

Personal Attitudes and Technology: Implications for Preservice Teacher Reflective Practice

By Melanie Shoffner

The increasing importance of technology in today's world challenges teacher educators to create technology-proficient teachers, practitioners who can utilize existing technology, learn to work with emerging technology and adapt as needed when confronted with technological issues. In the 2001 report, *Preparing Tomorrow's Teachers to Use Technology: Perspectives of the Leaders of Twelve National Education Associations*, a panel of educators agreed that "future teachers emerging from the nation's teacher education programs [must be] prepared to meet this challenge" (Bell, 2001, p. 517). Acknowledging the need for technologically proficient teachers, teacher educators across the nation now infuse some degree of technological competency into the preparation of their preservice teachers (Bird & Rosaen, 2005; Cohen & Tally, 2004; Rosaen, Hobson, & Khan, 2003). Teacher educators face several obstacles to the implementation of technology into teacher preparation, however, among them the attitude held by preservice teachers toward the technology itself (Gunter, 2001; Johnson & Howell, 2005). While providing opportunities for preservice teachers to engage with technology personally, academically and pedagogically, teacher educators must also consider the attitudes toward technology that influence preservice teachers' experiences with that same technology.

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Technology has a place not only in preservice

teachers' emerging classroom pedagogy but in their professional development as well. Reflective practice is one area currently drawing on different technologies, as teacher educators incorporate a range of technology into preservice teacher reflection. Drawing from a qualitative study in which weblogs were used for voluntary preservice teacher reflective practice, this article examines preservice teacher attitudes toward a specific technology and the influence of those attitudes on the use of that technology for voluntary reflection. The researcher uses the term "voluntary reflection" to express reflection that is undertaken by choice, outside course or programmatic requirements, with all aspects of the reflective activity (such as topic, quantity, formality and medium) determined by the preservice teacher.

This article opens with an overview of reflection in teacher education and the use of asynchronous communication technologies in reflective practice, with a focus on the specific technology of weblogs. The study, in which preservice teachers volunteered to use a weblog for their personal reflection while completing a teacher preparation program, is then briefly explained. Next, the preservice teachers' use of reflective weblogs is presented, followed by a discussion of the role played by individual attitudes toward technology in the use of reflective weblogs. The article concludes by considering the implications of preservice teacher attitudes toward technology for teacher educators.

Reflection in Teacher Education

Reflection, defined by Dewey (1960) as an "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (p. 9), is a well-established practice in teacher education today. Teacher educators seek to provide preservice teachers with a range of reflective experiences, drawing on their understanding of reflection's potential benefits for preservice and practicing teachers. Engagement with reflective practice in teacher education prepares preservice teachers to identify, analyze and manage the many complex issues that arise in classroom teaching (Spalding & Wilson, 2002). Experience with reflection during teacher preparation also supports preservice teachers as they construct the personal knowledge needed to guide their teaching and learning decisions (Francis, 1995). By engaging in reflective thinking, preservice teachers generate questions and, by seeking answers, support change in their educational actions, responses to criticism, and social and cultural beliefs (Liston & Zeichner, 1990).

Achieving change in educational thought and action is an on-going process, however, as is achieving higher levels of reflective thinking. The "various entrenched ideas and beliefs about teaching, learning and the curriculum" (Calderhead & Gates, 1993, p. 3) that preservice teachers bring to their preparation are formed during their previous years of schooling, in what Lortie (2002) termed the apprenticeship of observation. Through experiential observation, preservice teachers have formed

conclusions about the actions and motivations connected to teaching and learning that can conflict with the knowledge and experiences offered in university preparation. During their university preparation, then, preservice teachers “should be made aware of this relationship and be given the opportunity to identify and examine their beliefs and practice” (Bramald, Hardman, & Leat, 1995 p. 23) through reflection for their personal growth and professional change. Preservice teachers who learn to develop and refine knowledge through reflection are more likely to benefit as practicing teachers from reflective thinking: maintaining an awareness of personal beliefs and actions, recognizing the many influences on student learning, drawing links between theoretical issues and everyday practice, and learning to question taken-for-granted knowledge (Liston & Zeichner, 1990; Loughran, 2002; Ward & McCotter, 2004).

Teacher educators often rely on step-by-step processes to configure preservice teacher reflection. Francis (1995), for example, offers preservice teachers specific steps to follow during the reflective process: summarize—give new insights—ask questions that emerge from the topics or issues—and explain personal reactions. Yost, Sentner, and Forlenza-Bailey (2000) provide explicit questions to structure preservice teacher reflection: “(1) describe—What do I do? (2) inform—What does it mean? (3) confront—How did I come to be like this? (4) reconstruct—How might I do things differently?” (p. 44). Often, the goal of such structure in reflection is to move preservice teachers through varying hierarchical levels of reflective thought. Not surprisingly, higher levels of reflection are seen as the more desirable, concentrating as they do on the broader educative concerns of equity and justice. These concerns, however, are supported by diverse experiences and broader views of the world, which preservice teachers are still developing during their university preparation (McIntyre, 1993). Teacher preparation provides opportunities for preservice teacher development, offering various education-based experiences while challenging personal views on teaching and learning, often through engagement with reflective practice.

While higher levels of reflection are noted as desirable, lower levels of reflection are not poor substitutes but important components of preservice teacher reflection. Description and explication are an “essential aspect of initial student teacher development and a precursor to other kinds of reflection” (Hatton & Smith, 1995, p. 35). Understanding that preservice teachers are still growing, intellectually and emotionally, during their preparation, teacher educators should work to provide a range of experiences to encourage that growth, including exposure to various reflective forums that encourage differing levels of reflection. All reflection at the preservice level holds value, as it contributes to the professional and personal growth of the individual future teacher and the development of higher order reflection in the years to come (LaBoskey, 1993; McIntyre, 1993; Ward & McCotter, 2004). To support such growth and development, then, teacher educators must work with preservice teachers “to reflect on their practice in meaningful ways, to consider the effect their teaching has on student learning, and [to] develop habits that will

stay with them” (Ward & McCotter, 2004, p. 244) as they emerge from teacher preparation and move into their own classrooms.

Asynchronous Communication in Reflection

Asynchronous communication technologies are fairly ubiquitous in teacher education and increasingly found in preservice teacher reflective practice. The use of an asynchronous format incorporates the inherent characteristics of the technologies: independence of time and location, participation beyond classroom walls, flexibility in involvement and structure. These specific elements carry certain benefits when applied to preservice teacher reflection.

Electronic mail, for example, allows individuals to write and send messages to one person or several people, with listservs used to facilitate the sending of messages to groups of people. The interaction facilitated by emails and listservs has the potential to increase both discussion and questioning among preservice teachers, as new ideas are introduced and old ones extended. Whipp (2003) instituted a reflective email discussion among her preservice teachers during their urban field placements. The resulting communication supported critical reflection on their classroom experiences beyond the university classroom walls.

Discussion boards are another asynchronous technology found in reflective practice. Permitting numerous participants at a time to focus conversations and questions on a given topic, discussion boards support increased questioning and dialogue among preservice teachers while supporting the collaborative meaning-making of shared reflection. Mayer (2002) created online discussion boards to support preservice teachers across the vast distances of Australia. The flexibility of time and place made possible by the discussion boards supported student participation, as preservice teachers could not be physically present in a classroom to contribute their thoughts and perspectives on teaching and learning. Sliva (2002) established an online discussion board for her preservice teachers during a mathematics methods course. The critical thinking and reflection requested of the preservice teachers were supported by the time delay required by the electronic medium versus the immediacy of the classroom environment.

Weblogs, an emerging asynchronous technology in teacher education, provide another avenue for preservice teacher reflection. Although created and maintained by the individual, an audience is an inherent component of weblogs, as they are continuously published to a wider public through the World Wide Web. The presence of that audience establishes weblogs as an asynchronous communication technology. Although weblogs may not attract a readership, interaction with others is made possible through comment functions attached to the weblog templates. Like emails and discussion boards aimed at specific readers, weblogs “actively solicit ideas and opinions from their readers” (Blood, 2002, p. 17), although the readers may be unknown to the weblogs’ creators. Like other asynchronous technologies, weblogs also allow the individual to communicate in a loosely structured environment.

Weblogs bring differences in use, application and intention to the reflective process when contrasted with more traditional paper reflective journals. Weblogs typically consist of short postings that may include hyperlinks to outside information found on the Web. The writing found in weblogs is informal; punctuation, grammar, spelling and capitalization are of little concern to writers or readers. In addition, weblogs are bound by their publication to the Web. Without Internet access, neither writer nor reader can access the weblog.

Teacher educators are taking an interest in weblogs as reflective spaces. Stiler and Philleo (2003) replaced pen-and-paper reflective journals with weblogs in a teacher education class, citing several drawbacks to the more traditional paper journal, among them generic responses, illegible handwriting and instructor access to the journal. In their analysis of the preservice teachers' weblogs, they found that entries were longer and provided more analysis and evaluation, with increased breadth and depth in topic discussions. Stiler and Philleo (2003) also noted certain drawbacks with the weblogs, as some preservice teachers expressed concerns with technical problems and the lack of privacy inherent in publishing to the Web. Overall, however, the preservice teachers responded favorably to the use of the weblogs, prompting the authors to suggest engagement with the specific technology as another motivating factor when incorporating weblogs into reflection.

Bull, Bull, and Kajder (2003) used weblogs as reflective journals for preservice teachers in a technology course, considering the weblog a "communication medium that is more structured than an e-mail list and more focused than a discussion board. The structure creates a framework for social networks and taps a basic human desire to interact and communicate" (p. 32). They determined that the specific format of weblogs encouraged their preservice teachers to include multimedia links and embed multimedia objects within their postings, extending their reflective thinking. Bull, Bull, and Kajder (2003) also noted economical writing and timely entries when weblogs were used as personal reflective journals.

Hernández-Ramos (2004) integrated weblogs and online discussion forums into a teacher preparation course in instructional technology to provide "meaningful mechanisms for students to engage in active reflection with a reference to larger social issues" (p. 3). Although preservice teachers were required to engage with both technologies, Hernández-Ramos (2004) noted that weblogs specifically promoted reflective writing and community building. The preservice teachers responded favorably to their experience with the technology, with several expressing their intention to use weblogs in their own classrooms once they left the university.

The Study

In the fall of 2004, a qualitative research study was conducted to explore the use of weblogs in voluntary preservice teacher reflective practice. The study was predicated on the following foundation. Preservice teachers have the opportunity

to make meaning of their actions and beliefs on teaching and learning by engaging in reflection. Using weblogs, preservice teachers can engage in individual reflection that is also open for communal interaction. Taken together, these elements create a working foundation from which to explore weblogs as workable spaces for preservice teacher reflective practice.

Framework of the Study

From this foundational understanding, research questions focused on the preservice teachers' use of weblogs in their voluntary reflective practice were developed for the study. The research questions were designed to be exploratory, however, encouraging the researcher to look beyond the original questions as data was collected. As such, the researcher developed an additional question, which serves as the focus for this article: What role do preservice teachers' attitudes toward technology play in their use of weblogs for voluntary reflective practice?

Participants for this qualitative research study were drawn from a 2004-2005 cohort of preservice teachers in a secondary education Master's program at a large southeastern university in the United States. Nine preservice teachers elected to participate in the study, representing the content areas of English as a second language (ESL), mathematics, science and social studies. The preservice teachers ranged in age from early to late 20s, with five females and four males taking part.

As participants, the preservice teachers were asked to establish a personal reflective weblog and maintain it for the length of the study. They attended a voluntary information session at the beginning of the study, where the general research was outlined and the study expectations were explained. During this session, examples of weblogs were provided to the preservice teachers, who were then able to ask questions about developing and maintaining a personal weblog. In keeping with the communal nature of weblogs, the preservice teachers were asked to maintain public weblogs using the Blogger platform. This was the only structure required, however. Each preservice teacher determined the content and the frequency of weblog postings, as well as whether to read and comment on fellow preservice teachers' weblogs. Anonymity was also determined by the individual; although issues of privacy and pseudonymity were discussed at the session, each preservice teacher controlled the information posted to her or his weblog. The reflective practice in this study, then, was strictly voluntary and not predicated on specific guidelines or given structures. In addition to maintaining a reflective weblog, the preservice teachers were asked to take part in individual and focus group interviews throughout the study.

The study was conducted during an eight-month timeframe within the twelve-month teacher education program. Data was collected and analyzed during the fall of 2004, when preservice teachers were engaged in university coursework on campus; the spring of 2005, when preservice teachers were engaged in student teaching off campus; and the summer of 2005, when preservice teachers returned to campus to complete coursework and exit the program. Within the study's timeframe, 263

weblog entries were collected, two focus group interviews were conducted and 23 individual interviews were conducted.

Analysis of the Data

Analysis was informed by Wilkinson's (2004) work with content and ethnographic analysis. Content analysis allows for an examination of the data as a whole, with repeating elements and recurring themes noted and categorized. Ethnographic analysis focuses on specific elements and themes to be analyzed in greater depth and detail, with interpretation grounded in "the particularities of the situation under study" (p. 183). Ethnographic analysis, then, begins with the themes developed during the initial content analysis. The analysis moves forward by considering those themes in more detail within the context of the study.

As an example: Initial content analysis noted several recurring topics across the preservice teachers' weblog postings, one of which was the topic of students. Weblog postings referring to students were then categorized and coded "students." In these postings, the preservice teachers discussed meeting students outside of school, questioned their ability to relate to the students in their classrooms and considered how they might positively influence students facing difficult choices, leading to a general theme of "interactions with students." Subsequent ethnographic analysis of the weblog postings delved more deeply into this specific theme and incorporated contextual elements that offered more information related to the postings; this information ranged from the location of student teaching to the identity of a peer referenced in a post. Ethnographic analysis also incorporated the data of individual and focus group interview transcripts. These transcripts provided additional information pertaining to the theme of "interactions with students" coded in the initial content analysis, as when preservice teachers clarified their emotions on encountering students outside the classroom or provided more detail regarding their ability to relate to students. Through ethnographic analysis of these multiple data sources, the specific theme of "teacher and student relationships" was identified.

The interview questions that generated one source of data for the study emerged from the weblog content collected from the preservice teachers and the responses of the preservice teachers during the interviews. Marshall and Rossman (1999) support this approach, stating that qualitative interviews "are much more like conversations than formal events with predetermined response categories. The researcher explores a few general topics to help uncover the participant's views but otherwise respects how the participant frames and structures the responses" (p. 108). This allows for what Holstein and Gubrium (1997) term *active interviewing*, where the "objective is not to dictate interpretation, but to provide an environment conducive to the production of the range and complexity of meanings that address relevant issues, and not be confined by predetermined agendas" (p. 123).

The individual interviews, then, included both open-ended queries related to the research topics and pointed questions related to the specific preservice teacher's

Personal Attitudes and Technology

weblog postings. The interview protocol for Davis' first interview, for example, included the following questions:

- Tell me about your experiences with blogging this semester.
- One topic running through your blog is the role of the teacher. What are your thoughts on that topic here at the end of the semester?
- You mention that “you can't fake caring for someone” in your blog—can you elaborate on that?
- How do you view weblogs after this semester?

Davis' final interview included the following questions:

- How would you describe your experience with weblogs?
- You mention in your blog that practicing teachers have too little time. Could you tell me more about that?
- What role do you see reflection taking in your future teaching?
- Is there anything else you would like to share with me?

Questions for the focus group interviews were similar in nature, providing a venue for the researcher to explore certain topics yet allowing the preservice teachers to guide the direction of the conversation. The protocol for the final focus group interview, for example, included the following questions but remained flexible to allow the preservice teachers to develop the discussion as they saw fit:

- After this year, how do you personally define reflection?
- How do you view weblogs after this experience?
- What positive and negative aspects do you associate with weblogs?

Through these different data sources, a richer understanding of the research was possible, with potential limitations in one source balanced against potential benefits of another (Bogdan & Biklen, 1998; Patton, 1990).

Preservice Teachers and Weblogs

With the incorporation of any technology into reflective practice, teacher educators must consider its potential benefits and drawbacks, as well as the receptivity of the preservice teachers to the technology. The use of weblogs is no exception. Weblogs have the potential to support reflection in multiple ways (Bull et al., 2003; Hernández-Ramos, 2004; Stiler & Philleo, 2003), encouraging teacher educators to consider their use for reflective practice; if, however, preservice teachers hold attitudes toward technology that dissuade them from engaging with weblogs, those

benefits are not realized. To explore this construct, this article will continue with a discussion of the preservice teachers' weblog use and their attitudes toward weblogs for voluntary reflective practice.

Weblog Use

The preservice teachers participating in the study were asked to maintain an individual weblog while completing their teacher preparation program. During the eight months comprising the study, the preservice teachers were involved in different phases of their teacher preparation, moving from the university classroom to local middle and high school classrooms and back to the university classroom. The study began in the fall of 2004, with the preservice teachers on campus for coursework. While the preservice teachers took part in on-site classroom observations during the semester, the majority of the week was spent on the university campus. During this time, eight of the nine preservice teachers posted entries to their weblogs. The number of postings varied widely among the preservice teachers, ranging from Colin's three to Kate's 79. The frequency of postings to the individual weblogs also varied, ranging from several times a day to several times a month.

The study continued in the spring of 2005, when the preservice teachers entered local public schools to fulfill their teaching practicum. The preservice teachers returned infrequently to the university campus during this time, most commonly for course modules held during evening hours. The majority of the semester, then, was spent in the cooperating classroom engaged in the responsibilities of teaching. During this student teaching semester, five of the nine preservice teachers posted entries to their weblogs. The number of postings decreased overall, from Eric's one to Kate's 46; the frequency of postings also decreased, ranging from one time only to several times a month.

The study concluded when the preservice teachers returned to campus for the conclusion of the program in the summer of 2005. In addition to summative coursework, preservice teachers were also applying for full-time teaching positions. Two preservice teachers posted to their weblogs during this summer semester, Nicole writing one entry and Kate writing eight entries.

A summary of the preservice teachers' weblog entries posted each semester is contained in Table 1. As the table clearly shows, the preservice teachers' use of the weblogs for informal reflective practice declined throughout the course of the study. Weblog postings were more frequent during the Fall 2004 semester, when weblogs were introduced and preservice teachers were on campus for classes. Postings declined as the preservice teachers moved into student teaching positions in the Spring 2005 semester and stopped completely for all but two in the Summer 2005 semester.

When questioned about the reduction in reflective entries over the course of the study, the preservice teachers offered two explanations: lack of access and lack of time. Access to an Internet-connected computer certainly plays a role in weblog

Personal Attitudes and Technology

Table I
Preservice Teachers' Weblog Entries by Semester

Participant	# Entries Fall 2004	# Entries Spring 2005	# Entries Summer 2005
Abby	14	0	0
Colin	3	0	0
Davis	16	19	0
Eric	8	1	0
Kate	79	46	8
Lauren	10	0	0
Nicole	12	12	1
Shannon	15	9	0
Zach	0	0	0

use, as weblogs are a technology defined by connection to the Web; without such access, one cannot use a weblog. Time also plays a role in weblog use, since one must take the time to physically engage with the weblog to post entries. The preservice teachers provided more detail on both issues through their individual and focus group interviews.

Several pointed to lack of access to public campus computer clusters, indicating that having reliable access to the Internet between classes encouraged them to post to their weblogs. While on campus, all preservice teachers had access to a public Internet-connected computer cluster in the same building in which classes were held. As student teachers, they had access to computers with Internet access in the school setting through computer labs, classroom computers and/or Internet-connected computers in the teachers' lounge. When the preservice teachers returned to campus for summer coursework, they had access to the Internet-connected public computer clusters once again. In addition to these public computers, eight of the nine preservice teachers also owned home computers with Internet connections. Colin was the exception, choosing not to have Internet access at his home.

The majority of weblog postings in each semester, however, were time-stamped in the afternoon and evening, when preservice teachers were not on campus for coursework or in a local school for their student teaching. Based on the times recorded for each entry, then, the preservice teachers appeared more likely to post entries to their weblogs while at home. Colin was the obvious exception, lacking Internet access and, therefore, weblog access from his home computer. While the preservice teachers perceived a lack of public access to confound their weblog use, the time stamps of weblog postings indicated that the preservice teachers were more likely to access the weblogs in private spaces, where the majority had access to an Internet-connected computer.

Several preservice teachers also offered lack of time to explain their decrease in weblog postings. As their teaching responsibilities increased, the amount of time available for non-teaching activities necessarily decreased and weblog postings fell

into this latter category; this situation would seem to be supported by the decrease in postings in the spring of 2005, when the preservice teachers began their student teaching. The definition of time in this particular situation, however, may take different meanings, from “number of open hours in a day in which to perform a task” to “effort one is willing to devote to a certain project.” Both explanations are highlighted in the last focus group interview, when Lauren explained, “It’s just hard to find time to sit down, pull up the computer [and] find your theme” (Focus Group; June 2005). Shannon agreed, saying, “Yeah, if you schedule time to sit down, it’s not like you’re always going to have great reflections at that specific time, while you’re sitting there.”

Other preservice teachers echoed this concern throughout the study during interviews and through their weblogs. Eric equated his decrease in weblog postings to a lack of time. While his postings were quite long in the fall, taking up multiple screens and numerous paragraphs, by the spring his postings were “short and sweet and to the point” because he considered his free time more limited (Interview; Feb. 2005). During his final interview, Eric acknowledged that, despite good intentions, he had neglected his weblog during student teaching because he “really didn’t find a good time” to post his reflective thoughts (Interview; June 2005). While the preservice teachers appeared to value reflective practice, in general, connecting their reflective thinking to the writing of weblog entries was often difficult, requiring a measure of time the preservice teachers were unwilling or unable to commit. Abby exemplified this particular situation with her comment, “I don’t have enough time to write more frequent [entries...but] I am always thinking about things that I would like to put in there although I don’t necessarily get those thoughts on-line every night” (Interview; Dec. 2004).

Kate, the most consistent in posting to her weblog, poetically acknowledged at the beginning of the study, “Oh, time management, you are the bane of my existence...too many deadlines and not enough hours in the day” (Weblog; Oct. 2004). During her teaching practicum in the spring semester, Kate’s weblog often mentioned feeling overwhelmed by the amount to do each day and the consequent sleep deprivation. At no point, however, did Kate mention her weblog as an intrusion on her obviously limited time. Only in the last interview did she address time in connection to her weblog, noting that she did not edit her recent posts as carefully as past ones because she lacked the time to do so (Interview; June 2005).

As pressed for time as the other preservice teachers, in terms of student teaching and course requirements, Kate continued to post to her weblog on a regular basis, as did Nicole. Davis, moreover, posted more frequently during the spring semester, when student teaching decreased the amount of “free” time available for weblog posting. Demands on their time notwithstanding, some preservice teachers found ways to integrate reflective weblog postings into their daily routine, maintaining their weblogs while completing coursework and student teaching, while others did not.

Attitude and Technology

Teacher educators work with and against preservice teachers' previously formed beliefs on a daily basis (Calderhead & Gates, 1993; Danielewicz, 2001; Lortie, 2002; Zeichner & Liston, 1996). While attitudes held toward aspects of teaching and learning are regularly examined, often through reflective engagement, attitudes concerning technology use are easily overlooked. Preservice teachers may develop proficiency with different technologies in various situations yet develop negative attitudes toward the use of those technologies. Likewise, preservice teachers may hold positive attitudes toward technologies yet refrain from engaging with those same technologies. By taking into consideration preservice teachers' previously formed and emerging attitudes toward technologies, however, teacher educators can seek ways to interrogate and challenge those same attitudes.

The preservice teachers entered the study with a variety of experiences with technology, with computer proficiency ranging from Davis' expertise as a former computer programmer to Colin's inexperience as a self-proclaimed technophobe. Previous coursework in the program required technology use, however, so the preservice teachers were competent with Internet-connected computers, allowing them to apply and adapt previous experiences to their use of weblogs. Blogger, the user-friendly Web platform used for the weblogs, further limited the need for specialized technical knowledge, providing various "help" features and allowing the preservice teachers to create weblogs without specialized training.

In this study, preservice teachers revealed a positive attitude toward weblogs for voluntary reflective practice independent of their personal use of the weblogs. They used specific criteria to determine their personal use: the ability to integrate weblogs into daily life and the capacity for weblogs to provide connection to other people. By the end of the study, they considered weblogs a viable format for reflection even if that format did not suit their personal preferences for reflection.

Integration into daily life. During the study, several of the preservice teachers noted the convenience of using weblogs for their voluntary reflective practice. Because of weblogs' accessibility through the Internet, the preservice teachers did not need to keep up with a tangible notebook or confine themselves to a particular computer's hard drive in order to post a reflective entry. Nicole mentioned this element specifically in her first interview, noting that her weblog was "like having a journal that you can access anywhere, whatever computer you're on" (Interview; Dec. 2004). Kate agreed with the benefits of on-line access, saying, "I do like the convenience of blogging; I'm on the computer a lot anyway, so I find myself writing more frequently that I probably would in a notebook" (Interview; Dec. 2004).

Kate's admission that she spent a great deal of time on the computer highlights the reality of daily computer use. These preservice teachers, like so many people, used computers for both personal and professional needs on a regular basis, emailing friends, "googling" teaching materials, creating worksheets for student activities, taking part in course-based discussion boards. Their familiarity with ubiquitous

technologies and their ability to complete commonplace tasks with technology supported the preservice teachers as they used weblogs for their reflective practice. Several of the preservice teachers mentioned the ease of working with the weblog template, noting the similarity of creating a weblog post to that of creating a Word document. Nicole associated her comfort with the weblog with basic computer skills: "I type faster than I write [so] it was easier for me to get out a lot of thoughts, a lot of content" (Focus Group; June 2005).

Nicole's comment illustrates the positive potential of using a comfortable medium for reflection, one that allows preservice teachers to concentrate on the reflection itself rather than the technology required for that reflection. Some preservice teachers created weblogs but, as evidenced by the decrease in entries as well as their own statements, preferred to use other forms of technology to engage in reflective thinking during the study. Abby took part in online discussion boards with people outside the teacher education program, choosing a different audience for her reflective thinking, although she did engage with her fellow preservice teachers at times through comments on their weblogs. Zach, who explained at the end of the study that the weblog wasn't his "outlet" (Focus Group; June 2005), nevertheless maintained a regular email correspondence with his preservice teacher science cohort, reflecting on his own student teaching experiences and encouraging similar reflective responses from his peers.

Colin was the exception regarding the integration of technology into his daily life, which may explain his experience with and attitude toward the use of weblogs for reflection. He did not have Internet access at his apartment, using the university computer lab for any computing needs requiring Internet use. He admitted more than once that he did not enjoy using any technology and tried to complete all tasks requiring a computer as quickly as possible. Despite his humorous explanation of a "personality conflict between me and the computer" (Interview; June 2005), however, Colin did agree to take part in the study and created an individual weblog in the fall semester. He posted three entries in the fall of 2004; when he attempted to post a fourth, he was unable to do so and gave up in frustration. When he returned to his weblog a week later, this time unable to log in at all, he determined he had "enough going on" (Focus Group; June 2005) and did not revisit his weblog again during the study. Whatever the cause of Colin's weblog troubles, this experience further reinforced his negative attitude toward the use of technology, in general, perhaps supporting any future resistance toward technology integration into his reflective practice.

Of interest, however, is that Colin's experience did not negatively influence his attitude toward reflection. Throughout the study, he stressed his belief in the importance of reflection but, as he explained in an interview, "I do prefer writing pad and paper, but as far as reflecting, the best way I reflect is just verbally, just talking to somebody" (June 2005). Colin, then, was not actually opposed to weblogs as a reflective medium in general but recognized that such a medium did not fit his style of reflective practice.

Personal Attitudes and Technology

Connection with others. The weblogs' ability to create a form of community was a positive attribute to the preservice teachers, in general, but they also recognized the benefits of interacting with others during reflection rather than isolating their reflective thoughts. Abby was strongly in favor of interacting with others through her weblog, noting, "I do like the aspect of writing something and then other people, strangers, [they don't] have to be from our program, anyone who has an Internet connection can just come on in and agree with you or disagree, give you advice" (Interview; Dec. 2004). Davis pointed out the positive aspects of connecting with others, explaining, "You can get other people's feedback and you can give other people feedback; I think that's really a good thing, rather than just keeping a sort of personal log in a notebook" (Interview; Dec. 2004). In the final group interview (June 2005), several preservice teachers discussed the benefits of connecting with other teachers through weblogs, Davis suggesting a school- or department-based weblog for practicing teachers and Kate describing the comfort she took in reading weblogs maintained by practicing teachers across the United States.

One of the defining aspects of weblogs, made possible through their publication to the Web, is their potential to connect the writers to other people. Through the comment feature, readers can question an understanding, share a similar situation or disagree with a particular point—an invaluable feature for a reflective weblog. Although weblogs have the ability to support community, they do not automatically create it, as the preservice teachers discovered during the study.

In keeping with the voluntary nature of the reflective weblogs, the preservice teachers were not required to read or provide comments to each other's weblogs. Some did, although the comments offered more support than reflection. Davis, for example, offered reassurance to Lauren that "we'll get it all done" when she worried about completing her coursework (Weblog; Nov. 2004); he answered Shannon's concerns of competency by reminding her they shared a professor who "thinks we'll be good" (Weblog; Nov. 2004). Kate supported Eric when he defended a student's use of his native language in the classroom and affirmed Nicole's frustration with teaching as a natural reaction to encountering "something that's harder than we expected" (Weblog; Feb. 2005).

As a regular participant in online communities and web discussion boards, Abby was familiar with Internet-supported communities. Her weblog, however, did not provide the connection she looked for in an online environment. Abby explained in her final interview (June 2005) that she stopped using her weblog in the spring semester in part because it received few comments during the fall semester. Without that connection to others, she did not consider the weblog a valuable space for posting her reflective thoughts.

The experience of using weblogs for reflective practice assisted some preservice teachers in defining their preference for face-to-face, rather than electronic, connection for reflection. Zach determined during the study that he preferred talking about a reflective topic "instead of writing it and posting it on the Internet; I would

rather actually have someone to talk [to] about it” (Interview; Jan. 2005). Colin also solidified his preference for a physical reflective medium, explaining that “just talking to somebody” (Interview; June 2005) was more beneficial for his reflective thinking than even an earlier preference of pen and paper. During the final group interview (June 2005), the preservice teachers reiterated how much they enjoyed interacting with others during reflection. Shannon initiated a discussion on this topic when she noted that it was important to reflect, “just not necessarily time to yourself but maybe time talking to other people.” In response, Kate, Davis and Lauren provided examples of working with mentor teachers or peers to verbally reflect on different teaching situations.

This final discussion summarizes well the preservice teachers’ attitudes toward weblogs and reflection. Throughout the study, the preservice teachers expressed the value of reflection to their teaching lives; they saw reflection existing in multiple forms and supported by various formats. For some, the weblog was a positive format in which to capture their reflective thinking. For others, the weblog format was not the best fit for their personal reflective style. Whatever their views on weblogs for personal reflection, however, the preservice teachers considered weblogs a positive medium, in general, and supported their use for reflective practice.

Discussion

Successfully integrating technology into preservice teacher preparation requires teacher educators to consider a range of issues, among them, the attitudes preservice teachers hold toward technology use. Reflective practice can benefit from the incorporation of ubiquitous technologies like email and discussion boards (see Whipp, 2003; Mayer, 2002; Sliva, 2002), as well as the popular technology of weblogs (see Stiler & Philleo, 2003; Bull, Bull, & Kajder, 2003; Hernández-Ramos, 2004). Incorporation of these technologies without the consideration of preservice teacher attitudes toward their use, however, fails to consider the role current use may play in future voluntary reflective practice. With teacher education programs committed to creating reflective practitioners, the consideration of how—and if—future teachers might view technology for reflection is a valid one.

This study examined the role preservice teachers’ attitudes toward technology played in their use of weblogs for voluntary reflective practice. The short answer to this question is, surprisingly, “very little.” Of the nine preservice teachers taking part in this study, eight revealed positive attitudes toward technology, in general, and weblogs, in particular, through individual and focus group interviews. Of those eight, five maintained weblogs in both fall and spring semesters and, of those five, only two maintained weblogs for the entire length of the study. At the end of the study, however, each preservice teacher—regardless of personal experience—expressed a positive view of weblogs and advocated their use for reflective practice. Throughout the study, as well, the preservice teachers revealed positive attitudes

Personal Attitudes and Technology

toward reflection; weblog postings and interview answers indicated that the preservice teachers valued reflection as a necessary practice for their own teaching.

The issue, then, is perhaps not one of attitude toward technology—as expected by the researcher—but one of preference for reflection. As discussed above, the preservice teachers wanted their reflective weblogs to integrate easily into their daily routine: Reflection should be easy. Those who were able to integrate the weblogs into their daily routine were more likely to use those weblogs as reflective spaces throughout the study. Those who were not, whether due to lack of access or time, chose not to use the weblogs. Weblogs, by their very definition, offer convenience through their Internet-based accessibility but that convenience is necessarily confined by the individual's daily routine.

The preservice teachers also wanted the weblogs to provide connection to others: Reflection should be interactive. When the weblogs did not provide that desired connection, the preservice teachers turned to other reflective outlets, both those that required technology—email and discussion boards—and those that did not—talking with mentor teachers and fellow preservice teachers. Weblogs exist in a communal, albeit electronic, environment and provide support for reflection through a standard interactive comment feature. The development of community, however, is not automatically generated by weblogs' potential for such.

As demonstrated by the preservice teachers in this study, expressing a positive attitude toward technology does not automatically ensure the use of a specific technology. However, possessing a positive attitude toward technology may support experimentation with different technologies as well as clarification of personal preferences for specific technologies. Although weblogs did not meet the reflective needs of each individual in the study, the preservice teachers supported the potential of weblogs for others' reflection, encouraging teacher educators to consider diverse implementations of technology in reflective practice.

Teacher educators can broaden preservice teachers' experiences with any technology during teacher preparation and provide options for technology use in reflective practice once preservice teachers leave the university. Drawing from this study, teacher educators should keep in mind, however, that positive attitudes toward technology may not be enough to encourage preservice teachers to incorporate technology into their reflective practice. In addition, teacher educators should bear in mind the criteria considered by the preservice teachers in this study: Reflection should fit into daily life and offer connection with others.

In considering reflection's integration into daily life, teacher educators should create numerous experiences with formal and informal reflection during teacher preparation. Preservice teachers should use technology to reflect often and in various manners: electronically submitted formal reflective essays, informal reflective instant messaging and chat forums, class reflective discussion boards and listservs, individual reflective weblogs. The emphasis on the act of writing in reflection can be acknowledged and deemphasized, with teacher educators teaching freewriting

techniques that support reflective thinking and minimize the importance of correct grammatical and mechanical structures. Preservice teachers should also experiment with video, audio and photo files, expanding their comprehension of diverse technology as support for personal reflective practice.

In response to the need for connection during reflection, teacher educators should experiment with a range of situations that support such connectivity, with and without technology. Preservice teachers should engage in whole class and small group reflective discussions, with the teacher educator guiding and naming their efforts. Preservice teachers should also engage in one-on-one reflective conversations with peers, mentor teachers and university educators, continuously asking “why” as they explore issues of teaching and learning. Communal technologies, like discussion boards, email listservs and multiple authored weblogs, should be integrated into course reflective activities. Preservice teachers should be encouraged to share their reflective thoughts outside the classroom, with non-course related communal and voluntary spaces created for their reflective conversations.

Conclusion

Preservice teachers’ attitudes toward technology necessarily have implications for their use of technology. Taking these attitudes into account implies a responsiveness to the beliefs and experiences preservice teachers bring to their preparation. Attitudes alone, however, do not determine preservice teachers’ use of technology. If we expect preservice teachers to integrate technology into their personal professional practice, we must also consider the preferences they express regarding reflection. As evidenced by the preservice teachers in this study, integration into daily life and connection with others are seen as positive features of technology, generally, and reflection, specifically. Teacher educators, then, are encouraged to integrate various technologies into preservice teachers’ reflective practice in order to interrogate attitudes toward technology and determine personal preferences for reflection.

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Melanie Shoffner

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