduate literacy class attended by teachers/researchers as the context of investigation for the purpose of exploring how teachers learn about literacy learning and teaching in a virtual environment. I observed the group of teacher learners learn and interact with the belief that the theoretical understandings about the study of teachers' dispositions and attitudes towards technology and literacy would not

only help understand and evaluate the instructional and curricular decisions made by teachers, but would also help to transform teachers' beliefs so as to better account for their practice. Given that the investigation took place in a university setting, this article, written from a participant observer's perspective, also wants to emphasize the productive roles that university educators can play in supporting teachers' professional development through challenging and changing their beliefs.

The main purposes of investigation are to explore 1) what beliefs that the teacher learners articulated about the function of e-mail communication environment in literacy learning, and 2) how the teacher learners' beliefs about the e-mail communication environment influenced their literacy learning. Belief is understood in this article as a complex of orientations on which one draws to formulate one's stance and opinions. By focusing on the participants' beliefs on how e-mail technology affects literacy learning, the study seeks to argue that viewing technology as an agent for constructing knowledge and meaning making would make a difference in the learning and inquiry process. As the two research questions are intrinsically related, they will be addressed as a unified whole in the report of the findings and analysis.

This article is organized into three parts. Part one draws on constructivist theories of literacy learning and teaching (Mezirow, 1991; Leu, 2001; Anders & Guzzetti, 1996; Goodman, 1994; Valmont, 2002, 2003) to build a conceptual frame on the construct of beliefs about the changing roles of technology in literacy. It is followed by a description of the research findings to address the two research questions proposed above. The third part is devoted to the implications for teacher education and professional development.

A Theoretical Framework: Beliefs about the Deictic Roles of Technology in Literacy

In the following pages, I discuss two major concepts which constitute the theoretical frame of the study. One is the metaphor of deixis proposed by Leu (2001) in characterizing the connections between technology and literacy. Another is the beliefs about the deictic roles of technology in literacy. These two constituents contribute to a framework of the argument structure in which teachers' beliefs were examined.

Deictic Roles of Technology in Literacy

A widely used concept in linguistics and pragmatics, deixis is an act of relating the meaning of the lexicon indicating time, place or person(s) to the possible context(s) in which the text or utterance take place. To understand deictic expressions a grammatical and/or pragmatic frame of reference is required to specify when, where, and/or how the event happens and who are involved in the event(s). For instance,

Sarah said to her mother today that she already knew how to read and write.

There are two deictic words in the above sentence: today and she. To determine the actual time to which "today" refers, we need to know when Sarah said this to her mother. A variety of possibilities exist as to how "today" is being interpreted, although it is known that the action happened the same day as the speech events took place. In contrast to the multiple interpretations of the word "today", little controversy would arise as regards what "she" refers to in the sentence because our knowledge of the English grammar and of the world establishes the anaphorical connection between "she" and "Sarah".

It is very obvious that the meaning of the deictic expressions depends on the grammatical and/or pragmatic frame of reference constructed by the reader or listener. The dynamics by

which readers explore the potential referential frame for meaning making is theorized by Ken Goodman (1994) in his discussion about the "locus of meaning".

> Texts are constructed by authors to be comprehended by readers. The meaning is in the author and the reader. The text has a potential to evoke meaning but has no meaning in itself; meaning is not a characteristic of texts. This does not mean the characteristics of the text are unimportant or that either writer or reader are independent of them. How well the writer constructs the text and how well the reader reconstructs it and constructs meaning will influence comprehension. But meaning does not pass between writer and reader. It is represented by a writer in a text and constructed from a text by a reader (p. 1103).

This theoretical assumption allows us to conceptualize the deictic connections between technology and literacy proposed by Leu (2001). The meaning of literacy, or what counts as being literate, changes as new technologies arrive and the societal demands for literacy develop. Hence, it seems legitimate to consider that "literacy is defined largely by change itself, its meaning dependent upon rapidly changing technologies for information and communication and the envisionments for literacy they repeatedly inspire." (Leu, 2001, p. 746).

The deictic roles of technology in literacy have been well documented in Leu (2001) and Reinking, McKenna, Labbo, & Kieffer (1998). It is not the intention of the article to provide a chronological synthesis of the changing definitions of literacy along the path of technological development. Neither do I intend to offer an analysis of the functions of a particular software and its applicability to instruction. Rather, the deictic roles of technology in literacy are proposed as the *possibilities* of which technology can be harnessed as an agent for learning and teaching literacy. Whether any technology can be effectively used in instruction, as Caverly & Peterson

(2000) note, relates to three major factors: a) learners' perspective of technology use, b) instructor's perspective in applying technology, and c) the complexities of the learning task. Depending on the objective and focus of instruction, technology can be used as curriculum (to learn knowledge about technology), a delivery mechanism (to learn knowledge in the subject area), a complement to instruction (to practice the skills learned in class), or an instructional tool (to enhance interaction in classroom) (Kasworm & Londoner, 2000).

As more and more educators and researchers knowledgeable about literacy education and technology realize, infusing technology with learning itself would not necessarily produce desired outcomes because technology itself does not have a theory base (Goodman, 1994). What matters is what we understand about the practice and context that affect learning. It is, therefore, the basic assumption of this article that how one views technology affects the way technology is used. The following part explores such deictic consequences of the beliefs on the use of technology.

Beliefs about the Deictic Roles of Technology in Literacy

It seems to be the shared view of the field (Goodman, Watson, & Burke, 1987; Borchardt, 2002; Ruschoff, 2002; Anders & Guzzetti, 1996) that the transmission-constructivist continuum anchors the decisions for instruction and learning. Those who subscribe to the transmission model of learning assume that knowledge comes from academic authorities and learning is essentially a process of delivering knowledge from authorities to learners, whereas the prior knowledge and experience in learners are under-represented in instruction. Beneath the transmission mode of instruction operates a deficit undercurrent (Agar, 1994) in which the learners are judged against a set of decontextualized skills and competencies. In contrast, constructivist theories of learning believe that learning is a higher order of thinking and inquiry

process in which learners construct knowledge through transactions with the information gathered. According to this model, teacher is viewed as co-learner, collaborator, or mediator in the process of learning. However, it is important to realize that the fundamental philosophical differences notwithstanding, many instructional decisions reflect a combination of multiple paradigms (Alverman, 1999). Differences among paradigms are best seen as "competing" rather than "incompatible" (Ruiz, 1984/1988, p. 6) forces which propel the cyclical move of paradigm shifts (Borchardt, 2002).

This article attempts to understand how the deictic roles of technology in literacy are perceived by teachers in a graduate class who utilized technology in learning about literacy learning and teaching. Research on the relationship of teachers' beliefs and their pedagogical practice (Green, 1976; Fenstermacher, 1986, 1987; Richardson & Anders, 1990) reveals that what teachers believe hold in relation to what they act in classroom can be explained in light of the practical argument they make for the way they act in classroom. The practical argument operates by virtue of "a reasonably coherent chain of reasoning leading from an expression of a desired end state through various types of premises--some empirical, others situational---to an intention to act in a particular way" (Fenstermacher, 1987, p. 359). Examining beliefs through the argument structure makes visible how the assumptions are taken, how the argument is developed, and how the conclusions are drawn (Zhang, 1998). From their longitudinal research on reading/literacy process, Goodman & Goodman (1990) stated:

> "In our own work we have been aware that there are complex differences among being able to read, being able to talk about reading, and understanding the reading. But it is the knowledge learners bring to the making of meaning, the knowledge and relationships between the people in the environment who interact with the learners, and the particular

environment itself that influence how easily and how well reading develops" (p. 230-231).

This insightful conclusion was confirmed by research on teacher study indicating that the process of reflection in the practical argument (Short & Burke, 1989; Lloyd & Anders, 1994) is the leading force for the difference to make in action. It is argued in this article that in teacher learning, as it might differ from student learning, emphasis needs be appropriately placed on a systematic examination of teachers' beliefs and biases, rather than a simple categorization of "what works and what does not work". This is because teachers are the ones who are going to influence the way of thinking in the students they teach, and they have to possess the competency to "change the truth of the premises of the practical argument" in the mind of the student (Green, 1976, p. 249). It is worth to mention that the use of retrospective miscue analysis (RMA) as an inquiry method with pre-service and in-service teachers in recent years, for instance, has successfully made changes on the "premises of the practical argument" teachers held about reading/literacy (Goodman, 1996; Theurer, 1999). During the process of RMA sessions, teachers did not only become more conversant about their beliefs about reading/literacy as they consciously examine the way they read, but also developed the language and voice that would allow them to "share their growing understanding with their students" (Goodman & Marek, 1996, p.1). The heightened awareness of their beliefs system has proved helpful for teachers to think about the rationales for their practice and actions (Richardson, Anders, Tidwell, & Lloyd, 1991).

Methodology

Context

The present study used the data sources from my previous research (Zhang, 2000) on the intertextual learning taking place in the same graduate reading/literacy class entitled "Essentials of Reading and Writing" offered at a major research university in the southwestern United States in Spring 1999. This course meets the core requirement of the graduate program of Language, Reading and Culture at that institution, and also serves the needs of other graduate programs related to the study of language and literacy. In order to address the diverse needs of the audience taking this class, the instructor (professor) combined "theories of reading and writing process" and "instructional and evaluative practices" (Anders, 1999) in the development of curriculum. To help participants conceptualize their literacy practice, a wealth of scholarly and professional readings authored by well-noted scholars and experts in the field were provided, including Literacy in Process (Power & Hubbard, 1991), Developing Engaged Readers in Schools and Communities (Baker, Afflerbach, & Reinking, 1996), Language and Thinking in Schools (Goodman, Smith, Meredith, & Goodman, 1990) and Creating Classrooms for Authors and Inquirers (Short & Harste with Burke, 1996). More importantly, this class engaged class members in reflecting on personal literacy processes and beliefs about literacy through a variety of collaborative inquiry activities and practices.

Emphasized in this course is the concept of community in which the teacher learners were encouraged to interact with the scholars in the department and involve in the literacy activities and events "locally and nationally" (Anders, 1999). As the instructor plays a leadership role in the field of reading/literacy education and is one of the major contributors in the development of constructivist theories of literacy teaching and learning, she used seminar and

workshop as the main instructional format to engage class participants in constructing theoretical perspectives of literacy through dialogues and conversations with each other. As part of the learning experience, the professor utilized dialogue journal to communicate on an individual basis with the class participants as a "critical friend" (Costa & Kallick, 1993). She described this approach in the following:

> Students are expected to write at least one entry a week, responding to their reactions to each class meeting (which consists of lecture, discussion, large-group and small-group activities) and the reading they do for class.... She (the professor) wrote a page or two back to the students in a conversational tone, elaborating on points they raise. She often relates anecdotes about the author whose work is being read, presents contrasting perspectives, and offers suggestions as to where information might be found to address student questions. Students report benefiting from this input, and the professor benefits by keeping track of students' concerns and accomplishments. It is common that the next week's class meeting begins by connecting the plan for the class with what was read in the journals. These journals are not graded in the sense of a student product. Rather, they are process oriented; while students might receive credit for engaging in the process, they are graded in a normative sense of "good" or "poor" (Anders & Guzzetti, 1996, p. 163).

In this particular class, an e-mail discussion group (listserv) was used to build a virtual collaborative learning community. It was expected of the learners, as documented in the course syllabus, "not (to) simply summarize" what they read or discuss, but to "respond critically to both and make connections to... emerging theories and projected practice" (Anders, 1999). As she did with the dialogue journal, the instructor participated in listserv discussions throughout the semester, responding to learners' questions and in contributing her insights to critical issues in

reading/writing instruction and research. Through the collaborative efforts of the instructor and students, on-line discussion forum was established.

Participants

Twenty-four participants including the course instructor (N=24) were engaged in the e-mail group discussion. Among them, twenty-one were female and three were male. The ethnic composition of the group was diverse including Anglo-American, Hispanic, African-American, and Asian. Most of the class members were pre-service or in-service teachers, community-based educators, or graduate students with multiple years of teaching experience, and were pursuing advanced degrees or seeking professional advancement. The focus areas (major) represented in this group included language and literacy, bilingual/multicultural education, special education, elementary education, secondary education, educational linguistics, and instructional technology. The investigator of the project was one of the class members.

The professor and her teaching assistant were responsible for putting together the e-mail group and for providing specific technological instructions for the students. Here was the message explaining how listserv worked at the beginning of the discussion.

> I strongly encourage you all to use this listserv, and to take the pressure off of who is going to write first, I need you all to respond to this so I can make a list of who is receiving messages and who is not. In order to do that, all you have to do is "Reply to ALL" this way we can all see how it works and how everyone receives the message (I apologize if this clutters your mailbox at first, but this is just a test and it will only last until I hear from everyone). Also, if you ever want to e-mail only the professor, all you do is click on the reply button (and not the reply to ALL recipients button).

The topics of on-line discussion were initiated by the students through the exchange of reflections on topics of common interests through e-mail messages. Fifteen class members and the instructor participated throughout the discussion, while eight participated in various portions of the discussion. Many of the topics were related to the class readings and discussion. The instructor joined the discussion, making comments on the students' input and offering suggestions and recommendations about reference resources. Many participants related their academic, professional and personal experience to the information and ideas presented in readings and class discussion. This part of information was useful to study their beliefs and opinions about e-mail technology in literacy education.

Data Collection

As mentioned earlier, the data of the study came from an earlier project (Zhang, 2000) on the same group of participants in the same setting. Thus, this study is by definition based on the "secondary use of pre-existing data" (Dunn & Chadwick, 2001). And the permission to use the data sources for research had been obtained when the previous project was conducted.

The e-mail message entries posted by the participants during the process of discussion generated 239 pages in printout, which comprised the major sources of data. After the course was completed, a survey was transmitted electronically to all the student participants consisting of questions confirming participation, the communication with the audience as well as the comments on the listserv activity. The following questions were asked in the survey.

1. In general, how you feel about e-mail group discussion?
2. How often did you participate in the discussion and how many entries did you contribute to the listserv throughout the semester?

3. Do you think the listserv discussion has served your purpose of learning? Why or why not?
4. Please list three things (both positive and negative) you have learned from the e-mail group discussion.
5. Was there any change you noticed in your use of e-mail as a mode of communication over the semester?

Nine class members responded to the survey, and a return rate of 40% was obtained. Follow-up conferences were held with two interested participants who elaborated their individual responses to the e-mail group discussion.

The third source of data came from my class notes and reflective journals on on-line discussion. The class themes documented in my class notes helped me to understand the patterns of various topics and issued covered in listserv. Proceeding from the lens of my own reflections, the beliefs that the teacher learners articulated became more accessible and meaningful.

Data Analysis

Following a theory-driven perspective (Smagorinsky & Smith, 2001), this study used the practical argument structure (Green, 1976; Fenstermacher, 1987) as the analytical tool. In this particular context, the practical argument structure was extended to include two parameters 1) what the teacher learners think about the functions of e-mail communication in literacy education, and 2) why they think so. The first constituent is concerned with four functional dimensions of e-mail communication—accessibility, authenticity, connection, and relationship. Accessibility has to do with the availability to log on to an e-mail account and to check and respond to messages. Authenticity deals with how well e-mail as a mode of communication would serve the purpose of learning and meaning construction. Connection pertains to how information and prior knowledge

are integrated in the e-mail communication process to mediate learning and meaning making. Relationship is concerned with the social and interpersonal roles developed through the dynamics of e-mail interaction. The above four variables provided a *descriptive* analysis of what teacher learners thought about the usefulness of e-mail technology for learning.

The data were coded to determine which dimension of e-mail communication was addressed. An example of the participants' comments on accessibility is the following: "With how writing differs in the morning or late at night by e-mail, I feel there is no difference. I can write late or early in the day. My first entry to the listserv I wrote late at night, sending it off at quarter to mid-night. I write early and I write late, but I don't see a difference in my writing style or even in how it feels to write at different times of the day." As regards the dimension of authenticity, one wrote: "I was in LRC 505 last semester and once I started our listserv it was one of the greatest learning, sharing, and communication tools for the class. It is not only a wonderful opportunity to discuss, share, and comment on class readings, exercises, projects, and so on, but also a great way to get to know each other!" The third dimension—connection—is related to the effects of e-mail communication on integrating prior knowledge and experience with what is being learned, such as "I remember in SER 534 (Language Development in Exceptional Children) and PSYCH 530 (Psychology of Language) my teachers going on and on about Chomsky and Skinner... I prefer the innate language ability theory myself... maybe because children who are exposed to a language that is not totally accessible (like deaf children to non-signing hearing parents) will invent a language on their own". The fourth dimension—relationship—addresses the way that ones interacts with each other, for instance, "I have very much been enjoying reading the listserv entries throughout the semester, but have been sending

mine to the professor alone. However, I'm going to start sending my entries to "all", and I am also going to send some of my past entries that I thought others might like to respond to."

The second parameter in the practical argument structure focuses on the rationale(s) the teacher learners adopted their beliefs. Borrowing from Richardson & Anders's category (1990, cited in Anders & Guzzetti, 1996) in the study of teachers' beliefs, four categories of rationale were formulated: empirical, conditional, normative and valuative. The empirical rationale relates to the reasons based on testable evidence. The conditional rationale relies on the context or situation in which responses or reflections take place as the frame of reference for reasoning. The normative rationale connects certain rules and/or principles with a particular concept or action to be defined. The valuative rationale justifies the beliefs in terms of the value system adopted by the teachers (Anders & Guzzetti, 1996). As one step further, the four parameters in combination provided an *inferential* analysis of why the participants thought this way and how that thinking affected learning.

After the coding was completed for the functions of e-mail communication, the criteria of rationale were applied to categorize the responses that the participants gave. The following was categorized as empirical rationale:" According to Jacueline Grennon Brooks and Martin G. Brooks' (1993) The case for constructivist classrooms, such classrooms 1) present curriculum whole to part rather than part to whole; 2) value student questions and allow students to pursue those questions; 3) rely heavily on primary sources; 4) place teachers in the role of environmental mediators where they interact with students rather than spend most of their time delivering information; 5) interweave assessment, learning, and teaching and allow teachers to observe students as they present or as they work through and create portfolios; and 6) find students often working in groups. Certainly computers don't create a constructivist environment,

but they certainly enable it." For conditional rationale, an example would be, "As is typically the case, I think I need to state my question more clearly. What changes have happened in writing that couldn't have happened without computer technology?" The normative rationale deals with standards or rubrics. An illustration of the normative rationale is in the following: "I am concerned about an over-reliance on visual forms of communication (e.g. clip art to replace text) will produce future generations of students who are illiterate by today's standards." The fourth rationale—valuative—is expressed as: "I must be fair and admit that it is more fun to argue in person or in class than on the listserv."

The rationales which the teacher learners used to support their beliefs about the functions of e-mail communication were summarized in Table 1. Because the conditional rationale was reported consistently across all the four dimensions of the argument, the following section on research findings and interpretations focuses on the impact of the conditions of e-mail communication on literacy learning.

Table 1 Rationales Appearing in Teacher Learners' Beliefs about the Functions of E-mail Communication in Literacy Education

	Empirical	Conditional	Normative	Valuative
Accessibility		•		
Authenticity	•	•	•	•
Connections	•	•		
Relationships		•	•	•

Findings and Interpretations

Focusing on the conditional rationale on which all teacher learners drew to support their argument, the report of the research findings and interpretations was organized into two parts 1) conditions in which e-mail communication facilitated learning, and 2) conditions in which e-mail communication challenged learning. It should be pointed out that the two kinds of conditions were not identified in a dualistic sense of "positive" and "negative". Rather, they provided a continuum of perspectives that affect the learning and teaching of literacy. The quotes from the data sources were edited minimally (for spelling, capitalization and punctuation) in order to reflect the genre features of e-mail communication.

Conditions in which E-mail Communication Facilitated Learning

It is evident through the analysis of data that there were distinctions between being able to use e-mail as a means of communication and being able to talk about it. While some were more articulate in describing their beliefs, other teacher learners appeared more reticent to make judgment. And it is also obvious that those who contributed more to group discussion tended to be more conversant about what they believed about e-mail communication. But regardless of the language they employed, the understandings of the contexts and practices that would facilitate learning versus those that would challenge learning were well in place in their mind. It is the knowledge that the participants construct in the process of learning and inquiry that helped them decide the usefulness of e-mail technology. Three conditions were identified that facilitate e-mail communication: constructivist support, meaningful inquiry, and the perception of the discourse community.

Constructivist Support

Constructivist approaches of instruction value the wealth of knowledge and experience learners bring to the learning community, and create opportunities for learners to develop new ways of thinking by building on their prior knowledge and beliefs. As all the class members acknowledge, the constructivist support provided by the instructor had been the key to a successful learning experience. The instructor feedback to learners' input led the teacher learners to reflect on their literacy experience and explore the possibilities that would address their interest of inquiry. Below is an example of the comment from the instructor on one of the class members' reflection on teacher research.

> Sue (the names of the participants were changed or omitted to protect their privacy), your experiences are very enlightening. We are lucky to have you in our class. I agree that teacher research is a wonderful idea, and that despite the fact that it is hard to do, those who do it are often very enthusiastic. Personally, I think research is one of the most powerful ways of learning, and I don't think it should be reserved for just those in the ivory tower! ah-hem . . . so, no matter how small the activity it is usually worthwhile to try it out. Your studies are interesting & I bet they will get considerable response from our colleagues in class.

It was believed by the majority of the class members that supportive responses promoted collaborative problem-solving, and boosted their confidence as a reader and thinker. The following dialogue illustrated how the two class members got to the understanding of teaching as a "political act" as meant by Freire (1991) (Q stands for the question, and A indicates the answer).

Q: Freire says that teaching adults to read and write is a political act (p.25) What makes teaching a political act?

A: What I got out of Paulo Freire's writing was this: We learn to read words by first learning to read the world; our ability to read the world is expanded through reading words. To me this means we learn from our world, and our world encourages us to read, but at the same time our reading develops our world. Our personal world is changed by our reading. We are influenced in our decisions by the knowledge we gain through our reading. Our understanding of our world increases and our perception of the world changes with our acquired knowledge. We interact with and react to the world according to the influence reading has impacted upon us. Also, the world is changed through reading. ... The more each of us read as an individual, the more our own lives are enriched. The more we read as a society, the more our society prospers.

The constructivist responses also challenged the beliefs and conceptions held by the participants. As the class moved to examine research methodology, different views about research were represented in the discussion. In the following example, the instructor explained the maxims for qualitative research through contrasting with alternative conceptions (Anders & Guzzetti, 1996). The combined use of refutational discourse—which identifies a misconception, and expository discourse—which explains a certain concept, resulted an enlightened understanding of the concept in the teacher learners. Table 2 provides some examples of the refutational discourse and expository discourse appearing from the following excerpt.

"I want to make some comments regarding criteria for qualitative research. I'm not sure that my phrase "rich description" is very descriptive for many of you. So, let me take a

stab at what might be criteria for qualitative research. 1) It is relational. That is, there is a relationship between the researcher and the researched. It is not detached (as is typical in quantitative research). 2) Qualitative research is conducted not to confirm or disconfirm earlier findings, but rather to contribute to a process of continuous revision and enrichment of understanding of the experience. 3) Positionality: this means that we never see the complete experience, that we can only see the experience from our own vantage point; hence, a researcher will acknowledge that position & will let readers know about his/her position (thus, detachment and author objectivity are barriers to quality, not insurance of having achieved it!). 4) Qualitative research takes place in a community. It takes place within a community, is addressed to a community, & the community is often involved when the research is reported. 5) Qualitative research has a voice. Researchers pay attention to who speaks, for whom, to whom, for what purposes. They also pay attention to who has no voice, who might be resisting through their silence. 6) Qualitative researchers possess "critical subjectivity." That is, the ability to enter into an altered state of consciousness, or high quality awareness for the purpose of understanding with discrimination subtle differences in the personal and psychological states of others. Such subjectivity enables the researcher to begin to uncover dialectical relationships, array and discuss contradictions within the stories being recorded, and move with research participants toward action. 7) Reciprocity: parties to the research have a sense of trust, caring, heightened awareness, and mutuality. 8) qualitative researchers have a profound concern for human dignity, justice, and interpersonal respect; and 9) qualitative researchers recognize their privileged position and attempt to share their knowledge with their research participants . . . does this help?"

Table 2 Examples of Refutational Discourse and Expository Discourse

Refutational Discourse	Expository Discourse
It is not detached (as is typically in quantitative research)	It is relational. That is, there is a relationship between the researcher and the researched.
Qualitative research is not conducted to confirm or disconfirm earlier findings.	...but rather to contribute to a process of continuous revision and enrichment of understanding of experience.
Detachment and author objectivity are barriers to quality, not insurance of having achieved it!	A researcher will acknowledge that position and will let readers know about his/her position.

Meaningful Inquiry

The second condition in which e-mail communication played a positive role in learning was the development of meaningful learning activities. The activities of the learning were not assigned by the instructor; rather, they were negotiated and co-constructed between the class participants and the instructor. The following episode described collaborative learning in class.

> For those of you who were absent (several were due to sickness), let me provide some context for John's contribution. After the lecture last night, we spent 15 minutes in small groups reacting/responding to the readings. Then each group proposed either a "thesis" statement or a question. I recorded them on the board and made some comments along the way. John wrote those questions/statements down and promised to list them on this server. I noted that any one of these questions would make great inquiry project questions. They might also, of course, fuel our email and class discussions.

When learners gained control of the learning process, the topics and questions they generated showed their awareness of the realities in education and their willingness to use

research as a way of inquiry to seek solutions. For the purpose of clarity, the questions were grouped in the following table.

Table 3 Inquiry Questions that the Teacher Learners Asked

Theme Areas	Inquiry Questions
Research Purpose	• Is research for teachers or for policy makers? • Research shouldn't be forced on teachers. How willing are they?
Research Methodology	• Which research (inferential or qualitative) is more useful to teachers? • What is the relationship between action and qualitative research? • Certain questions/issues are answered by different methodologies.
Research on Instruction	• How does a teacher deal with classroom (district) expectations, her knowledge and meet students' needs? • What should be done when curriculum doesn't allow for research? • What is the relationship between labels and performance in different instructional settings/tasks?
Research on Teacher Development	• Teachers are evolving readers and writers. • T. Gillespie learned from his own children as a "kid-watcher".
Research on Program Evaluations	• Do school-wide programs, such as SFA, work?
Research on Sociocultural Issues in Literacy Education	• To what degree are differences among/across children's literacy related to socio-economic status, ethnicity and opportunities to learn?

When students began planning on the inquiry projects as they chose, the listserv became a repository of information, resources, and perspectives for teacher learners to draw on. The

following episode highlighted collaborative inquiry in understanding key concepts in educational research.

Q: In class, I think it was Mary who said there are some kinds of case studies which one does not give to the person being studied. This is neither qualitative nor quantitative research. My first question is, What is the difference between this kind of case study and a case study which is considered qualitative research?

A: I have found S. B. Merriam's book Case Study Research in Education: A Qualitative Approach to be an excellent resource. She defines a case study as "an examination of specific phenomenon such as a program, an event, a person, a process, an institution, or a social group. The bounded system, or case, might be selected because it is an instance of some concern, issue, or hypothesis." (p. 10). Then she says, "case study does not claim any particular methods for data collection or data analysis. Any and all methods of gathering data from testing to interviewing can be used in a case study" (p.10) Further on she says, "...the uniqueness of a case study lies...in the questions asked and their relationship to the end product" (p. 14) in the qualitative sense, a qualitative case study "...can be defined as an intensive, holistic description and analysis of a single entity, phenomenon, or social unit...and rely heavily on inductive reasoning...[and] inextricably linked to certain philosophical assumptions" (p. 16). Therefore, the difference between quantitative and qualitative case study is dependent upon the type of question asked, the methods used, and the end product.

<u>The Perception of the Discourse Community</u>

The third condition in which e-mail communication promoted learning pertains to the perception of a discourse community in the participants. As Gee (2001) explained, discourse represents

> "socioculturally characteristic ways of being in the world—associations among ways of thinking, feeling, acting, interacting, valuing, speaking, dressing, gesturing, moving, listening, using particular objects (and sometimes writing and reading) that allow people to recognize each other as "doing" (acting out in thought, word, and deed) being some identity" (p. 27).

Gee (2001) maintained that it is the conventions constructed in the ways of being—*Discourse* with a capital "d", that "recruit" the ways that language and literacy is used in context—"discourse" with a little "d" (p. 27).

Based on Gee' sociocultural perspective on discourse, *discourse community can be conceptualized as a complex of the shared ways of knowing, inquiring, interpreting representing, identifying and/or transforming the social worlds and the relationships in the social worlds.* It is the shared process of constructing the meaning (albeit variability might exist in the "chorus of polyphonous voice" (Kent, 1991, p. 425) that nurtures a sense of belonging and confers the membership of the community. With this perception, participants were able to identify themselves as a member of the digital club, and to embrace the input from others. One student wrote:

> I have very much been enjoying reading the listserv entries throughout the semester, but have been sending mine to the professor alone. However, I'm going to start sending my entries to "all", and I am also going to send some of my past entries that I thought others

might like to respond to. Thanks to all for the inspiring stories about teachers and students.

The acquisition of the membership of literacy club promoted the participants' obtainment of the ownership of literacy (Au, 1993) and enabled them to use reading and writing to make making of the text and the world. As the participants sought to build a meaning perspective (Meirzow, 1991) on literacy processes, they became more conversant about their growing understandings of literacy.

> Words are like paint; sometimes they become art. When they do become art, we can only give our own interpretation. If we really want to be certain of their underlying meaning, we need to ask the artist.... The best place to find the answer is at the source.

A noticeable shift was found in the teacher learners from viewing reading as a positivistic process of text-reproduction to viewing it as a holistic process of meaning-construction (Goodman & Flurkey, 1996). As a consequence, they became more confident in questioning the authority of published texts (Goodman, 1996). This pattern of conceptual change is consistent with those revealed retrospective miscue analysis (RMA) studies (Goodman & Marek, 1996). After the annual departmental colloquy, one participant reflected:

> As I heard David Berliner speak at the colloquy about the inconsistence in news reports, I remember that I have also experienced something similar in the newspaper. When I first saw it, I thought there were glitches in the story: the title did not go together with the content. But on the second thought, I believe it may be my own problem of comprehension. Now, I shall be more careful in deciding if the headline of the story really tells about its content.

Conditions in which E-mail Communication Challenged Learning

The advent of digital technology has undoubtedly influenced the medium by which knowledge is constructed and learned, expanded the connotations and norms of literacy, and changed the social and cultural relationships in learning (Alexander & Jetton, 2001; Leu, 2001). But as technology opens up opportunities for change in learning and teaching, it also has controversial effects on literacy achievements. The patterns of challenge as perceived by the participants in this study are 1) participants' concerns of accountability and 2) assessment and concerns of the culture of interaction. It is important to know although some of the challenges are more directly related to technology itself, others seem to be persistent problems across the academic culture in general.

Concerns about Accountability and Assessment

Similar to the situation in regular classroom contexts, the participants in on-line virtual settings were concerned about the accountability of their input and the criteria of assessment. While they recognized the role of discussion and reflection in literacy learning, they continued to be influenced by the instructional models that they have previously experienced in conceptualizing "course requirements". Consider the following comments from one class member.

> This is not the first listserv I've ever had for a class, nor is it the first that has been used as a forum of discussion. I've had good and bad experiences with them, and on the whole really like it. (Although I must be fair and admit that it's more fun to argue in person or in class than on the listserv.) The only thing I would really change about it is that if we have to have fifteen of these things, and we have to keep track of them, then we should either ALL do them written so they get turned it (it is the nature of every college student to

procrastinate, and I am an equal offender), or simply be recommended to do fifteen and come as close as we can..

In responding to the participants' concern about meeting the requirement, the instructor pointed out that once writing is internalized as a way of reflection, it becomes a natural, instead of burdensome, process in which ideas and thoughts are generated to guide inquiry.

> I doubt that you will have any trouble making 15 entries! Most people (at least in previous semesters) have exceeded the "requirement." (hopefully because they got interested in the topics and because they saw the value for their own learning and growth).

Concerns about the Culture of Digital Interaction

Like any other modes of communication, navigating on-line has its pros and cons. There were mainly three limitations that the participants mentioned about e-mail communication for learning. First, the impact of computer technology on writing style seemed an issue of concern seen in the light of the genre traditions of print.

> One of the theoretical issues I've seen talked around (as opposed to about) in the literature on computers and writing is the notion that computers somehow produce (or at least enable) changes not only in how writing happens, but what writing is, i.e., there is a substantive/qualitative shift in literacy from print to electronic media. My friend here, who writes almost exclusively in hypertext, said for example that she finds her paragraphing changing in response to different standards of readability--her paragraphs are shorter, since on-screen visualization is different from paper. Changes like that (although that particular example may sound trivial) are what interest me far more than the abstract notions of "democratization" that pervaded the literature for a while.

Second, as mentioned at the beginning of the article, "the control and surveillance" that digital technology exercises over the learner and teacher (Smith, 1998, p. 10) appeared to tether learning. For instance,

> I know, at least for me, that there are times when I want to discuss something and come home so tired that I forget how to turn my computer on, let alone write a cognizant journal entry. So keep them coming, but maybe allow a combination of written and listserv responses to ensure that if we want to jot down our responses while waiting in line at the bank as well as 3 am computer ramblings, both are okay.

Third, the concern about the discipline and order in regular classroom settings was extended to the etiquette of communication in a virtual context. During the process of discussion, one of the participants related her experience with classroom management to argue for the importance of rules. She wrote:

> I would urge you (the instructor) to not underestimate the importance of control in the classroom. I hate to say this, but I learned this the hard way. I used to think it wasn't that important. Or if teachers taught right and motivated their students appropriately, then control wouldn't be an issue. I no longer believe that. I now believe that students need to know that limits will in some way be enforced. Otherwise you won't have a classroom which is physically or emotionally safe for students. This is true not only in the classroom, but also on the playground.

The analysis showed that the normative rationales the teacher learners drew on to support their argument of concerns were largely influenced by what was established in traditional classroom settings. When that lens of perspective was applied to a different context, conflicts arose as to what they believed about the context and practice that would facilitate learning and

inquiry contradicted what they actually faced. To resolve the conflicts, one of the recommendations made by the instructor was to revisit the assumptions and premises from which the argument was developed, and to "think and act creatively with courage" in accordance with what was learned from the reflection (Anders, e-mail communication). Although it was not the intention of the instructor to take credit for the support she offered, the participants acknowledged that their concerns as well as voices were being attended to.

> I can understand how you might feel about having to rewrite a paper and trying to write it only once, showing the teacher that you were capable of understanding what she wanted. ... Only here at the U. of A. have I encountered professors that want to hear more about you, your background and how you can share this with the class, etc. without getting to technical.

Discussion

What does it mean to be untethered? Can language classrooms be virtual? (Saito-Abbott, 2001) As I related the theme of the conference to my study, the cursory response that I could come up with is that it depends on what teachers and learners believe and think about the instructional contexts and practices that would make technology a useful aid to literacy learning and teaching. With the rapid advancement of new information and communication technologies, literacy is exhibiting more and more faces to reflect the "virtual" realities. As Valmont (2002, 2003) proposes, "literacy in a digital age involves the act of constructing meaning using any or all of the body's senses for the reception and interpretation of external information." This definition succinctly captures the nature of and complexities in literacy in a digital context, and offers a platform for integrating technology into literacy pedagogy.

As the current study suggests, a comprehensive view of literacy as a meaning making process provides an avenue to conceptualize the role of instructional technology in literacy learning. To what degree the constructs of accessibility, authenticity, connections, and relationships would serve the purpose of learning and inquiry depends on what contexts and practices are chosen. Among the distinctions between the conditions that promoted learning and those that challenged learning, the majority of them tended to be applicable to the instructional context in general, although some were more specific for the digital context. This finding suggests that the effectiveness of teaching and learning is linked to the conditions that the teachers and learners create, and that the potential changes that technology brings to learning could only be realized through constructivist integration. Isolated from teachers' and learners' initiatives, technology, as a component of the whole enterprise of learning, is hard to produce desired outcomes by itself.

The use of listserv represented an innovative effort in creating a domain of conversation that emphasizes the collaborative nature (Short, 1986) of the literacy process, and the inquiry-oriented model of teacher education (Alvermann, 1990). For most of the participants, the listserv was a marketplace for the exchange of reflections, perspectives, and experience. Further, they believed that technology should be employed as a vehicle to create a context conducive to learning and inquiry while recognizing the challenges and limitations of e-mail communication. During the process of e-mail communication, the professor played a pivotal role in mediating conceptual change in teacher learners. She had been wondering about how to share the theoretical and abstract knowledge concerning literacy research and instruction with the class members, and about how to help them make connections to teacher knowledge. The feedback she provided served as "catalyst" (Goodman, 1996, p. 18) that pushed teacher learners to step

outside of their own territory of thinking to embrace a broader spectrum of perspectives that comprise the thought collective (Fleck, 1935) of the learning community. As documented in the participants' reflection and comments, she acted respectfully as a co-learner, a critical friend, and a facilitator to support the growth and development of teacher learners.

Putting teacher learners' beliefs and practices in the perspective of the practical argument structure provided insights to account for why beliefs affect a particular action to be taken in a particular situation. As teacher learners looked for the rationales for their action, they were engaged in a reflective reasoning process to define the premises and assumptions that guide their practice. At the same time, the insights gained from their practice help teachers to evaluate and reconsider their beliefs, and to make informed decisions about what changes they want to make in their beliefs. In addition, the social relationships teacher learners constructed in the process of transaction and interaction with people involved in the culture of schooling influence what they think they do.

Limitations and Conclusions

There are two unresolved issues in this study. The rationales the teacher learners identified in supporting their beliefs in e-mail communication involved a complex combination of empirical, conditional, normative and valuative criteria. However, no evidence is available, to show that which combination of the rationale components would be more effective than the other options in contributing to the forming and changing of beliefs. Second, there is no evidence available to answer which particular component of rationale was the major influence on the participants' behaviors.

What has been learned, however, is that it was the dynamic process of reflecting on the competing paradigms, models and approaches concerning the incorporation of technology into

literacy education that has impacted the teacher learners' understanding of literacy and literacy learning. It is this very process of reflection from which knowledge-in-action (Applebee, 1996) emerges.

> Such knowledge arises out of participation in on-going conversations about things that matter, conversations that are themselves embedded within larger traditions of discourse that we have come to value (science, the arts, history, literature, and mathematics, among many others). When we take this metaphor seriously, the development of curriculum becomes the development of culturally significant domains for conversation, and instruction becomes a matter of helping students to participate in conversations within those domains." (p. 3).

As we revisit the question "What does it mean to be untethered in language classroom?", the perspective of knowledge-in-action seems to provide some constructivist response in this respect. As it stands, a universally applicable answer to the question asked above is non-existent in, and will not presumably be generated automatically and autonomously by any epistemology of language and literacy education. Rather, the answer seems to be rooted in the on-going process of the query as teachers endeavor to incorporate what they believe are the best practices to support the use of technology in learning and instruction. This is not to suggest that the epistemological heritage of teaching and learning be ignored, but to "make use of and move beyond the tools they inherit" (Applebee, 1996, p. 3). At this point in history, we are challenged to take the courage to transform the traditions that guide our beliefs and thinking and make classroom a better place for teaching and learning.

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