An Exploration of Pre-Service Teachers’ Perceptions of Learning to Teach while Using Asynchronous Discussion Board

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ABSTRACT
Pre-service teachers’ perceptions of their own learning are important to the ways they integrate technology into their practices. Therefore, the purpose of this study was to examine the pre-service teachers’ perspectives of asynchronous discussion board (ADB) as a tool of learning to teach. ADB was integrated into two literacy courses for 33 pre-service teachers over 16 weeks. Data were collected through oral interviews, written reflections, and participants’ postings on the discussion board. The data were analyzed using Chi’s (1997) framework of verbal analysis method. The findings indicated that the participants perceived ADB as an important tool of learning to teach because it promoted situated learning, facilitated a social construction of knowledge, and afforded customized learning experiences.

Keywords
Asynchronous discussion board, Distributed knowledge, Educational technology, Social learning, and Sociocultural theory

Introduction
The material and social affordances of new technologies of communication are transforming different aspects of people’s lives, including the ways they think, work, learn, and communicate (Jewitt, 2005; Gura & Percy, 2005). Obviously, university students’ lives – their intellectual and everyday social activities are increasingly dependent on, expanded and supported by new communications technologies. Thus, the shifting social and technological landscape in the 21st century suggests that policymakers, faculty, and administrators should develop systematic plans to harness the potential of technology-mediated instruction to support and improve how pre-service teachers are prepared to teach the different school curricula. The Academic Senate of the California State University (2003) defines technology-mediated instruction as “all forms of instruction that are enhanced by or utilize electronic and/or computer-based technology. It specifically includes distance education, instructional modules delivered via mass media, and computer assisted instruction” (AS-2321-96).

The assumption that educational technologies have the potential to revolutionize how pre-service teachers are trained to teach is an important one. For example, Johnson (2006) and Simpson (2006) observe that asynchronous discussion board (ADB) is collaborative and interactive and thus opens new opportunities for pre-service teachers to learn how to teach in innovative ways. The increasing availability of new technologies of teaching and learning seems to suggest that teachers’ preparation to teach this millennial generation may be fundamentally different from previous approaches. For one, the material affordances of new technologies of communications challenge the conventional conception of pedagogical practices, social space, social practices, and schedules (Brewer & Klein, 2006). For example, instruction in different subject areas may no longer be restricted to face-to-face meetings within classrooms or the few hours officially allotted for instruction in university schedules.

However, despite the promise of technology as “powerful pedagogical tools” (National Research Council, 1999, p. 218), many faculty members keep to the face-to-face, instructor-dominated, and knowledge transmitted approach to teaching (Bryant, 2006; Alghazo, 2006). Bryant (2006), Otero, Peressini, Meymaris, Ford, Garvin, Harlow, Reidel, Waite and Mears (2005) and Rogers (2000) observe that many faculty members are reluctant to adopt new technologies as a curricula tool and improved pedagogy because of the doubt that it will improve student learning. Gura and Percy (2005) argue that those who run schools have little understanding of “what is possible with the technology and how to make it happen” (p. iv). Indeed, the National Research Council (1999) pleads with school administrators and instructors for a better understanding and appreciation of technology as a significant tool of instruction:
What has not yet been fully understood is that computer-based technologies can be powerful pedagogical tools – not just rich sources of information, but also extensions of human capabilities and contexts for social interactions supporting learning (p. 218).

This quotation suggests a need to integrate technology as a tool for preparing pre-service teachers. Johnson (2007) and Doering and Beach (2002) contend that technology helps students to construct knowledge. More importantly, Johnson (2007) argues that understanding pre-service teachers’ perceptions of their own learning while using technology will help researchers and teacher educators to gain insights into the connection they make between the theory of using technology for learning to teach and what they actually do in real-life situations. In this regard, Molebash (2004) blames teacher education for “the existing gap between how teachers are expected to use technology and how they are actually using it” (p. 412).

Therefore, the purpose of this study was to investigate the pre-service teachers’ perceptions of asynchronous discussion board as a tool for learning. The following research questions provided the framework for the study:

- What are the pre-service teachers’ views of ADB as a tool for learning to teach?
- What are the participants’ perceptions of the kinds of learning opportunities afforded by asynchronous discussion board instruction?
- What are the participants’ views of using ADB for independent learning needs?
- What are the participants’ views of the contribution of other students to the learning process in ADB?

These are important questions because how students perceive their learning experiences and how they conceptualize their roles in teaching and learning (from students’ perspectives) are important for designing pedagogies and tasks that meet the learning needs and interests of learners (Shellens, van Keer & Valcke, 2005; Ashworth & Lucas, 1998). Shellens, et al. (2005) argue that learners’ perception of a learning task “defines the challenge, its difficulty, and the balance of motivation necessary to address it” (p. 734). Molebash (2004) argues that the perceptions of pre-service teachers influence their teaching of specific subjects and their decisions on whether or not to integrate technologies into them. It seems, therefore, that studies of pre-service teachers’ perceptions will advance researchers’ understanding of how technology can best enhance teaching and learning for teacher educators and pre-service teachers. In addition, there is a need to understand how the use of ADB mediates faculty members’ pedagogical practices, their motivation to use it, and the kind of problems they face when using it.

In the rest of this study, I will address the research question by first discussing the relevance of discussion board in pre-service teacher education. I will also develop a theoretical framework, review related literature, present results and discuss them, discuss summary of findings and implications.

Asynchronous Discussion Board and Pre-service Teachers

Ben-Jacob, Levin and Ben-Jacob (2000) and Rogers (2000) observe that a combination of many factors is producing fundamental and far-reaching transformations in teacher preparation across universities. For example, most universities are faced with dwindling financial resources, competition from other institutions, and the demand for technology integration – all pointing to the need to reform the way they do business. Also, pre-service teachers have other commitments in addition to being students (Ben-Jacob et al. 2000). For instance, all pre-service teachers in this study indicated in their pre-treatment survey that they lived off campus, 87% indicated they had family commitments (as parents, wives/husbands), 94% noted they supported themselves by working full-time or part-time while only 6% indicated they were full-time students. The real question and concern for teacher educators becomes how to better understand “the qualities, habits, skills, attitudes, naturalized and habituated practices” (Kress, 1997, p. xv) that are required of individuals for productive engagements with the world.

Such a new understanding and conception of pre-service teachers should start from an appreciation that technologies such as cell phones, television, computers, video, ipods, personal data assistant, (i.e. blackberry), etc. play a major role in their everyday social interactions. As such, it is reasonable to assume that they have been apprenticed to the use of technology through communities of practice (home, peer groups, work) and can apply technological skills in academic contexts. In this regard, Buckingham (2006) and Ben-Jacob et al. (2000) argue that today’s students are inquisitive, digitally savvy, critical, explorative, manipulative, and nonconforming – challenging and questioning established authorities. Again, one can reasonably assume that students of the digital generation learn differently.
As a result of the confluence of diverse factors discussed in the preceding paragraphs, most universities are adopting course management systems (CMS) software such as Blackboard and Taskstream, and brainstorming software such as Inspiration to create new possibilities and provide innovative pedagogical and learning supports for faculty and students (de Smet, van Keer & Valcke, 2008; Mabrito, 2006). Such technologies offer instructors new opportunities to examine their own pedagogical practices in relation to the fundamental challenge to traditional pre-service teacher preparation courses, the traditional conception of knowledge, and the kind of dispositions that today’s students bring into learning (Buckingham, 2003; Kress, 1997). This suggests a need for researchers and teacher educators to understand how students perceive learning to teach while using technologies.

Fortunately, ADB facilitates new models of teaching and learning where knowledge is networked in the affordances of people, tools, and technologies. In this regard, Gee (2007, 2003) argues that rather than teacher-authority, teacher-domination, and knowledge transmission that characterize lecture-based approach to teaching, the use of technology facilitates critical learning, distributed knowledge, inquisition, discovery, and creativity for learners. In particular, ADB has the potential to build learning conditions that facilitate equitable participation for all students irrespective of their gender, ethnicity, language, and social-cultural backgrounds (Gee, 2007, 2003). This is one of the reasons why de Smet et al. (2008), Brewer and Klein (2006), van Aalst (2006) and Lim and Cheah (2003) suggest that there are clear differences between traditional teaching and ADB instruction. Table 1 provides a brief summary of the differences between lecture-based and ADB instruction.

<table>
<thead>
<tr>
<th>Traditional Lecture-based Instruction</th>
<th>Asynchronous Discussion Board Instruction</th>
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<tbody>
<tr>
<td><strong>Teacher Domination</strong></td>
<td>Learner-centeredness</td>
</tr>
<tr>
<td>- authoritative</td>
<td>- self-directed</td>
</tr>
<tr>
<td>- knowledge transmission</td>
<td>- self-motivated</td>
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<tr>
<td>- linear</td>
<td>- inquisitive</td>
</tr>
<tr>
<td></td>
<td>- innovative</td>
</tr>
<tr>
<td></td>
<td>- more analytical and critical</td>
</tr>
<tr>
<td><strong>Teacher’s Role</strong></td>
<td>Teacher’s Role</td>
</tr>
<tr>
<td>- deliverer of content</td>
<td>- facilitator of learning</td>
</tr>
<tr>
<td><strong>Knowledge Construction</strong></td>
<td>Knowledge Construction</td>
</tr>
<tr>
<td>- hierarchical knowledge (from instructor to students)</td>
<td>- Social &amp; interactive learning</td>
</tr>
<tr>
<td>- facts and information-based</td>
<td>- Nonhierarchical</td>
</tr>
<tr>
<td>- tests, practices, &amp; learning are detached from social contexts</td>
<td>- Demands the use of individuals’ skills, knowledge &amp; perspectives</td>
</tr>
<tr>
<td>- teacher role-modeling appropriate learning behavior</td>
<td>- Different types of knowledge: individual, distributed, dispersed</td>
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<tr>
<td>- quiet, concentrated, reflective analytic activity</td>
<td>- Learning is an active process</td>
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<tr>
<td>- passive learning is encouraged</td>
<td>- Students learn skills, strategies, knowledge, values, and practices within contexts of learning</td>
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<tr>
<td></td>
<td>- Skills &amp; knowledge are gained through efforts, practice, &amp; experience</td>
</tr>
<tr>
<td></td>
<td>- Learning is fun</td>
</tr>
<tr>
<td><strong>Kinds of Social Relation</strong></td>
<td>Kinds of Social Relation</td>
</tr>
<tr>
<td>- competitive</td>
<td>- dialogue</td>
</tr>
<tr>
<td>- face-to-face</td>
<td>- anonymity</td>
</tr>
<tr>
<td>- hierarchical (instructor first, then bright students, then others)</td>
<td>- facilitates taking multiple identities</td>
</tr>
<tr>
<td>- reliance on visual, proxemic, and verbal cues</td>
<td>- equality and democracy</td>
</tr>
<tr>
<td></td>
<td>- multiple ways of engaging with others</td>
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<tr>
<td></td>
<td>- power sharing</td>
</tr>
<tr>
<td></td>
<td>- multiple simultaneous participations</td>
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<tr>
<td><strong>Participatory Structure</strong></td>
<td>Participatory Structure</td>
</tr>
<tr>
<td>- instructors transfer knowledge</td>
<td>- flexibility (about how and when to participate)</td>
</tr>
<tr>
<td>- students learn from instructors</td>
<td>- creativity</td>
</tr>
<tr>
<td>- less social interaction</td>
<td>- mobility across spaces</td>
</tr>
<tr>
<td>- passive participation (students may choose not to ask and/or answer questions)</td>
<td>- social interaction is required</td>
</tr>
<tr>
<td></td>
<td>- share the same space, may engage in different roles</td>
</tr>
</tbody>
</table>
As shown in Table 1, traditional instructional practices tend to be authoritative, linear and knowledge transmitted while ADB instruction seems to promote active learning, inquisitive, self-directed, self-reflective and analytical learning (Schellens & Valcke, 2006). The table further shows the difference in social relations and participatory structures between traditional instruction and ADB. For example, while traditional instruction facilitates competitive, face-to-face, and hierarchical kinds of social relation, ADB promotes dialogue, anonymity, multiple identities, and equality (Gee, 2003). More importantly, the potential of discussion board to support self-reflection, collaboration, and learning anytime and anywhere (Lim & Cheah, 2003) for pre-service teachers is very important in contemporary conception of teaching and learning.

**Technology and Learning to Teach: A Theory**

Learning afforded by new technologies is increasingly becoming important in pre-service teacher education (Schellens & Valcke, 2006; Lee-Baldwin, 2005; Schellens, van Keer & Valcke, 2005). This is because the sociocultural theory of learning posits that learning is interactive, discursive, technology-mediated, and situated (Schellens et al. 2005; Gee, 2004, 2003). Gee (2003) extends this perspective to suggest that human learning is “fully embedded in (situated within) a material, social, and cultural world” (p. 8) and that the affordances of tools and technologies (e.g. computer and the Internet) can enhance learning.

Gee (2003) further argues that when people learn with human and technological resources, such individuals extend their knowledge and social connections. Gee (2003) suggests a theory of distributed knowledge to explain that learning is not only inherently social, in addition, it is “…distributed, and part and parcel of a network composed of people, tools, technologies, and companies all interconnected together” (p. 177). This implies that learning to teach literacy is social as well as networked in the affordances of what people can do with modern technologies.

Implicit in Gee’s view of literacy as social learning is the pivotal role of knowledge, people, context, and technology – all continuously interacting as central elements to the pragmatics of learning to teach. The implication of Gee’s theory is that these four elements constitute an integrated view of pedagogical practices. While the “knowledge” element emphasizes criticality, i.e. the notion that learning to teach entails reflective, critical thinking and extension of knowledge; the “people” aspect explains social connections and social interactions inherent to learning to teach. Similarly, the “context” explains learning to teach as activities situated in embodied experiences resulting from learners’ social-cultural interactions with the world, while the “technology” element explains how learning to teach entails learning of social practices and networking capabilities associated with specific communications technologies and tools. Gee’s (2003) theory seems to suggest that the issue of preparing teachers to teach in this digital age entails knowing “what people can think and do with others and with various tools and technologies” (p. 184).

Gee’s theory of distributed knowledge applies to learning to teach as conceived in this study. Gee (2007, 2003) provides detailed description of distributed knowledge. Specific aspects of the theory as applied to learning to teach through the resources of ADB are briefly paraphrased below:

- Individual students’ knowledge is not only social; it is distributed across their peers, contexts, and technologies.
- Knowledge and skill acquisition resides in the importance of networking the affordances of interconnectedness of people, tools and technologies.
- Learning is extending knowledge, social connections and interactions.
- Learning is a change in identity as knowledge is learning the process of participation, and it is a process in which participants and practices change.
- Learning is situated practices as participants constantly learn new roles in different configurations and contexts.
- Learning takes place as students participate in scaffolded joint activities with other people and their associated tools and technologies.
- Learning promotes formation of groups of learners with common interests as members combine all their resources – sociotechnical expertise, sociocultural affiliations, tools, and technologies to accomplish common goals.

In summary, learning to teach requires a new way of learning by pre-service teachers. This new way requires teacher educators to use technology to engage pre-service teachers in learning (Schellens et al. 2005). It also requires pre-service teachers to construct knowledge through active participation in discussions and knowledge sharing with their
peers (Schellens et al. 2005). Schellens et al. (2005) aptly argue that ADB facilitates active engagement in learning processes as students collaboratively work on a learning task, and by “mutually explaining the learning content, giving feedback to other group members, asking and answering questions” (715). In this way, the dialogue they engage in (through the use of discussion board) provides an understanding of “the nexus between how students understand a phenomenon belonging to a learning task and what they actually do in undertaking the task” (Johnson, 2007: p. 1).

Review of Related Literature

ADB is increasingly becoming a powerful tool of creating new possibilities and providing innovative pedagogical and learning supports for teacher educators and pre-service teachers (Simpson, 2006; Lim & Cheah, 2003; Doering, Johnson & Dexter, 2003). Lim and Cheah (2003) explore pre-service teachers’ perception of the role of their tutors in using ADB to teach education courses. Lim’s and Cheah’s (2003) findings suggest that there is a significant difference between the students’ “experiences and perceptions of the roles of the tutors” (p. 43). They recommend that tutors should provide specific guidelines for their roles in ADB.

Johnson (2007) explores students’ perceptions of how they construct knowledge while using ADB. The study is premised on the argument that teacher’s understanding of students’ perceptions of their learning while using ADB provides an understanding of the link between how students understand learning tasks and what they actually do in undertaking the task. Johnson (2006) argues that students experience learning events independently when they use ADB because each learner can work at his or her own pace. Johnson (2007) observes that the variation in learning is important for teacher educators to take into consideration when designing learning tasks for their students in ADB. He contends that since students learn differently, assessment criteria should be built around learning processes (the construction of knowledge) instead of factual knowledge. Johnson (2007) emphasizes the need to “stress the context as one that necessarily requires careful consideration with regards to assessment” (p. 11) in ADB learning environments.

Brewer and Klein (2006) investigate the effect of rewards, roles and affiliation motives in asynchronous learning for undergraduate students. Their findings show that students learn better when the design of ADB provides an opportunity for students to work collaboratively and interact through asking and answering questions within groups. Similarly, Schellens and Valcke (2006) examine whether collaborative learning in ADB enhances learning academic discourse and knowledge construction. Schellens and Valcke (2006) conclude that there are “significant increases in the cognitive interaction, task-orientation and higher phases of knowledge construction” (p. 349) when students use ADB. The two studies suggest a need for educators and instructional designers to provide structures that enhance cognitive interaction among participants.

In their exploration of the use of ADB to support pre-service teachers, Doering, Johnson, and Dexter (2003) argue that participants gain teaching experience and a better opportunity to interact with their students. They further posit that the participants develop important skills in writing of different genres and communicating through multimedia. Simpson (2006) examines the use of ADB to provide graduate students access to a conventional course. The findings suggest that his students consider the technology as an important instrument of learning. He calls for further studies to confirm the benefits of using ADB for course delivery. Schellens, van Keer and Valcke (2005) investigate the impact of learning using ADB on students’ degree of knowledge construction. The study focuses on the effect of students, groups, and task characteristics on one hand and on the other, the assignment of roles to group members. It concludes that there is no conclusive evidence that role assignments do in general result in a positive effect on knowledge construction.

Similarly, Biesenbach-Lucas (2003) investigates students’ perceptions of the efficacy of ADB as a teaching tool in teacher training courses. His findings are also mixed. On one hand, students in this study suggest that discussion board offers “greater social interaction with other class members” (Biesenbach-Lucas, 2003, p. 24) and promote understanding of course content. Conversely, non-native speakers of English note that ADB fails to provide opportunities for additional language practice. Biesenbach-Lucas (2003) summarizes his findings: “For all students, the two main issues perceived as negative related to their perceptions of forced, unnatural interaction promoted by the asynchronous discussions and lack of topic prompts, the requirement to make connections to prior postings, and the frequency of required contributions to discussions” (p. 24).
In his contribution to the study of ADB, Lee-Baldwin (2005) explores the potential of the technology to facilitate reflective thinking among pre-service teachers. The findings suggest that discussion board tends to lend itself to peer-scaffolding and thus promotes social dynamics within groups as an important tool of facilitating cognitively higher levels of reflective thinking. However, the study notes that while ADB has the potential to facilitate reflective thinking among pre-service teachers, tapping into the potential depends on “an array of explicit and implicit factors involved with the complexities of teaching and learning” (Lee-Baldwin, 2005, p. 110).

The literature review above seems to suggest that ADB has promises and challenges as a tool of improving how pre-service teacher preparation courses are taught and learned. This seems to suggest further studies to better understand pre-service teachers’ perspectives of how they use ADB to mediate learning to teach.

Methodology

Participants: a total of 33 pre-service teachers participated in this study. While 21 of the participants were in the elementary education program and enrolled in Skills in Teaching Reading to Bilingual Elementary Students, the remaining 12 were in the secondary education program and enrolled in Skills in Teaching Reading in Secondary School. The elementary education candidates consisted of 19 (90.48%) females and two (9.52%) males, while secondary school education candidates had five (41.67%) females and seven (58.33%) males. The age range of the students varied from 22 to 47. In addition, fourteen (42%) worked as substitute teachers, three (9%) as full-time teachers and two (6%) as teacher aides. Also, two (6%) were full-time students and 12 (36%) worked in offices.

The Courses: Skills in Teaching Reading to Bilingual Elementary Students is the first of two literacy courses that the students are required to take. The course was designed to provide a variety of language arts experiences for the candidates to learn including such concepts as multiliteracies/multimodality; different approaches to reading instruction; early (home) literacy practices and transition to school literacy: phonemic awareness and activities, instruction and assessment; word recognition, word decoding; reading fluency; vocabulary and concept development; and reading comprehension. Others included spelling, reading-writing connections, and identifying literacy needs of diverse learners.

Similarly, Skills in Teaching Reading in Secondary School was the first of two literacy courses the secondary education students need to take. The primary focus of the course is to provide the students’ experiences regarding theoretical foundation and practical application of literacy instruction in content areas. Specific instructional strategies and concepts that were discussed included the following:

- the notion of literacy: traditional, multiliteracies/multimodality;
- literacy across curriculum: definition, the role of teachers, theories of content reading, etc.;
- creating a positive learning environment: activating and/or building background experiences, understanding the context of students lives, linking literacy content with students’ out-of-class social and cultural experiences;
- meaning-making strategies, vocabulary teaching strategies, vocabulary learning activities;
- comprehension strategies: summarizing, clarifying, questioning, predicting;
- literacy assessment: types of assessment, learning about students, assessing textbooks; and
- issues in literacy teaching: language learning, diversity, culture.

The university, the site of this study, provides faculty members and students access to a course management system (CMS). The system consists of (a) Blackboard with features such as voice annotation, virtual classroom, and discussion board and (b) Taskstream with rubric capabilities. ADB is a web application for holding discussions and user-generated content (Wikipedia, n.d.). Discussions are grouped in threads that contain a main posting and all related replies. For example, when a student posts a question, it appears in the main thread and subsequent responses will be indented under the thread. Typically, each posting may have multiple indented threads as responses to the original question. Students can post questions and responses at any time. There is, therefore, no time constraint on users. Also, students can navigate the postings in nonlinear order (Mabrito, 2006). In this way, it allows students to deliberate, reflect, and simultaneously utilize other resources (texts, tools, people, and other technologies – websites), thus promoting active and critical learning (Biesenbach-Lucas, 2004). Also, it allows students, when used regularly to develop a sense of virtual community (Wikipedia, n.d.).
The integration of discussion board into the two courses was designed to facilitate an out-of-class engagement with course content as well as provide the participants a space for a social relation and collaboration. In both courses, 100% of teaching was done in lecture rooms during the university assigned time. The course syllabus states: “This assignment requires each student to reflect on the teaching/learning in this course on a weekly basis. Identify one issue that you will like to explore further or one area you need further explanation. Then develop this into a question or comment and post it on the discussion board for comments from your course mates. Read other students’ postings and make sure you post a response to one question.”

Instruction was delivered through a combination of different strategies – including hands-on activities, in-class discussions, PowerPoint presentations, and web discussions. Learning activities involved the use of different technologies such as Taskstream (for students to prepare lesson plans for microteaching), discussion board (for reflection, and posting questions and answers – as described above), and websites (listed in the syllabus, for reading specific articles to supplement classroom instruction). The range of functions used in the board is tabulated in Table 2 below:

<table>
<thead>
<tr>
<th>Discussion Board Facility</th>
<th>Utilization</th>
<th>Student Activities</th>
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</thead>
<tbody>
<tr>
<td>• Announcements</td>
<td>• Provide information</td>
<td>• Students generate questions</td>
</tr>
<tr>
<td>• Whole-class conference</td>
<td>• Provides instructions</td>
<td>• Students respond to questions</td>
</tr>
<tr>
<td>• Record of students’ work</td>
<td>• Post course materials</td>
<td>• Students read other’s responses</td>
</tr>
<tr>
<td></td>
<td>• Post assignments</td>
<td>• Students work collaboratively</td>
</tr>
<tr>
<td></td>
<td>• Write comments</td>
<td>• Students work independently</td>
</tr>
<tr>
<td></td>
<td>• Student-student discussion</td>
<td>• Students upload documents</td>
</tr>
<tr>
<td></td>
<td>• Teacher-student discussion</td>
<td>• Provide links to websites</td>
</tr>
<tr>
<td></td>
<td>• Group or independent work</td>
<td>• Source information from texts course mates, lecture notes</td>
</tr>
<tr>
<td></td>
<td>• Shared material (content available to all students)</td>
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</tbody>
</table>

As indicated in Table 2, ADB allowed the participants to generate questions and responses to questions, read other students’ responses, work collaboratively and independently, and provided links to different websites and sourced information from peers, lecture notes and textbooks. In addition, it allowed the instructor to post announcements, syllabi, course assignments, and materials; write comments, and engage in student-student and student-instructor discussions. In particular, it allowed for shared material as all comments, questions and responses posted were available to all the participants.

Classroom Procedure: This study ran for a semester – 16 weeks. The course instructor (and the author) prepared the students to use discussion board by first introducing them to the software, its capabilities and how its range of functions were specifically adapted for the purpose of the classes (see Table 2). During the subsequent weeks, all students logged onto ADB to reflect and discuss their perceptions of the topics covered during lectures. Each student (a) posted a question about topics covered in the class, (b) posted questions about topics of interest not sufficiently covered or not covered at all, (c) posted a response (five sentences) to another student’s question, (d) postings addressed course related topics, and (e) postings discussed and reflected critically on their perceptions of learning. The structured nature of the assignment was to facilitate a productive social interaction by ensuring that the participants engage in in-depth discussions rather than random postings. On weekly basis, the course instructor read the postings and provided comments. The instructor’s comments were designed to provide additional ideas and concepts on different topics. All the threads were available to the students to view throughout the semester. The first 15 minutes of each lecture were devoted to addressing such questions and related issues of working on such a space. Students also printed out and submitted hard copies of their weekly entries (questions posed and questions answered) for grading and recording of their grades.

Instrument for Data Collection: Three instruments were used to collect data for the study. They were: (a) students’ postings on the discussion board: this included the weekly posted questions, answers and comments for the semester,
(b) oral interview: students were interviewed regarding their experiences using discussion board, and (c) written reflection: each student wrote a two-page essay of their perceptions regarding the impact of discussion board as a tool of learning to teach. Assignments pertaining to discussion board carried 40 points out of 200.

Interviews with the participants took place in lecture rooms during the last week of the semester. The interview questions were based on the theoretical framework proposed by Gee (2007, 2004, 2003); Davies (2006); Karppinen (2005); Hewson and Hughes (2005); and Rogers (2000) that tools and technologies mediate learning and that technology is a “product and process of socially dynamic relations” (Davies, 2006, p. 219) that promotes:

- active learning by promoting reflection;
- learning as a social practice involving shared practices, interaction, and collaboration;
- dialogue between students and between students and faculty;
- freedom, autonomy, and flexibility;
- diverse types of learning styles; and
- different types of knowledge.

During the interview sessions, I asked the following specific questions: (a) How did the discussion board help you learn in this course? (b) What are your views of using ADB as a tool of learning to teach? (c) How did the discussion board allow you to tap into other resources to help you learn in this course? (d) What kind of unexpected skills and knowledge did you acquire by using the discussion board? (e) What kind of social practices did you develop by using this technology? (f) How did discussion board motivate you to learn in this class? (g) In what ways have you changed regarding how you think of teaching/learning in relation to technologies?

To establish content validity of the questions used for oral interview, the draft of the questions was given to two professors for their comments. Their comments and suggestions were used to refine the instrument. 

Data Analysis: The content of the participants’ postings and responses to interview questions were analyzed within the framework of verbal analysis method developed by Chi (1997). The goal of the verbal analysis method is to analyze students’ verbal utterances to capture the knowledge underlying them, and in the process, to understand what a student knows and how that knowledge shapes the way she or he reasons and solves problems (Chi 1997). In this approach, students’ utterances are segmented based on semantic features such as ideas, concepts, argument chains, and topics of discussion.

The participants’ responses were segmented and then coded according to the meanings they expressed. Broadly, the meanings were coded as (a) Knowledge construction – such as when the participants asked for clarification of ideas, define or explain ideas, concepts, and so on. (b) Interactivity – when the participants’ responses confirmed, appreciated, challenged or learned from others’ ideas or positions. (c) Development and growth – in cases when they expressed learning diverse skills such as linking to websites, uploading, and downloading texts, printing, etc. (d) Independent learning – such as when the participants used the technology to design learning experiences suitable to their own conditions, including scheduling and selection of questions to respond.

Results

This study examined the pre-service teachers’ perceptions of ADB as a tool for learning to teach. Four specific questions were raised for investigation at the beginning of this study. Therefore, results were first presented according to the issues and this was followed by the discussion of the general themes that emerged from data analysis. The verbal data that were quoted for illustrating the specific themes were “typical” of the participants’ responses to such categories. The participants posted a total of 491 questions and 491 answers in addition to the interviews.

What are the pre-service teachers’ views of ADB as a tool of learning to teach?

ADB allowed the participants to learn different ideas and create different types of knowledge. In particular, the discussion board allowed the pre-service teachers to participate and contribute to discussions of different topics unlike what typically happened in traditional face-to-face lectures where vocal students tended to dominate. This is
because the technology allowed the participants to freely reflect, critique, and extend knowledge. Some of the participants, in their reflective essays, wrote:

- “What are some effective strategies for teaching reading fluency, particularly when you have English language learners in your class?”
- “What are some resources (extra materials), other than the ones provided by the school sites, that we can use to improve students’ literacy practices?”
- “Last week we discussed paired reading. What is paired reading? Is this strategy limited to language arts or can we use it to teach other school subjects?”
- “Do you think standardized testing scores should be the only source of criteria for judging students’ success or failure in literacy?”

In their reflective essays, the participants identified specific kinds of learning activities they viewed as useful. For example, 27 students (82%) noted that using the discussion board “pushed” them to read over their lecture notes, textbooks and reflect on class discussions before posting their questions and answers. In addition, 25 participants (76%) wrote that they learned from other students who had practical experiences of teaching because of their backgrounds as full-time or substitute teachers. Also, 25 (76%) suggested that the use of the discussion board provided them a chance to ask questions about topics they considered important but were not covered in class. Furthermore, 23 students (70%) noted the activity forced them to think of how to use technology in their own classrooms when they become teachers.

During the follow-up interviews, I asked the participants to explain how the discussion board helped them to learn the course materials. The following are some of their responses:

- “When I saw questions that were interesting, I usually went back to read my notes and even went back to the chapter [of the topic] in my textbook [and read] in order to post a good answer.”
- “The links to different websites provided by my course mates helped me to access very important information online. Clicking, surfing, and connecting with other sites are fun for me; it makes learning interesting.”

What are the participants’ perceptions of the kinds of learning opportunities afforded by ADB instruction?

Buckingham (2006) argues that technology-mediated instruction affords learners innovative, immediate, interactive, and investigative approaches to learning. This is because learning activities are geared toward helping students to access, explore, process, and apply information in ways that are radically different from lecture-based pedagogies. For example, the students in this study understood the need to learn the features of the software, how to manipulate it, how to extend their knowledge, and how the interactions associated with the discussion board as a social space. Here are some selected samples of the students’ written reflections to the kinds of learning opportunities that they perceived the technology afforded them.

- “Students are not only sharing with their peers their questions and comments, but they are also learning about topics that they never thought about before.”
- “You can print a particularly interesting or relevant discussion, because threads of discussions are generally archived.”
- “I had forgotten how to use the discussion board . . . I [later] became an expert in using it. I also learned to use several other features having to do with discussion board, as I had to explore the web page I was using.”

Furthermore, their written reflections indicated that 31 (94%) students learned to manipulate the functions of the discussion board to print, upload and save documents, make connections or links with other websites, integrate visual images, use different font sizes, and request help from other students or the course professor when they ran into problems. During the follow-up interviews, the students expressed ideas such as:

- “what I really like in discussion board is that one is learning and doing many things all at the same time. You can use your notes, textbooks, other postings or even link with other websites as you prepare your questions or responses”

What are the participants’ views of using the discussion board for independent learning needs?
Learning in ADB promotes freedom and autonomy. This is important as students learn differently. Learning in discussion board therefore, means different experiences for different people. The pre-service teachers in this study used ADB to meet their own unique learning needs as shown in their reflective essays:

- “I like to wait till the last minute to post my questions and answers as I am a big procrastinator. The good thing is that the discussion board still gave the chance to complete my assignments.”
- “I never had the time to read all the questions and answers posted each week by each student, but it was up to me to go back and read the questions and answers some other day.”
- “Many times, I used the links posted by peers to connect with other sites to source additional materials that helped me to post my own answers to questions posted by my classmates.”

During the follow-up interview, the participants expressed positive views regarding the use of ADB:

- “Since a discussion on the Blackboard is done behind a computer and not face-to-face, there is less intimidation of expressing myself compared to sharing my concerns during a whole class discussion.”
- “Discussion board was a great way to read people’s different perspectives or ideas about assigned topics. Many times . . . I noticed that my ideas were different from others which was great because it helped me think of things differently which made me grow as a student and an educator.”

What are the participants’ views of the contribution of other students to the learning process in ADB?

Students’ perceptions of the value of their interactions with others in ADB significantly influenced their interests in using the technology as a learning tool. This means that students need to perceive ADB as a technology that does not only provide quality postings but serves as a social space for mutual respect and trust. The participants had positive views of the contributions of their peers because despite the variety of activities, they shared a common endeavor in the sense that all activities related in one way or the other to learning to teach. The students wrote following in their reflective essays:

- “I like discussion board because it allowed students to work with, contribute to one another and share thoughts and ideas freely.”
- “Another thing I learned from the discussion board was to respect others’ thinking. When I read questions from classmates, I understand them. I appreciated their beliefs and feelings towards education.”
- “I feel that the different topics addressed in the discussion board showed the maturity and responsibility of some of the classmates, as well as, their interests in learning more strategies and other ways of helping the students we work with.”

Data from the participants written reflections suggested that they had positive views of the contributions of their peers. For example, while 28 (85%) respondents considered the postings as helpful for them; 26 (79%) noted that their peers’ postings helped them to clarify what they learned during previous lessons. Also, 23 (70%) of the participants wrote that the dialogues helped them to expand their perspectives, and 22 (67%) noted that the postings encouraged them to be more self-reflective before postings their questions and answers. During the follow-up interviews, the participants expressed positive views regarding the contribution of their peers:

- “I used to think that the teacher was the only one who has all the right answers, but now I know that I can also learn from my classmates. Even though most of us are working in the school setting, we have different experiences that make us know or learn differently.”
- “Usually, when you attend classes at a university, you do not get a chance to talk to many people from your class. Even though I did not talk to some of my classmates face-to-face, I talk to them through the discussion board. . .I connected with many of the peoples’ questions and answers. It helped me think I was not alone in my ideas.”

Discussion

To summarize the thematic discussion in this study, pre-service teachers perceived ADB as a tool for fostering active participation in learning to teach processes and a means of engagement in different kinds of learning opportunities. In addition, they viewed the technology as a resource that helped them to meet their specific learning needs. They also perceived the contributions of their peers as positive while they use ADB to learn. These themes will be further explored.
The pre-service teachers perceived ADB as a tool of learning

The pre-service teachers in this study tended to perceive ADB as a learning tool with the potential to foster knowledge construction. For example, data from their postings, essays and interviews showed that they focused on issues of immediate concern to their interests – how to solve real-life classroom problems. They asked questions about supplementary reading materials and strategies for teaching literacy. Furthermore, their answers provided varied discussions and perspectives about different topics. In many instances, they provided links to related websites for participants who needed additional readings on different topics. For example, a student, in her written reflective essay noted that the discussion board did not only afford her “extended class sessions,” in addition, it provided “very enriching activities” because the course mates posted “varied and useful” questions and answers.

The participants’ reflective essays and interviews seemed to indicate that they understood that knowledge construction resided in the networks of relationships created by members of a learning community (Gee, 2003). First, individual members brought with them some specialist knowledge as students of teacher education to the discussion board learning endeavor. In addition, some brought other kinds of knowledge as full-time teachers, substitute teachers, teacher aides, etc. that contributed to the groups’ pool of knowledge. Also, the participants’ reflective essays, interviews and postings showed that they enhanced their understandings of concepts, ideas and topics by asking questions of one another, articulating their own views and experiences, and gaining new insights from the experiences and perspectives of others.

Johnson (2007) argues that the wide range of questions and answers posted by students while using ADB can help them to integrate different learning activities such as analyzing and synthesizing ideas from their peers’ postings, textbooks, and additional sources such as websites. This kind of shared, varied and rich knowledge built around peers, texts, and technology afforded by ADB is difficult to attain in traditional face-to-face lectures settings. Wijekumar and Spielvogel (2006) conclude that ADB is a powerful resource that “scaffolds learners into contributing new ideas and managing their learning by providing feedback on their paraphrasing and focusing on the relevance of the posting” (p. 231). Also, Biesenbach-Lucas (2003) argues that ADB provides students with a realistic audience (their peers) and a real purpose for writing.

Pre-service teachers use ADB to foster situated learning

Gee (2003) observes that the principle of self-knowledge requires that students learn not only about course content and context of learning, but also “about themselves and their current and potential capacities” (p. 208). The participants in this study perceived ADB as a technology that promoted learning as situated in their embodied experiences (e.g. experiences of learning to use ADB to learn) and a space for growth. For example, some students initially had problems – while some made mistakes, others had forgotten how the different features of the discussion board related to each other and how the different components interactively and independently functioned to afford learning. But through practice and persistence, they learned new skills – printing, accessing and exploring webs, uploading/downloading texts, etc.

In particular, the students’ responses seemed to suggest that they “link new information with existing and future-oriented knowledge in uniquely meaningful ways” (The American Psychological Association, cited in Kayler & Weller, 2007, p. 141). The participants learned to take risks where real-life consequences were little. They could start, stop, or continue at any time; they were not discouraged by the initial “failures.” In addition, discussion board appeared to afford the participants ample opportunities to practice, experiment, make mistakes, learn, and make discoveries. Also, the students learned the basic skills to manipulate the software by actually using it. Lastly, they learned to use the discussion board by thinking of it at a “meta” level as a complex system of interrelated and interconnected parts that could be used to read others’ views, connect to websites, upload, and print. This showed that the participants perceived ADB as a technology they could use to foster self-knowledge – the kind of understanding that learners gained about the technology they are using while at the same time they acquire new knowledge about themselves, their present and potential capacities (Gee 2003). This kind of knowledge is hardly made available to students by the old-style lecture-based instruction.
The participants used ADB to approach learning in ways that suited their needs and conditions

An important finding in this study was that ADB allowed pre-service teachers to approach learning in unique ways; to customize learning experiences to align with their unique conditions and expertise. This finding is important as available literature (Brewer & Klein, 2006; van Aalst, 2006; Lee-Baldwin, 2005) tends to stress only the social aspect of learning in ADB. However, the pre-service teachers learned independently by sourcing additional materials on their own, making their own schedules to use ADB, deciding what questions were important to ask and respond to. More importantly, the participants perceived that what they learned from their peers’ perspectives and experiences created an incentive for them to reflect on their own ideas and, in the process, gained important insights into teaching and learning.

Kayler and Weller (2007) argue that when students use ADB, they write about their unique experiences and develop their own voices and perspectives. This suggests that freedom and autonomy are critical in using ADB as Schellens et al. (2005) observe that learners do better when there is “freedom for students to define their own problems to be solved, rather than a teacher presenting the students with rigidly designed problems” (p. 734). In a crucial way, this study shows that ADB afforded pre-service teachers multiple ways of learning that will encourage them to “make choices, rely on their own strengths and styles of learning and problem solving, while also exploring alternative styles” (Gee, 2003, p. 209).

The pre-service teacher viewed the contributions of their peers positively

Pre-service teachers’ perceptions of the kinds of social interaction surrounding the use of ADB have the potential to shape the principles by which knowledge, values, practices, skills, and teaching strategies are negotiated, learned and applied to teaching/learning activities in real-life situations (Johnson, 2006). Data from the participants suggested that they created a learning community built on mutual trust and respect, and in addition, valued and appreciated each others’ contributions. For instance, the students’ written reflections and interviews suggested that they respected their peers’ perspectives, experiences, maturity, and sense of responsibility. Johnson (2006) argues that ADB facilitates student learning due to the cognitive processing required in writing postings, time to reflect on their peers’ postings, and think over their own responses. Similarly, Biesenbach-Lucas (2004) observes that ADB provides students not only the opportunity to discuss content and teaching and learning experiences outside the classroom; also it allows them to expand their perspectives on course readings and class discussions.

Brewer and Klein (2006) argue that meaningful interaction between students is an important component of ADB. From a constructive perspective, Kayler and Weller (2007) argue that students construct knowledge as they work in the company of their peers. Wijekumar and Spielvogel (2006) posit that ADB affords the opportunity for students to actively engage in the construction and use of knowledge. Kayler and Weller (2007) put it aptly: “The social construction of knowledge embedded in dialogue creates new opportunities for self-reflection, growth, and intrinsic motivation for belonging . . .” (p. 141). More importantly, such dialogues and interactions happen in a “free” social space (ADB) where learners can afford to take risks with lowered real-life consequences as they share ideas, perspectives, agree and disagree (Biesenbach-Lucas, 2004; Gee, 2003).

Implications and Conclusion

The purpose of this study was to investigate the pre-service teachers’ perceptions of how ADB mediated learning of teaching. Data from this study indicated that the participants perceived ADB as important tool for sharing ideas, experiences, and perspectives in ways that facilitated a social construction of knowledge. This is an important step in learning to teach. Kayler and Weller (2007) argue that the kind of social construction of knowledge afforded by ADB creates new opportunities for pre-service teachers to engage in self-reflective practices, development and self-motivation.

This study, also, indicated that the participants perceived ADB as a technology that afforded learning as situated experiences because they had the opportunity to manipulate the technology and apply knowledge and skills in contexts of using it. They learned to navigate their peers’ postings, upload, download, print, and link with websites – thus extending their knowledge and social interactions associated with the discussion board as a social space.
Furthermore, the study demonstrated that the participants perceived ADB as a technology that afforded them the opportunity to design their own learning experiences to suit their unique situations. They seemed to appreciate the freedom and autonomy associated with ADB. Lastly, the pre-service teachers perceived the contributions of their peers as essential to learning.

The findings in this study have some implications. Universities and faculty should realize that technology has become “an external extension of human intelligence” (Gura & Percy, 2005, p. v) with a potential to support pre-service teachers’ active exploration and manipulation of learning materials, and create contexts for social interactions that support knowledge construction. In particular, after classroom lecture online interaction provides learners a community of practice with the potential for “cognitive and affective development and opportunities for growth as independent learners” (Kayler & Weller, 2007, p. 145). In this regard, this paper calls for approaches that integrate ADB into pre-service teacher preparation in ways that increase the quality of instruction and learning. Such approaches should raise some fundamental questions, including: (a) What is the impact of ADB on the way pre-service teachers learn to teach? (b) What are the students’ perceptions of their own learning in ADB? (c) How do they want to experience learning? (d) How do teacher educators want them to experience learning? (e) What is the nature of ADB in relation to the learning needs of students? (f) How can assignments and reading materials be most appropriately prepared to meet the learning needs of pre-service teachers working with ADB?

These questions will help teacher educators to see the world from their students’ perspectives and prepare themselves to understand variations in ways pre-service teachers perceive their own learning in the context of ADB (Johnson, 2007). In this way, individual teacher educators will be better prepared to develop ADB as a social space for learning as well as nurture students’ own individual learning pathways (Johnson, 2007; Gee, 2003). This is important as Ashworth and Lucas (1998) contend that research and pedagogy must “be sensitive to the individuality of conceptions of the world – it must be grounded in the lived experiences of its research participants” (p. 417).

References


