Learning from Teachers' Conceptions of Technology Integration: What Do Blogs, Instant Messages, and 3D Chat Rooms Have to Do with It?

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This study was designed to investigate 19 preservice and practicing teachers' conceptions of the role of new technologies in literacy education. The study documented how these conceptions, as well as my own, evolved over time and impacted the content and curriculum of a university course. Using a design-based research model, I documented students' engagement in a semester-long teacher education course titled Literacy and Technology. Relying on multiple data sources, including digitally recorded classroom conversations, one-on-one teacher and student meetings, student surveys, classroom artifacts (e.g., online threaded discussions, written responses to readings, and journal entries), and my own reflective notes, I documented classroom conversations, analyzed written assignments, and discovered how participants' conceptions of literacy and technology frequently differed from my own. Throughout the semester, I developed new conceptions of teaching when I saw that my students responded to course assignments and activities in ways that I had not anticipated. The study raises questions about the role of the instructor and the purposes and goals of courses like Literacy and Technology. It also points to a number of areas that need to be further explored if teacher educators hope to effectively introduce teachers to the ways in which technology can support literacy learning.

Introduction

Despite increased focus on technology and recognition that teachers must be prepared to provide technology-supported learning opportunities for students, research has shown that little technology is actually being used in classrooms in meaningful and transformative ways (Bruce & Hogan, 1998; Cuban, 2003). Instead of using technology to contribute to learner-centered teaching approaches which can improve learning (Askov & Bixler, 1998), many educators are using technology in ways that replicate what can be done with overhead projectors, televisions, or blackboards (Bruce & Hogan, 1998). There are various reasons why individuals might not take advantage of the educational power of technology,

some of which include limited access to computers, insufficient technological support, and teachers' own limited knowledge of the literacies that surround new technologies (Reinking, Labbo, & McKenna, 2000; Zhao, Pugh, Sheldon, & Byers, 2002). Yet, even when these barriers do not exist, educators still face the fact that the highest likelihood of integration will occur only if they value technology integration and see compatibility between its innovative uses and their existing values and beliefs (Zhao et al., 2002).

If K-12 teachers are going to integrate technology in ways that are not seen as extensions of conventional print-based literacy, they will need to shift the educational philosophies that guide their instruction (Smolin & Lawless, 2003). This can be especially challenging, however, because the images of teaching and learning that people bring to the classroom provide powerful organizing frameworks for how they think about teaching and are, therefore, difficult to change (Borko & Putnam, 1996). With the advent of the Internet, learning and communicating through mass media, multimedia, and electronic hypermedia has now become increasingly multimodal, "in which written-linguistic modes of meaning are part and parcel of visual, audio, and spatial patterns of meaning" (Cope & Kalantzis, 2000, p. 5). Luke (2000) argued that engaging in the literacies of new technologies demands a multimodal view of reading and writing, a view that currently counters many teachers' linear, "exclusively language- and print-based" views of literacy (p. 73). In order to help teachers acquire a new understanding of technology and the ways in which it can be used to support children's literacy learning, it is important to understand the kinds of situations and experiences that might shift, and possibly change, teachers' understanding of the role of technology in literacy education. A number of researchers have investigated how teachers have been taught to use technology; however, the "more specific question of preparing pre- and inservice teachers to integrate technology in literacy instruction and curriculum" has been less well explored (Pang & Kamil, 2004, p. 157).

Taking into consideration the challenges of preparing teachers for the demands of an information rich, Digital Age society, I designed this study to explore the teaching and learning that occurred during a semester-long teacher education course titled *Literacy and Technology*. The study documents how I, acting as university instructor and researcher, reached a new understanding about my own teaching when I noticed that my students were responding to course assignments and activities in unanticipated ways. The study provides insight into how students' and my own conceptions of literacy and technology were informed by one another and evolved over time. The research questions guiding the study were the following: What were participants' conceptions about the role of technology in literacy education? and, in what ways did new insights gained by me, the course instructor, impact the course content and curriculum?

Conceptual Framework

In a review of research on technology integration in schools, Hennessy, Ruthven, and Brindley (2005) stated that technology is "often underused and poorly integrated into classroom practice" (p. 159). When integration does occur, they added, ". . . established curricula and teaching methods remain in place under a thin coating of technological glitter" (p. 159). A Canadian study conducted by Goodson and Mangan (1995) reported that few teachers radically alter their teaching practice when integrating technology. Hennessy, Ruthven, and Brindley also note "the interim report of ImpaCT2 (Becta 2004), a major English evaluation, indicates that 'relatively few teachers are integrating ICT into subject teaching in a way that motivates pupils and enriches learning or stimulates higher-level thinking and reasoning'" (p. 156). Research performed in the United States also supports these findings. Cuban (2003) examined "the assumptions underlying the infusion of new technologies in Silicon Valley schools" (p. 19). He looked at how teachers and students used technologies in classrooms to determine whether technology had an impact on teaching and learning. Cuban found that teachers' uses of technology were inconsistent and did not reflect a change in teaching practice and also found little evidence that information technologies increased students' academic achievement.

Traditionally, the "development of appropriate pedagogies for integrating use of ICT in subject teaching has lagged behind the massive investment in provision of hardware, software and teacher training in using ICT" (Hennessy, Deaney, & Ruthven, 2003, p. 3). In fact, studies have actually indicated that encouraging changes in teacher beliefs or teaching practices can present a greater obstacle to technology integration than the lack of sufficient resources (Rogers, 2002; Veen, 1993). Citing the work of Ringstaff and Kelley (2002), Hernández-Ramos (2005) argued that "changing teachers' beliefs about the nature of learning *with* technology (Ringstaff & Kelley, 2002) may be one of the more complex challenges" (p. 48). Additionally, this process of changing teachers' pedagogical thinking can be quite slow (Kerr, 1991); yet most current research has focused on the difficulties that students confront when learning with ICT, rather than on teacher learning (Lagrange, Artigue, Laborde, & Trouche, 2001).

In order to explore educators' perceptions and uses of technology integration, I designed the study recognizing that integrating emerging technologies into literacy instruction can bring about new responsibilities for teachers. Coming to a new understanding requires some educators to go beyond learning how to use technology to understanding the relationship that exists between technology, pedagogy, and learning (Koehler, Mishra, Yahya, & Yadav, 2004). To both prompt and document potential "paradigm shifts" in literacy education (Smolin & Lawless, 2003) and educators' expanding visions of literacy and technology, I approached

the study from a social constructionist perspective that is aligned with Gavelek and Raphael's (1996) modified Vygotsky Space Model.

The Vygotsky Space Model was created by Rom Harré (1984), a social psychologist and philosopher (Kong & Pearson, 2002). It highlights different features of a social constructionist perspective on learning, including the relationship between student-teacher discourse and "the idea that many voices contribute to an individual's learning" (Gavelek & Raphael, 1996, p. 185). In this model, learning begins in the social/public arena, where learners are exposed to the practices of a community (Kong & Pearson, 2002). Learners then appropriate and transform what they see and hear through their personal and individual space, after which they are able to demonstrate their understanding in a public/social space. Accordingly, construction of knowledge occurs through a non-linear movement between public, private, individual, and social dimensions and does not "develop in the space of a single event" (Gavelek & Raphael, 1996, p. 185).

The Vygotsky Space Model has been influential in helping educators and researchers think about "how learning moves from its social aspect to its individual phase and back to the social again" (Kong & Pearson, 2002, p. 2). Gavelek and Raphael (1996) applied the model to language and literacy education to explain that "the movement from what is taught and learned as part of the classroom's social setting to what eventually becomes an individual's personalized learning" is an ongoing process that is "evolving and changing over time and with experiences" (p. 187). In this way, learning occurs while individuals interact with more knowledgeable members of a community "within specific social, cultural, and historical contexts" (Kong & Pearson, 2002, p. 2). When based on the Vygotsky Space Model, learning is described as being "dialogic and interactive" in nature where "meaning construction highlights the importance of participation, which becomes the goal as well as the means of learning" (Kong & Pearson, 2002, p. 2).

Although I did not design the study with a multimodal view of reading and writing in mind, I began to see how a multimodal view of reading and writing could ultimately inform the findings of the study. According to Cope and Kalantzis (2000), a multimodal view is one in which "written-linguistic modes of meaning are part and parcel of visual, audio, and spatial patterns of meaning" (p. 5). With the advent of the Internet, one could argue that learning from mass media, multimedia, and electronic hypermedia has now become increasingly multimodal. According to Luke (2000), "in hypertext navigation, reading, writing, and communicating . . . demand a multimodal reading of laterally connected, multi-embedded and further hotlinked information resources variously coded in animation, symbols, print text, photos, movie clips, or three-dimensional and manoeuvrable graphics" (p. 73).

Methods

This qualitative study followed a design-based research model where I, acting as a teacher-researcher, engaged in a continuous cycle of data collection and analysis (Reinking & Bradley, 2004). The study was conducted during my first semester teaching a new course titled *Literacy and Technology*, which provided an excellent opportunity for me to investigate how both my students' and my own conceptions of technology and literacy education evolved throughout the semester. According to Cobb, Confrey, diSessa, Lehrer, and Schauble (2003), the theoretical products of design-based research "speak directly to the types of problems that practitioners address in the course of their work" (p. 11). The theoretical intent of such a study is to "identify and account for successive patterns in student thinking by relating these patterns to the means by which their development was supported or organized" (Cobb et al., 2003, p. 11). This design-based model assumes that the intervention may transform the educational environment; however, it is also "guided by the realization that the intervention and its implementation, within the context of a formative experiment may produce important unintended consequences" (Reinking & Bradley, 2004, p. 160).

Research following this model "must not only document success or failures but also focus on interactions that refine our understanding of the learning issues involved" (Design-Based Research Collective, 2003, p. 5). I documented ongoing course interactions, discussions, and written assignments, recorded changes in both my conceptions and my students' conceptions of technology and literacy education throughout the14-week semester, and noted what appeared to instigate such changes.

The Course

Literacy and Technology was designed so that participants could investigate the role of technology in classroom instruction and learning relative to the field of reading. In this elective graduate course, students read articles related to theory and research on the integration of technology in K-12 classrooms. They analyzed and evaluated educational software, Internet sites, and other technologies (i.e., such as Leapster, Language Master, and Alpha Smart) for suitability to literacy instruction. Each student also participated in a group project where he or she chose to investigate a topic related to literacy learning and technology and presented information to classmates at the end of the semester. Group projects investigated how teachers could support literacy learning by integrating technology with a) children's literature, b) reading comprehension instruction, c) English as a Second Language (ESL) instruction, and d) content area reading and writing. In addition to working on group projects, participants completed an individual project of their choice. The only criteria for the project were that it be related to literacy and technology and receive instructor approval. Some of the individual projects that

students selected included creating a WebQuest[1] for classroom instruction, creating a teacher website that provided links to literacy learning activities, and creating an instructional unit that taught children how to conduct searches on the Internet.

Throughout the course, participants had various opportunities to interact with others as they came to understand literacy education and technology integration in new ways. Students listened to guest speakers and engaged in both face-to-face and online conversations about technology and literacy learning. Guest speakers included an English high school teacher who discussed her involvement in a district wide one-to-one laptop initiative, a special education teacher who discussed how technology can support literacy learning for students with disabilities, a high school teacher who shared a graduate project that investigated the relationship between instant messaging and writing, and a technology coordinator who shared various websites that could be used to support literacy learning in grades K-12. Classroom conversations occurred in class and online through a course management system called eCompanion.

At the outset, I believed that a number of participants in the course might be introduced to emerging technologies with which they had had little or no experience. One of the goals of the course was to introduce participants to new technologies such as weblogs (or blogs) and 3D chat rooms so that they could engage in conversations about the role that these new technologies might or might not have in literacy education. In order to capture how changes in their understanding of technology might develop in non-linear ways, moving between public, private, individual, and social dimensions (Gavelek & Raphael, 1996), I gave participants opportunities to explore their ideas through individual written activities, collaborative group conversations, and ongoing written reflections. I also shared stories of my own experiences using technology and described some of the confusions, frustrations, and successes that I had experienced. My intentions for sharing such experiences were to model a form of teaching practice supported by the concept of a *cognitive apprenticeship* (Bayer, 1990; Collins, Brown, & Newman, 1989; Lave & Wenger, 1991) where teachers "make explicit the tacit reasoning processes, strategies, and discourse rules" that shape learning (Greenleaf, Schoenbach, Cziko, & Mueller, 2001, p.88). When following this model, I drew upon my own knowledge of technology and teaching expertise to model, direct, and support student learning (Greenleaf et al., 2001).

Participants

A group of 19 graduate students who were enrolled in different education programs at the same university participated in *Literacy and Technology*. Students were not required to enroll in the course but had chosen to take it as an elective. All students agreed to participate in the study. Four of the 19 participants were male.

One was a high school vice principal who was in his second year of an Education Doctorate (Ed. D.) program in Educational Administration. He had previously worked as a high school history teacher. The second male student was also working towards an Ed. D. in Educational Administration, and he was in his final semester of coursework. This student was a public school technology coordinator who had experience teaching elementary school. The third male student was a teacher candidate majoring in Special Education who wanted to become a high school teacher, and the fourth was a teacher candidate in the Elementary Education program who had just completed a semester of student teaching.

The 15 female participants included 3 elementary school teachers, 1 high school English teacher, and 11 teacher candidates. The classroom teachers consisted of a high school English teacher who was enrolled in a Language and Literacy doctorate program and a first grade teacher enrolled in an Educational Administration masters program. The high school teacher had over 14 years of teaching experience; the first grade teacher had five years teaching experience. The group also included two second grade teachers; one of these was enrolled in a Reading Specialist graduate program and had seven years teaching experience and the other was enrolled in a Masters of Literacy Education program and had three years teaching experience. Out of the teacher candidates, 3 female participants were in their fourth year of a five-year elementary teacher certification program. A total of 8 participants were in their final semester of the program and had just completed their student teaching prior to enrolling in *Literacy and Technology.* A total of 7 teacher candidates were enrolled in the Elementary Education program, and 1 was enrolled in the Special Education program.

Half the class reported that they had never taken an educational technology course at the university, and only a couple of these students had taken one introductory technology course that introduced basic skills related to spread sheets, databases, and web design. Students who had taken the introductory computer science course claimed that they had forgotten much of what they had learned. The remaining students in the class had participated in technology-related professional development workshops with their schools or had taken one or two educational technology courses at the university. These students had varied experiences using authoring and publication tools such as PowerPoint, KidPix, Kidspiration or Inspiration, and Hyperstudio. When asked about their classroom uses of technology, most teachers indicated that they used computers for publishing and presenting students' work and conducting Internet searches. They also indicated that they used overhead projectors and televisions to show videos. When asked about their comfort level using technology, participants' responses ranged from being "not comfortable or confident at all" to "very confident." Even though the majority of participants had limited experience with integrating technology into classroom instruction, they all wrote about their eagerness to learn more and

expand their knowledge. This, they claimed, was why they had enrolled in the course.

Data Collection

Data collection was continuous and ongoing. Data sources came from digitally recorded classroom conversations, one-on-one teacher and student meetings, and classroom artifacts (e.g., online threaded discussions, written responses to readings, and journal entries). At the beginning of the semester, students completed surveys that asked about their teaching experiences, uses of technology, and purposes for taking the course. After each class session, I wrote weekly summaries and reflections about what occurred in class. Over 80 typed pages were written during a period of 14 weeks. I used surveys and summaries as data sources. In addition, I collected and analyzed participants' written work, which included four reflective journal entries, written in narrative form, for each student. Journal entries were completed at the end of January, February, March, and May, and they were designed so that students could write about their thoughts as they revisited artifacts and documents (i.e., class notes, posted discussions, readings, etc.) that were created throughout the semester.

In addition to collecting students' journal entries, I saved and analyzed students' online threaded discussions. Students engaged in three discussions throughout the semester and were asked to share their reactions and responses to chapters from the course textbook *Teaching with the Internet K-12: New Literacies for New Times* (Leu, Leu, & Coiro, 2004). Responses were based on three different chapters titled, "New Literacies for New Times," "Navigating the Internet with Efficiency and a Critical Eye," and "Effective Instructional Models: Internet Workshop, Internet Project, Internet Inquiry, and WebQuest." Students were encouraged to write weekly reflections on class activities using the journal function of eCompanion, the course management system used for the course. They were not required, however, to write such entries except for the week that blogs were introduced in class. Participants wrote an average of four journal entries throughout the semester, and entries were analyzed and coded so that they could be compared to what was being learned from other data sources.

Data Analysis

I collected and analyzed data using a grounded theory approach (Glaser & Strauss, 1965). In order to inquire broadly into the nature of learning and "to refine generative or predictive theories of learning" so that they could be understood (The Design-Based Research Collective, 2003, p. 7), I spent time after each class session reflecting on the class, reading participants' written work, and making connections to research questions. As I did this, I noted common themes, issues, and concerns that arose from participants. I made note of discussions that were related to literacy instruction and technology so that I could develop a sense of

what role participants felt technology should or should not have in literacy classrooms. Through instructor journals and the ongoing collection of participants' course artifacts (i.e., written reflections, responses to readings, etc.), I documented both my students' and my own evolving understanding of literacy education and technology integration. When a pattern of responses and sense-making began to emerge, I coded and periodically revisited the data to determine if my initial findings were confirmed through the triangulation of data sources. In instances where initial findings did not appear to support the goals of the course, I made adjustments to my teaching accordingly.

One example of how ongoing data collection and analysis informed the design of the course occurred when I first introduced blogs to my class. During class, I wanted to demonstrate how blogs could be used to support children's critical reading and writing skills. In addition, I wanted participants to see how blogs could be used as a tool for encouraging communication between home and school. When data were collected on the day that blogs were introduced, however, I noticed that many participants believed that blogs were simply online, personal journals that could not be used for educational purposes. Since participants' interpretation of blogs did not support the focus of my course for using technology in educational ways, I realized that I needed to give more specific examples. I also realized that I needed to engage students in more explicit discussions about how some teachers, administrators, schools, and districts are currently using blogs to communicate and share information over the Internet. In the next class period, I shared online examples of schools that were using blogs in educational ways and drew participants' attention to the ways in which these uses of online communication were different from the online diaries that were frequently seen on websites such as MySpace.com and LiveJournal.com.

When coding data, I used the qualitative software program NVivo. I noted when responses appeared to be supported with more than one example and by more than one participant. Using NVivo, I periodically searched through and revisited data to see if new data sources did or did not confirm the themes that had already been coded. As this process occurred, new codes were occasionally formed, and the searching, revisiting, and rereading of data began once more. While recording common patterns and themes, I also found that sometimes my initial hypotheses did not seem to be confirmed through my analyses. One example of this occurred when students created their own blogs in class. I noted that they appeared to be enthusiastically engaged in the activity. Their lively engagement and collaborative discussions led me to believe that students were valuing the activity and the concept of blogging. Upon reading their written course reflections later that evening, however, I noticed that some of my students felt that the class session was not very informative and that blogs had no use in education. This contradictory finding prompted me to once again revisit the data, which included

audio-recorded class discussions, so that I could search for additional evidence that would further shed light upon participants' actual perceptions about blogs and blogging.

Findings

One of my goals for the course was to have participants understand how technology can be used to enhance literacy learning. While analyzing data, I began to see that my students' views of technology and literacy education frequently countered my own views. I saw technology as being an integral part of K-12 literacy learning, while many of my students thought of technology as simply being used for "add-on" activities that are implemented only after children have already mastered foundational literacy skills. According to Leu, Kinzer, Coiro, and Cammack (2004), foundational literacies "include skill sets such as phonemic awareness, word recognition, decoding knowledge, vocabulary knowledge, comprehension, inferential reasoning, the writing process, spelling, response to literature, and others required for the literacies of the book and other printed material" (p. 1590). Challenges existed throughout the semester as I struggled with both my students' and my own concerns about teaching, learning, and technology integration. Over time, the knowledge that I gained from my students brought about curricular changes in my course.

Confronting Students' Beliefs and Concerns

From the very beginning of the semester, I strove to help students view technology as an important component of K-12 education. As I began analyzing students' written work and in-class comments, I saw that we had different views about the role of technology in literacy education. Attempts to change students' views were not always successful, and they often raised additional challenges and concerns.

Competing Views

At the beginning of the semester, participants completed a questionnaire that asked them to describe how they envisioned integrating technology into classroom instruction. They were told to "describe an ideal classroom scenario, lesson, and/or unit where technology is being used to support literacy instruction." Participant responses included such things as "using software such as Word or Excel to make a presentation," "using spell/grammar check to double-check work," and using computers to "present information in a different manner." One elementary teacher wrote, "I could encourage the use of computers and typing skills by having students write an assignment, a flyer for an event, and have them type it up." Based on these statements and others, I quickly realized that my students tended to view technology as making schoolwork more efficient and productive. Early in the semester, they did not explicitly give examples or make statements that directly linked technology to student learning.

Shavelson, Phillips, Towne, and Feuer (2003) argued that "to understand phenomena such as student learning and to document how this develops during the course of a design study, it is necessary to take into account the desires, beliefs, goals, reasoning processes, and so forth of the students over time" (p. 27). By capturing course participants' narrative stories through journal entries, classroom conversations, and written comments, I was able to document the ways in which individual's understanding and interpretations emerged over time through public and private spaces (Gavelek & Raphael, 1996). From the very beginning of the semester, a number of students expressed concern that bringing Internet-based activities into the classroom would "pull students away" from time that should be spent developing more foundational, "pencil and paper" reading and writing skills. They doubted that technology could be used to support and enhance literacy learning, countering the very goals that I had for the course.

In one example, participants argued that literacy instruction incorporating Internet-based activities or computer software programs did not promote children's higher level, critical thinking skills or their literacy development. Dave, who was a technology coordinator and doctoral student, wrote in one of his first journal entries that he believed it was difficult to create lessons and activities that "did not just vary the instructional model" but used computers "to foster higher order thinking." In their journal entries, two more students wondered how Internet programs, software, and online educational games could be used to develop critical thinking skills. Dana, a teacher candidate who had just completed a semester of student teaching, raised additional concerns and wrote:

> With my focus in the primary grades, I do not know how to effectively and efficiently use my time toward integrating technology into literacy instruction. So many important foundations need to be created and built on in these grades. I am really baffled on how to teach and use technology.

These participants and others expressed concern about using computers and the Internet during classroom literacy instruction. They felt that using technology would consume time that was needed to teach students more foundational literacy skills. Comments written by Emily and Katie, two teacher candidates, reflected some of these concerns. For example, one of Emily's journal entries included the following:

> I have some concerns that come up when I hear about all of these new technological innovations in schools. While now that I know how beneficial different forms of technology can be for different types of students, I worry that the technology is giving them the access to certain information and skills and participation in class, but it's also leaving behind the skills that are weak.

Katie expressed a similar concern and wrote:

> Although I understand the need for these new techniques that utilize technology, I am wary of students and teachers disregarding basic skills that these students may need to survive in the "real world." I also have questions that deal with how to use technology in a manner that allows students to really blossom and grow through a variety of techniques, but also making sure that their experiences are meaningful (i.e. not just "playing" a game on the computer).

Some individuals not only doubted the educational value of some Internet-based activities, they believed that engaging in activities that involved writing instant messages and email deteriorated children's writing skills. Teachers in the course professed that their students' lack of punctuation, capital letters, and correct spelling were due to students' online forms of writing carrying over into school work. Participants who were not yet teachers also shared similar concerns. According to one teacher candidate,

> Adolescents are now using online chat rooms, instant messaging and email as their primary form of communication. As a soon-to-be-teacher, this worries me for several different reasons. I worry that students' literacy skills are decreasing in quality because they are practicing these skills most frequently in an environment that is not monitored by adults and furthermore, where it is more accepted among their peers to not use the proper spelling, grammar and punctuation of the words they are using.

In my interpretation, both classroom discussions and writing assignments appeared to reflect participants' beliefs that engagement in online activities did not support the reading and writing skills that teachers are expected to teach in schools. Some individuals also seemed skeptical of the idea that new technologies could enhance literacy learning. As participants expressed their views and made them public, I predicted that I would need more concrete examples of the connections between literacy and technology if teachers were going to view classroom instruction and literacy learning in new ways.

A Failed Attempt

Since none of the participants in my class acknowledged having experience with blogs and since I found that the process of creating a blog to publish information online was a positive learning experience, I thought that the students would benefit from creating their own blogs. I believed that engaging individuals in the creation of blogs could heighten their awareness of the writing process and of the ways in which blogs could support writing instruction. In class, I described my blogging experience to my students and had them create blogs of their own. While they were creating their blogs, I noted that individuals appeared to be actively engaged in the

activity and seemed to be excitedly sharing their new creations with their peers. Their engaged discussions and lively interactions led me to believe that they were enjoying and valuing the activity. I also assumed that their first blogging experiences would be similar to my own, believing that they would make the same kinds of connections to writing instruction that I had made. Upon reading students' journal entries written at the end of class, however, I was dismayed to find that their blogging experience was not what I had anticipated.

In my disappointment, I wrote a journal reflection of my own after reading students' responses to the class blog activity:

> I could write [about class] chronologically, but there are some things bothering me. The blogs. I was so excited that students would actually get to create a blog. I was also excited because I thought the creation of the blog was a powerful yet troubling experience. So much to consider, like audience, purpose, etc. Anyways, I asked them to write a response/reaction in their journal after setting up the blog. I put some questions on the projector for them to see and consider. Anyways, the first couple of entries I read were really negative. Lindsey saw no reason at all for using blogs in school. Ted wondered if it was a form of exhibitionism and also didn't see a purpose to it. Others said how the blog was too revealing and students would share too much personal stuff, so they were completely against it . . . It bothers me that they weren't more open-minded to wondering, being critical, trying to stretch it a bit and challenge themselves to see [blogging] in other ways . . . The first reaction for some appears to be a bit skeptical.

Kong and Pearson (2002) claimed that the Vygotsky Space Model helped them think about "how learning moves from its social aspect to its individual phase and back to the social again" (p. 2). For them, learning begins in the "social/public arena" and what is seen and heard by individuals then becomes "appropriated and transformed through the learner's personal and individual space" (p. 2). The example provided above illustrates how students' public views, which were reflected through their course journal entries, impacted my interpretation of the class blogging events. I had misinterpreted individual's public reactions to blogs when class was being conducted. However, encouraging students to reveal their more personal and individual thoughts through a journal prompted my own learning. The example shown here illustrates how I, acting as course instructor and supposedly the "more knowledgeable other," gained new knowledge and understanding from my students when their viewpoints became public.

Concerns Over Internet Safety

In addition to having concerns about the educational value of new technologies such as blogs, students expressed hesitancy toward using online forms of communication with children because they felt that technologies such as blogs and instant messaging were unsafe. Individuals feared that schools and teachers would not have control over these conversations, ultimately leading children to share

personal information with the public or to engage in conversations with strangers. Dana, a teacher candidate, shared the same view as others in the class when she explained that she believed blogs were online dialogues that were personal and similar to diary entries. When sharing her thoughts about the role of blogs in education, she wrote, "I would not use a blog to support teaching/learning with my future students. Too much information and inappropriate information can be shared with one another." Another teacher candidate wrote that she understood why others used blogs; however, she claimed that she personally did not find "much value in others' random thoughts." She also explained that she did not feel comfortable having individual's personal entries posted publicly on the Internet.

The general consensus during class discussions was that blogs and other forms of online communication such as instant messaging had a recreational rather than educational purpose. Course participants shared concerns about using blogs and not knowing the identities of people who communicate online with children. One teacher stated that she was hesitant to introduce online communications to her future students because she continued "to hear stories about kidnapping, harassment, and other crimes being committed as a result of online communications and relationships that children are forming with people who want to put them in danger." She explained that the dilemma for her was how to ensure that children are safe and "using technology in a healthy way." Another elementary school teacher stated that she was not worried about "normal people" looking at a blog. Instead, she was worried about dishonest people and proclaimed, "I can't even imagine the schemes some people come up with!"

Some individuals referenced national news stories and television shows to highlight their concerns, providing examples of children who had been abducted by strangers whom they had met on the Internet. Ted, a high school vice principal, provided a personal example to illustrate his point. During a class discussion, he disclosed that he was greatly worried for his own niece's safety when he learned that she was posting family photographs and sharing personal information on a blog. When describing blogs, participants made comparisons to journal writing, in which individuals share personal information, personal joys, and concerns. The difference between a diary and blogs, they claimed, was the fact that blogs made such personal information public.

In response to students' concerns over Internet safety, I demonstrated that teachers can act as moderators when using blogging sites. My students and I discussed how many people's concerns about online forms of communication were due to limited knowledge and lack of information. I described how important it was for teachers to use programs that allowed them to control who can and cannot post online information. Although I brainstormed a number of ideas for safely using online forms of communication with my students, many of their concerns about online safety persisted. This was also the case when I introduced the class to

Active Worlds, an online "chat" program that allows users to converse using instant messaging in an online, 3D environment.

When I first visited Active Worlds on my own, I was struck by the ways in which a 3D environment changed the type of conversations that typically occur in a 2-dimensional chat. For example, as I was walking through an online world, I saw an image that did not look familiar to me and asked one of the individuals in the chat room, "What is that behind you?" The instant that I asked this question, I realized that I would have never asked such a question in a traditional chat room. The 3-dimensional world brought a new level of meaning and communication to the online environment. When introducing Active Worlds to course participants, I once again made the incorrect assumption that participants would have similar thoughts and feelings when entering the site for the first time.

Upon entering a 3D chat community, some students were still worried about issues of online safety. I responded by explaining that the class had entered a free demo site and that password protected 3D chat rooms could be created if users purchased an Active World membership. One individual stated that incorporating instant messaging into educational activities was inauthentic and "seemed too mechanical and technical and unrealistic." Comments such as these made me realize that once again, participants' experiences and reactions to technology had not been the same as my own. As I attempted to give examples of how instant messaging might be used to support children's literacy skills, I realized that my own enthusiasm might have gotten the best of me. I realized that discussing the educational value of new technologies such as 3D chat rooms was difficult to do when I myself had limited experience using such technologies for classroom instruction. Feeling a bit flustered, I then told my students how educators and researchers still have many unanswered questions about the role of technology in literacy learning.

An Evolving Curriculum

Citing the work of Jerome Bruner (1996), Raphael (2001) argued that curriculum is an "ongoing conversation" that is not static but dynamic in structure (p. 10). A sociocultural perspective on teaching and learning suggests that curriculum changes over time through dialogic activity. Findings from the present study provide similar evidence that the curriculum for *Literacy and Technology* was constantly evolving and changing, reflecting the non-linear movement of knowledge construction described by the Vygotsky Space Model (Gavelek & Raphael, 1996). Both my students and I developed an evolving understanding of *new literacies* that was informed by class interactions and the sharing of individual struggles, questions, and concerns. As I acquired new insights into the ways participants were responding to course activities, I reached a new understanding that impacted how I implemented the course. Over time, I began questioning the

effectiveness of some of my curricular decisions. I also began to recognize my own limitations and the significance of being able to provide students with effective models of classroom instruction. In the end, the content and curriculum of the course evolved as students publicly shared with me their views, beliefs, and perspectives.

The Impact of New Literacies on Course Activities

Participants were introduced to the term *new literacies* during the first two weeks of the semester as they began reading and responding to chapters in their textbook. Although I used the term quite freely during class, it was not until the semester began that I realized I had not been very critical of the term. I also did not have my own set definition for it and used our textbook's description to guide class conversations. In our course text, the authors described new literacies as being "especially important to the effective use of content area information on the Internet" (Leu, Leu & Coiro, 2004, p. 1). In their view, notions of literacy are being redefined as a result of living in an information rich, Digital Age society. Similarly, Leu, Kinzer, Coiro, and Cammack (2004) stated that new literacies are required to "effectively exploit" the potentials of new technologies (p. 1570). As technology opens new possibilities for communication and information, new literacies allow individuals to "*identify* important questions, *navigate* complex information networks to locate appropriate information, *critically evaluate* that information, *synthesize* it to address those questions, and then *communicate* the answers to others" (p. 1, italics in original). "These five functions," the authors claimed, are what "students need to be successful with the Internet and other information and communication technologies (ICT)" (p. 1).

Based on such textbook definitions, my students and I began to engage in conversations about whether the literacies surrounding the Internet are indeed new. An example of students' evolving views on literacy and technology occurred during one of the first whole class conversations about the term *new literacies*. This conversation was prompted by a comment that a student had posted on an eCompanion threaded discussion site after reading the first chapter in his textbook. Dave, a teacher candidate in the course, posted an online threaded discussion entry that read,

> I tend to disagree with this idea of new literacies and believe it is a bit of a misnomer. I feel so many feel confused or anxious when reading about another new set of skills to teach children. These "new literacies" I believe can be better explained to educators as further reinforcing already learned skills and expanding on these skills keeping technology in mind. The skills students must learn while navigating websites or creating WebQuests are not new. Students always needed to comprehend what they have read, synthesize the information, and react to the reading in writing. Now they must be more adept at doing so. They must look more critically while using the Internet. They must

> question a little more and sift through a lot more information. Yes they need to refine their literacy skills, but I do not think they need a new set of skills to welcome the changes of technology.

Since Dave's comments were posted at the very beginning of the semester, the class had not yet engaged in a discussion about the topic. In response to the reading that was assigned for homework, it appeared that Dave believed the definition of new literacies in our textbook was deceptive.

Leu, Leu, and Coiro (2004) introduced the concept of *information literacy* in their discussion of information communication technologies and new literacies. It appeared that Dave felt the authors were explaining how new technologies required competency in a new set of literacy skills. The idea that new literacies really were not new was significant and supported participants as they grappled with the issue of using technology to teach literacy skills throughout the semester. Framing new literacies as traditional skills being used in new environments and explicitly engaging in conversations about how to provide instruction to support literacy development played a role in making the concept of new literacies more accessible to the class.

As I began to see how participants were making connections between the literacy skills that are needed on the Internet and the foundational literacy skills that are emphasized in schools, I began to create more opportunities in class for students to make these connections. When they made connections between the literacy skills that surround the use of technology and the literacy skills that they typically teach in K-12 schools, they appeared to be more receptive to the idea of integrating technology into classroom instruction. In response to this, I provided class participants with hands-on experiences with educational software programs and had them critique software and online programs by keeping the instruction of foundational literacy skills in mind. Over a period of two class sessions, students worked in groups, critiqued various software programs, and reported on the literacy areas that were or were not supported by the program. They also discussed the relationship between the literacy skills that were supported by the program and those literacy skills that were supported by the state's literacy content standards. Students also brainstormed ways in which the programs could be used to support classroom instruction and literacy learning.

A journal entry written by Cathy, a teacher candidate who had completed one semester of student teaching, reflected the participants' growing understanding.:

> At the beginning of this course I questioned how technology could improve performance and develop higher order thinking and problem solving skills. After being exposed to websites and programs such as "Where in the World is Carmen San Diego," I have realized that there are credible resources to improve the skills needed to succeed.

> In such programs students improve skills such as note taking and making inferences and connections to material.

Cathy explained that she had originally thought that implementing technology into the classroom "would be extra weight" on her shoulders, and she would be "trying to do too much too soon." However, after completing a written assignment that asked her to revisit earlier journal entries and reflect upon her various experiences in the course, Cathy wrote that she was now able to "recognize tools that can be used to teach a skill, to reinforce a skill, or to enable a child to utilize and apply a learned skill." Cathy's reflections on the course mirrored what others wrote in their final journal entries and course review feedback forms. One participant explained how reading various research articles and using new software applications helped him realize that his previous use of computers in the classroom was "simply varying the instructional strategy."

As the semester progressed, my students and I explored new ways of thinking about what it means to be literate in today's society. After gaining new insight into students' views of literacy and technology, I designed activities that encouraged them to make connections between new technologies, classroom instruction, and the development of foundational literacy skills. Toward the end of the semester, however, I began to question the effectiveness of some course activities because I recognized that almost all of the discussions about literacy were related to computers, technology, and text. Most of the course activities were Internet based and placed a heavy emphasis on the written word. After engaging in conversations with a colleague who conducts research on multimodal literacy, I realized that my course had emphasized more of a language and print-based, or unimodal, view of literacy than a multimodal view (Luke, 2000). Only two classes had been explicitly dedicated to the ways in which other modes of meaning-making can support student learning. One class focused on website design and the use of various fonts and colors. The second class introduced the idea of how audio bytes and sound can enhance student learning. Over time, I began to wonder if I had unknowingly supported a view of new literacies that was too narrowly defined. I wondered whether approaching the course from a more multimodal view (rather than a traditional text-based view) would have prompted participants to view the role of technology in new ways. I pondered whether participants would have made more connections between technology integration and literacy learning if a stronger emphasis had been placed on the ways in which different modalities contribute to student learning.

Responding to a Need for Concrete Examples

In addition to encouraging participants to make connections between the literacy skills that surround the use of technology and the foundational literacy skills that

are reinforced in schools, I made curricular decisions based on participants' responses toward the use of blogs and instant messaging. When students raised questions about Internet safety and the educational value of these tools, I responded by having them create blogs of their own. While reflecting upon how I first introduced blogs, however, I realized that I might have actually contributed to the idea that blogs were simply personal diaries gone public. Instead of beginning class by assessing participants' current perceptions of blogs, I had them immediately begin by creating their own blog site. After reading journal entries and learning about participants' skepticism towards blogs, I found that my students needed examples of how blogs could be used for educational purposes. In a follow-up class activity, I presented examples of live blog websites used for educational purposes to illustrate how schools, administrators, classrooms, and even students shared information online without revealing personal information. I also pointed out that schools were using blogs as they would use websites and were disabling the feature of the site with which individuals could publicly post comments.

In response to participants' concerns about the use of instant messaging, I invited a classroom teacher who had used instant messaging with adolescents to share authentic examples of her own online experiences. This guest speaker's visit spurred conversations about the academic value of bringing different forms of online discussions into the classroom. Participants brainstormed ways that teachers might take advantage of students' high interest in chatting online. One participant explained that it might be helpful to have children discuss how the audience and context impact the ways in which people write. Another participant stated that a teacher could ask students to compare different forms of communication such as email, chatting, and letter writing. A third participant, Rachel, a high school English teacher, wondered how she might use chat rooms to represent a modern-day play written by Shakespeare. This teacher thought about having students use chat rooms to take on the persona of various Elizabethan characters and engage in modern-day online chats about the topics and themes that arose from class readings. Brainstorming and sharing ideas produced various examples of how instant messaging could be used to support more foundational literacy skills.

After reading participants' written reflections about the guest speaker's visit, I believed that students were growing more receptive to the idea that online forms of communication could be used to support literacy instruction. Students wrote about how much they enjoyed the guest speaker and the discussions that she prompted. Many indicated that she helped them think about online forms of communication in new ways. At the end of the semester, however, statements made by students in class indicated that some individuals still wondered about the educational value of online communication. One student in particular wondered about the implications of taking an out-of-school literacy activity such as blogging and turning it into something "academic" for school.

The following teacher candidate's comments reflect some of the questions, concerns, and tensions that remained unresolved at the end of the semester:

> The implications that this [online] writing has is interesting, confusing, and touchy to me. Online blogs, websites, personal sites give people the freedom and confidence to express themselves openly and collecting feedback only if they want it . . . If a school or teacher creates an open environment like this, there are a lot of considerations to take into account. Children will be monitored, who will know individual's identities?

This individual, along with others in the class, still worried about Internet safety and the logistics of how to safely introduce blogs into K-12 classroom environments. The teacher candidate who made the comments above also questioned whether blogs even had a role in schools. She pointed out that students might not want to write blogs for school because online dialogues were personal, and students' "freedom to talk openly" would be taken away by school restraints. She argued,

> In order for schools to get this type of writing from their students, they will have to create safe environments as well as specific, structured assignments. I really do not see the role of online writing in school because I am skeptical that it can successfully be done. I feel that the implications that researchers and possible educator see with online writing can not be achieved in school because the individual's freedom to express themselves is restrained and subject to opinion with known people, not strangers on the internet.

After learning about such concerns, I developed a better understanding of why some of my students were hesitant to use blogs with children. I also felt a bit frustrated because I could not give them the answer that would alleviate all of their worries and concerns.

The above responses reminded me that online forms of public writing could still fall under the scrutiny and judgment of teachers and classmates. Blogging at home for personal reasons can be very different from blogging at home for academic reasons. In an attempt to respond to such comments and concerns, I used the next class session to further flesh out some of the messiness and some of the unanswered questions that surround the use of technology in schools. I encouraged more students to share their thoughts and found that many of them still felt uncomfortable using online forms of communication with their own students.

Participants' comments at the beginning of the semester suggested to me that it was important for them to have concrete examples of how blogs and instant messaging could be used for educational purposes. I responded to this by brainstorming ideas with the class, sharing online examples, and inviting guest speakers to talk about their own personal experiences using technology to support

teaching and learning. Since I had not actually used instant messaging and 3D chat rooms for instructional purposes, I found that it was extremely informative having a knowledgeable guest speaker talk about the topic. I continually made adjustments to the course curriculum as I gained new insights from students' responses to class activities. Sometimes revisiting topics and making adjustments appeared to make a difference for some students.

By the end of the semester, all students described various ways in which their views about technology had changed. Many individuals described how they now felt more comfortable and confident using computers for both personal and professional reasons. One individual wrote, "My confidence in using technology has increased over these weeks in class. I am no longer unsure or timid in venturing in the area of technology." Students also described how they had become more thoughtful and critical of the ways in which technology could be used in classrooms. Dave, for example, stated, "Throughout the course my knowledge of technology has grown in several ways. First and foremost, I have been challenging myself to focus on the 'why,' along with the 'how.'" In regard to her skepticism about using interactive chat rooms for educational purposes, Rachel, the high school English teacher, explained that class discussions were very helpful because she "initially only saw the negative in it for literacy instruction." By the end of the school year, Rachel had begun to think of ways that she could integrate online discussions into her *Romeo and Juliet* unit.

After revisiting journal entries that were written at the beginning of the semester, a few students shared both amusement and amazement at how their perceptions had changed throughout the semester. In her final journal entry, a teacher candidate named Stefanie wrote the following:

> I find it so amusing now that in the beginning of this course time, my version of using technology in the classroom, the epitome of using technology in the classroom, was learning how to use Excel!!!! I don't know what I was thinking! It is evident that my perspective as to what technology is, and how I can use it has broadened immensely!

Although all students described how their knowledge, skills, and dispositions had both evolved and changed throughout the semester, many unresolved issues still remained at the end of the semester. A number of these issues were related to Internet safety and needing additional, classroom-based examples of how technology can be effectively used to support literacy learning.

Discussion

In the present study, participants' conceptions of literacy instruction and technology integration evolved over time, as new insights from my students influenced how I taught later parts of the course. The study raises questions about

the role of the instructor and the purposes and goals of courses like *Literacy and Technology*. It also points to a number of areas that need further investigation if teacher educators hope to effectively introduce teachers to the ways in which technology can support literacy learning.

Approaching learning from a social constructivist perspective, Wells (2000) argued that "it is by attempting to make sense with and for others that we make sense for ourselves" (p. 58). I ended the semester wondering if I had placed too much emphasis on foundational literacy skills and on textual rather than multimodal ways of knowing. I also wondered whether students would have made more connections between technology integration and literacy learning had I placed a stronger emphasis on the ways in which children understand language through different modalities. Luke (2000) argued that hypertext navigation, reading, writing, and communicating demand a multimodal approach to reading. It appeared that I might have been limiting how participants thought about technology and learning when I asked them to critique software in relation to the ways in which it supported children's foundational literacy skills. Although making such connections assisted participants in valuing the use of technology, one cannot help but wonder what might be lost when too much emphasis is placed on an "exclusively language- and print-based" view of literacy (Luke, 2000, p. 73).

As teacher educators continue to design and implement courses for preservice and practicing teachers, they might want to consider how their own conceptions of literacy and technology will impact the ways they design course content and curriculum. Although conventional literacy skills and printed materials still play a dominant role in literacy education (Reinking et al., 2000), the literacy skills that are needed in the 21st century are constantly evolving (Leu, Leu, & Coiro, 2004). Findings from the study suggest that teacher educators might want to highlight the complex views that surround literacy and technology. They might also want to design courses that challenge the belief that technology integration is only valuable when it is shown to support foundational literacy skills. In today's information-rich, Digital Age society, being literate involves much more than simply being able to read and write the written language (Lemke, 1998).

As teacher educators design courses, they might also want to consider their role as a teacher and how knowledge of literacy instruction and technology integration can be socially constructed within their classrooms. Gavelek and Raphael (1996) stated that the Vygotsky Space Model "underscores the complexity of learning and the different entry points a teacher has to observe and make decisions about formal intervention or informal guidance" (p. 190). This study suggests just how important it is to design courses and course activities that provide both students and their instructor opportunities to make their thinking public. Citing the work of Norman (1993) and others, Ferdig (2006) argued that "technologies are not inherently good or bad" (p. 754). Ultimately, he claims "it is the pedagogy and

personnel that determine the quality and impact of the creation, implementation and subsequent use" of new technologies (p. 754). When describing the Vygotsky Space Model, Gavelek and Raphael (1996) emphasized that students need leadership from their teachers. They also argued that students need "multiple opportunities in which to engage in discussions" if course activities are going to be "educative and meaningful" (p. 184). One area that Gavelek and Raphael did not emphasize, however, was how the co-construction of learning can ultimately impact the instructor. The study presented here illustrates that teacher learning is just as significant as, or at times even more significant than, student learning. As seen in the various examples presented above, the ways in which the curriculum evolved were largely guided by my own learning as I gained insight into how students were responding to course activities and how they were conceptualizing the role of technology in literacy education.

Over time, I recognized that my students and I had made many assumptions about the term new literacies. I had unquestioningly incorporated the term into my vocabulary and had not originally paid much attention to the power of my words or what connotations such phrasing might evoke in my class. Only when a student wrote that it was problematic to think of such literacies as being new, did my students and I become more critical of how we were using the term. Moll (2001) has argued that "clearly, within a Vygostskian perspective, social relations provide a major resource for the development of thinking" (p. 115). Moll acknowledged that the construction of meaning is regulated by social relationships and has stated that knowing how "this development of thinking may be accomplished is a legitimate area of investigation" (p. 115). Proponents of a social constructionist perspective suggest that "knowledge is constructed collaboratively by individuals as they discuss and argue a particular perspective or interpretation" (Gavelek & Raphael, 1996, p. 183). It would be useful to know, however, what types of conversations and activities best support teacher and student learning when the instructor is not the more knowledgeable other in the classroom. This is especially true when many unanswered questions still exist regarding the effective uses of technology in literacy education.

Currently throughout the nation there are school administrators and educators who are attempting to maximize the learning that can occur with new technologies while minimizing the potential dangers of the Internet. Many challenges exist, however, as literacy educators try to keep abreast of how to most effectively design instruction so that students acquire the knowledge and skills that are needed to excel in today's 21st century, Digital Age society. My own research and teaching experiences lead me to believe that educators could greatly benefit from research that explores which pedagogical strategies are the most effective for integrating technology into literacy instruction. Educators could benefit from understanding both the advantages and disadvantages of using online forms of communication

to support literacy learning. Currently, there is a need for better understanding how to design literacy instruction and the use of technology so that concerns over Internet safety can be alleviated. Ultimately, teacher educators and classroom teachers would be better prepared to integrate technology into classroom instruction if they had more knowledge, information, and examples of how new technologies can be used to support, enhance, and even extend literacy teaching and learning.

Finally, both researchers and educators might benefit from further exploring how to build and sustain a classroom environment that supports the co-construction of knowledge. Gavelek and Raphael (1996) stated that the Vygotsky Space Model helps "to explain the idea that learning is not linear, nor does it develop in the space of a single event" (p. 185). The model highlights "the importance of the public/social aspects of discourse" and the processes by which meanings are constructed "out in the open" (p. 188). When thoughts are expressed publicly, it is difficult to know an individual's true private thoughts. One cannot ignore the role of the classroom climate and the impact that classroom culture can have on an individual's willingness to "go public" with his or her thinking. All of the participants in the study voluntarily enrolled in the course and had an interest in technology. There is the possibility that open discussions and public debates might have occurred less frequently if students had been required (and possibly less interested) in the course. One must not forget how learning in the classroom is also impacted by other outside, sociocultural forces. Herein lies some of the challenges of conducting studies such as the one described above. Researchers need to acknowledge that one cannot always be certain as to what extent publicly shared information accurately reflects the true learning that is occurring among individuals. One of the limitations in the current study is not knowing whether students accurately represented themselves and their beliefs when sharing ideas in public.

Moll (2001) argued that there is currently a "lack of a critical perspective (in the political sense) within a Vygotskian approach, a perspective that is also central to the study of teaching" (p. 124). Citing the work of Gee (1996), Moll reminds us that institutions such as universities and schools are "not only pedagogical but also political sites with well-known structural constraints and biases" (p. 124). She further claims that "these institutional conditions also serve as distal but powerful mediating factors in determining why, how, and what [individuals] get to learn" (p. 124). In order to advance the field of teacher education and the ways in which teachers can meet the literacy needs of today's students, researchers might want to consider looking at issues of literacy instruction and technology integration with a more critical lens so that the complexities that surround teaching and learning are further acknowledged and explored. Although technology is continually becoming part of our daily lives, many have argued that a "profound gap [still exists] between the knowledge and skills most students learn in school and the

knowledge and skills they need in typical 21st century communities" (Partnership for 21st Century Skills, 2003, p. 3). It is evident that many researchers, teacher educators, and classroom teachers also still have much work to do in this area.

NOTE

1. A WebQuest is an "inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet" (Dodge, 1997, para. 2).

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