EXPLORING TEACHER CANDIDATES' EXPERIENCES, BELIEFS AND ATTITUDES TO TECHNOLOGY AS AN INSTRUCTIONAL LEARNING TOOL FOLLOWING INSTRUCTION IN A TECHNOLOGY-RICH CLASSROOM

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ABSTRACT

The use of so-called, "smart-classrooms" or "e-classrooms" where students have wireless access to the internet, electronic projection and display systems, laptops and hand-held computers are increasingly seen as a means for instructors and students in higher education to create new and personalized understandings of traditional content areas. This study explored the attitudes and beliefs of a group of elementary-level teacher candidates' and their instructor towards the use of technology in relation to their teacher preparation program and their instructional practices as classroom teachers. Participants' experiences working with information and communication technologies in their practicum classrooms were also explored as a means of understanding the instructional issues and concerns associated with learning to work with technology in the classroom. Findings are associated with participants' beliefs and concerns about working with technology, disillusionment about the actual status of technology in the classroom and their views of professional responsibilities and additional duties associated with the use of technology.

Keywords: Teacher Candidates, Instructional Learning, Technology.

INTRODUCTION

> *Teachers are being asked to learn new methods of teaching, while at the same time facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom…given such challenges relatively few teachers (20%) report feeling well prepared to integrate educational technology into classroom instruction*. (U.S. Department of Education, 1999a).

The use of Information and Communication Technology (ICT) as a learning and instructional tool has become commonplace in most postsecondary institutes across North America (DiPetta, Novak, & Marini, 2003; DiPetta, Woloshyn & Novak, 2008; Johnstone, 2005; Richards, 2005). So-called, "smart-classrooms" or "e-classrooms" where students have wireless access to the internet, electronic projection and display systems, laptops and hand-held computers are increasingly being used or touted as a means for instructors and students to create new and personalized understandings of traditional content areas. Students and their instructors also use these technologies to participate in on-line simulations, and interact with others within the classroom or around the globe.

Although not as prevalent as in postsecondary institutions, elementary schools across North America are beginning to include information and communication technologies as a part of their instructional repertoires with a majority of public schools having some form of access to computers and the Internet (Corbett & Willms, 2002; Smerdon, Cronen, Lanahn, Anderson, Iannotti & Angeles, 2000). At the same time, most school teachers and teacher candidates feel largely unprepared for working with these technologies and teaching in technology-rich environments (Kirkwood, 2002; StatsCan, 2007; U.S. Department of Education, 1999). Teacher candidates preparing to work in elementary school classrooms represent the future of how technology is used or might be

used in schools to help students learn. Establishing the orientations or beliefs and attitudes of teacher candidates and teacher-educators to the use of e-classroom technologies and their views on "when" and "how" these technologies might be used best when working with elementary school students is a first step towards understanding what can or should be done to facilitate the pedagogically appropriate integration of information and communication technologies into teacher preparation programs.

In this study, the authors explored a group of elementary-level teacher candidates' and their instructor's attitudes and beliefs about the role of smart-room technology in relation to their teacher preparation program and their instructional practices as classroom teachers. Teacher candidates were enrolled in a medium-size postsecondary institution in Southern Ontario. The study was conducted during the Fall and Winter academic terms at a medium-sized, Faculty of Education in Southern Ontario, Canada. All participants had been assigned to complete a required course in educational psychology in a "technology-rich" classroom where information and communication technologies were used routinely as part of instruction. Throughout the duration of the study, the authors gathered information about participants' beliefs about the role of information and communication technology as instructional and learning tools. They also monitored their experiences working with information and communication technologies in their practicum classrooms. In order to better understand instructional issues and concerns related to teaching with technology, the experiences of the course instructor were also monitored.

Method

Research Design and Context

Case study as a qualitative approach to educational research involves the in-depth exploration of an activity, event, process or individuals based on extensive data collection (Creswell, 2008; Yin, 2003). In this study, case study methodology was adopted to gain insights about participants' perceptions, experiences and views on the use of emerging networked communication and information technologies as teaching and learning tools in elementary education. Interviews provided the primary source of data for this study, with supplemental documents (i.e., lesson plans, instructor observations and field notes) used for triangulation. The findings of qualitative interviews provide situational understanding rather than globally, generalizable conclusions (Creswell; Merriam, 2002). Accordingly, the data drawn from the interviews completed in this study captured how one group of the teacher candidates and their course instructor developed their understandings, orientations and reactions to the use of technology as a teaching tool in elementary classrooms.

As a part of their 8-month teacher-education program, teacher candidates were required to complete an educational psychology course. At the time of this study, 15 teacher candidates were assigned to complete this course in a technology-enriched classroom where they had opportunities to download lecture materials, participate in on-line simulations, complete on-line assignments and use interactive technology to communicate with each other and the course instructor. This experience differed from that provided to teacher candidates assigned to traditional classrooms where instructional techniques included formal note taking, instructor-led demonstrations, pen-and-paper assignments and whole-class and small-group discussions.

Participants

At the beginning of their educational psychology course, all 15 teacher candidates assigned to the technology-enriched classroom completed a demographic survey. All candidates indicated that they owned a home computer and used it extensively to complete their academic activities. The majority of candidates (80%) indicated that they possessed "moderate" comfort levels with respect to using information and communication technologies and credited this comfort level to their personal experiences. All but one intended to teach at the primary/junior level, with the remaining candidate aspiring to teach at the secondary school level. Of these

15 teacher candidates, six then volunteered to participate in a series of in-depth interviews that extended throughout the duration of their teacher education program. All participants were female and ranged from 23 years to 25 years of age and intended to teach at the primary/junior grade levels. As females proportionally represent the majority of elementary-level teacher candidates and practicing teachers, the composition of the participant group was deemed to be typical.

Data Collection and Analyses

Interviews

The teacher-candidates and their instructor participated in a series of open-ended interviews throughout the duration of the teacher education program including at the beginning of the program and at the completion of the program following the completion of their first teaching practicum. As a part of these interviews, teacher candidates were asked to elaborate on their experiences with technology, their beliefs about how classroom teachers could use technology to support or enhance student learning and their intentions towards using technology in their professional careers. Similarly, the course instructor was asked to reflect on the role of technology in the postsecondary classroom, factors associated with its implementation and the responsibilities of teacher educators for preparing teachers to use technology as an instructional tool.

Interviews were audio-taped and transcribed verbatim, with participants being provided with a full transcription of their interview, as well as, a copy of the researchers' interpretations and conclusions based on this information. Participants were instructed to review, clarify, qualify and edit these documents (i.e., member checks).

Data Analyses

Analyses consisted of coding and categorizing data using procedures and protocols described by Bogdan and Biklen (1998) and others (Creswell, 2008; Merriam, 2002). To promote the credibility of the research findings, we reviewed the interview and supplemental documents (lesson plans, instructor notes) independently for common patterns and themes. These data were then coded to establish the general discussion topics. The authors then met to discuss their interpretations and arrive at a shared understanding of the participants' experiences. Cases were collapsed into categorical clusters or themes to provide a meaningful interpretation of the participants' individual perspectives, with categories compared for similarities, differences, and interconnections.

Findings

Four primary themes emerged as a result of data analysis including (1) recollections and experiences about using technology in the classroom (2) beliefs and concerns about working with technology, (3) disillusionment about around the status of technology in the classroom and (4) professional responsibilities and additional duties. A detailed description of each of these themes follows. These themes represented recurring categories that the majority of the participants articulated. The study also include data relating to the instructor's experiences throughout this course, emphasizing changes with respect to his beliefs and orientations about how to best prepare teacher candidates to teach with technology.

Recollections and Experiences with Technology

When asked to reflect on their elementary school experiences, all participants indicated that they had minimal experiences with technology. Their recollections of technology in the classroom were limited largely to computer game playing and video and movie watching. Some participants recalled that there were very few computers available for student use and the ones that were available were either located at the back of the classroom or in a central area such as a laboratory, library or other building. One participant recalled that part of her enrichment program included travelling to the school board office to use their computers.

Participants agreed that opportunities to use technology were greater in secondary school, albeit still restricted to word processing, power point presentations and limited use of the Internet. They qualified that using technology was not essential for their academic success at this level and that many of their peers elected not to use technology or take technology-related courses.

"In elementary school, technology wasn't significant. Even visual aids like overheads weren't used very much. In high school we got to use computers in some of our classes." (Natalie, Interview One)

"I don't think that technology played a huge part in my learning experience in elementary school. It would have been for movies, watching videos. High school I started to do a lot more with technology. For instance, I had a geography course where the teacher introduced us to GIS technology which is pretty cool." (Jessica, Interview One)

In contrast to their K-12 experiences, all participants perceived technology to be central to their postsecondary experiences. They relied on the Internet for data gathering and used word processing exclusively. The majority of their undergraduate courses included the use of WebCT or some other electronic online forum as a virtual learning environment for academic discussion.

" In university, I lived on the computer. Even now I do all my research on my own computer and I don't really use the school library. I do everything on the Internet at home. I have a laptop, I have a PDA and I have an Internet capable cell phone technology is a big part of my life." (Natalie, Interview One).

" Post secondary, I used computer technology for a lot of my assignments. I took a couple of distance education courses where we used WebCT, so I became quite comfortable and familiar with submitting assignments online, using discussion boards, signing in for discussion chats and that kind of stuff." (Jessica, Interview One)

All but one participant possessed a personal computer, with this participant expressing frustration about needing to rely on the computers provided at the university,

" University was the first time that I had to use the computer for my assignments and I've always looked at computers as being a pain because I don't have a computer at home. When an assignment has to be done on a computer, I always have to be on campus. I find it really time consuming and difficult to do everything during the hours of the school…"(Heather, Interview One).

A few participants expressed concern about how technology was used at the postsecondary level, citing experiences where course content was obscured by the technology, "…one professor used too many bells and whistles this distracted from the content of the information presented…" and "…one professor relied too much on the technology resources to supplement her own limited knowledge of content."

Beliefs and Concerns about Using Technology in the Classroom

All participants believed that students currently enrolled in K-12 programming would need to possess greater technology knowledge and skills than was required for themselves. When asked about how technology could be integrated into the elementary or secondary school classrooms, participants tended to provide "basic" or "limited" recommendations for both teacher and student use. For example one participant in this group suggested that keyboarding should be taught as typing had been taught in the past. She attributed her own awareness of computer technology and her confidence in being able to learn about technology and use specific software programs to her father's insistence that the family learn to keyboard and work with software programs while she was in elementary school (Natalie, Interview One). One participant suggested that using assistive technologies would be beneficial for students with learning disabilities and other exceptionalities, but cautioned that technology should not be used as a substitute for basic instruction in reading and writing.

…software that reads what's on a page to students is a real help to those students with exceptionalities who wouldn't be able to read the material in any other way… but does not help other students develop their reading skills (Heather, Interview One)

Other suggestions included game playing and work processing for students and lesson planning and resource gathering for teachers. In the case of the former, participants believed that technology could be used to maintain students' motivation throughout the learning process or as a link to their lives outside of the classroom (e.g., music, videos communications). It appeared that these participants' recommendations mirrored their

elementary and secondary-school experiences using technology.

Finally, participants believed that technology was a tool that could be used to "enhance" the professional appearance of student and teacher work, "…it's easy to use and takes some of the focus of everyone looking at you away. Plus, it looks professional it brings everything together and it makes it look good" (Adrienne, Interview Two). The instructor elaborated that the ability to "enhance appearance" is a strong initial motivational factor in students' and teachers' decisions to use technology, but that over time, should transform into a deeper desire to provide a relevant and meaningful educational experience.

…technology use in classrooms starts as a way of catching students' interests and getting them excited about the work they are completing but then it becomes a tool for research and refinement, as well as a way to present and share information in new and meaningful ways with peers and with teachers and parents. (Instructor, Interview One)

Concerns about Using Technology in the Classroom Participants also expressed a certain level of concern or caution about the use of technology in the classroom. Participants worried that retrieving credible information from the internet was a time consuming endeavour and that not all teachers would be willing or able to find or critique information appropriately, "I see a lot of teachers downloading information from the Internet and using that information as the 'Bible's' truth" (Samantha, Interview Two).They believed that both students and teachers needed to be able to evaluate critically the reliability and trustworthiness of information contained on the Internet, and that training in the acquisition of these skills was not a dominant part of either the school curriculum or teacher preparation programs.

This belief was surprising to their instructor who qualified that all teacher candidates were required to take a basic technology course that included criteria for the evaluation of websites and online resources. With further reflection he wondered whether these course discussions were insufficient for meeting the participants' needs and questioned the sufficiency of the instructional hour allotment.

Teacher preparation programs do not put forth sufficient time towards preparing candidates to design, implement and use technology in pedagogically appropriate ways…instead, they receive 10-20 hours of instruction that surveys a wide variety of technologies rather than subject specific applications of the technology. They learn *about* the technology rather than how to work *with* the technology as a teaching tool. (Instructor, Interview Two)

Participants were also concerned that technology could be used in such a manner to overshadow content information. They expressed concern that an emphasis on technology would detract students from the acquisition of basic skills such as reading and writing. They worried that students' and teachers' attention would be consumed by technological "bells and whistles" versus curriculum content. For instance, "… when instructors just read information presented with PowerPoint, the notes become the lecture instead of being used as an aid or supplement to instruction" (Jessica, Interview One). The course instructor also echoed these concerns and qualified that while the focus should be on how technology is used to enhance teaching and learning there would still be a need to understand the limits and pedagogical implications of working with technology. For example the instructor said,

…instructional emphasis should be on using the technology to enhance students' learning not highlighting the technology too much technology can be distracting as when a teacher has a class watching a video for more than five minutes without providing a focus for watching you have to focus the learners attention by structuring the activity, asking a few questions that makes the class watch with purpose rather than leaving them to watch or work without any direction so they drift off and lose interest in what they are supposed to be doing. Using technology for teaching and learning means providing structure that supports focused activity or it doesn't work. (Instructor, Interview Two)

The instructor emphasized that teachers needed to work to integrate technology into course content in a seamless manner that enhanced student learning without emphasising the technology per sec. He argued that teachers need to ask themselves such critical questions as, "How am I using the technology here? Is it appropriate, is it necessary or is it just easier than doing it some other more meaningful way that actually enhances what the lesson is trying to do." To illustrate the potential that technology holds for enhancing lessons, the instructor discussed a lesson on perception that he presented in both technology-enriched and traditional classrooms.

... [in the traditional classroom] I used overheads of images that the students had to view from two different manners. In one case, looked at one way, the two dimensional flat image represented an old lady's head wrapped in a scarf. Looked at in a different way, the same two dimensional image represented a young woman wearing a fancy hat. The lesson was effective in showing the learners the importance of perspective in determining what they see around them.

In the other class [the technology enriched classroom]... I was able to use large screen projections of animations…moving images... images that actually morphed from one object into another... as a way of making the same point about perspective but it was a more effective way of demonstrating perception because it enabled the class to talk about motion and time as factors in perception something that wasn't possible with the two dimensional flat drawings used in the traditional class. (Instructor, Interview Two)

Participants also expressed the general belief that technology should not be used as an alternative to knowledge acquisition. That is, that neither students nor their teachers should use technology to hide or compensate for a lack of knowledge, skill or understanding in a specific subject area. They worried that teachers would use technology as a "focus" versus a "supplement" to instruction thereby "letting the tail wag the dog". These concerns appeared to be exacerbated by fearful statements about the "unreliability" of technology, especially relatively newer technologies such as smart boards and LCD projectors. They feared that if the technology failed, they would be unable or unprepared to continue with instruction.

I don't want to end up like some of the teachers I've seen "empty handed" …having to teach a lesson that they had planned to use some Internet material with only to have the connection not work or the bulb in the LCD goes out and not knowing what to do or fiddling with it for a long time while the class just sits there doing nothing. (Angie, Interview Two)

One participant expressed slightly different concerns including the danger that students' use of technology might jeopardize the frequency and quality of their social interactions,

"…television, video games and now computers seem to be aimed at younger and younger children and I'm not sure about all of this… Is watching or playing games, computer games, even the educational ones, helping children learn how to get along or play with each other… or talk to each other?" (Samantha, Interview Two).

They also expressed concerns about teachers' abilities to "keep up" with advances in software and were sensitive that educators would need to be willing to engage in "out-of-school" professional development venues.

"Teachers need to understand hardware as well as software… and teacher-candidates need to be able to see demonstrations using technology, they need to see the different kinds of technology out there, to see it and interact with it…to experience it in different forums and see different instructors use it …so what is needed if for instructors to practice what you preach and model it" (Angie, Interview Two)

Disillusionment

After completing their first teaching practicum, participants shared their observations that schools appeared to have insufficient infra-structure resources, institutional will and leadership to support the use of technology in the classroom. Participants' practicum experiences seemed to have had a dampening effect on general enthusiasm for working with technology and raising vague concerns about professional risks and

pressures associated with working with technology on a daily basis.

"Kids love technology, its motivating and exciting for them, they see it on TV and they talk about it and they want to use it. I'm sure that it enhances their learning but my practicum didn't really show me much of how to use computers in the classroom. I guess it depends on the school you get. (Adrienne, Interview Two)

Participants commented on the lack of technology use in the schools. While all participants agreed that technology was very much a part of the majority of students' lives beyond the classroom and that it consumed a substantial portion of students' free time, they acknowledged that the reverse held in the classroom. They witnessed minimal use of technology in the classroom and perceived that some teachers were uncertain and uncomfortable with its use.

…teachers need to possess greater knowledge of technology if they are going to stay in charge of the classroom, they need to know how computers work and how to operate them - in some computer classes it does not seem that the teacher is in charge and it seems as if some students know more than the teacher about how the technology works… (Angie, Interview Two).

A few participants suggested that schools could focus less on training students how to work with technology in light of the rapid rate at which students were acquiring this knowledge outside of the classroom.

In elementary education, I don't know if technology has to play such a great role in elementary education… a lot of technology is being taught in the home…" (Samantha, Interview One)

…the kids had more technology toys than I did and used them better than I would be able to … which was somewhat intimidating (Samantha, Interview Two).

Others participants expressed distress at what they perceived to be unproductive use of instructional time where teachers were more consumed with the maintenance of the technology than with instruction per sec.

…when the students in her grade 2 class attended computer class, the majority of the instructional time was spent logging individual students into the system resulting in limited instructional time "students had very little time on the computers… perhaps 15 minutes out of a 40 minute class… the teacher was running around from student to student and their use was limited to playing educational games (Heather, Interview Two).

There was also a perception that educators were not reinforced in their attempts to use technology. Participants commented that they received little support, encouragement or resources when they attempted to integrate technology into their instruction as a student-teacher. They perceived their efforts to use technology were further hampered by high "administrative" demands including the completion of application forms, advanced bookings, and restricted laboratory times. Collectively, participants' resulting experience was one of disappointment with respect to the use of technology in the classroom. Participants were uninspired by the types of technology currently being used in classrooms and were less optimistic about their abilities to use technology as an instructional tool as beginning teachers, "I hope my next one [practicum] has a whole bunch of different programs for the kids to use and for me to use in my lessons but I know it's up to me to make a difference and I hope I can…" (Adrienne, Interview Two).

Professional Responsibilities and Additional Duties

When asked about whether there were any prerequisite conditions associated with using technology in the classroom, the teacher candidates and the course instructor emphasized that it was the responsibility of the individual to be familiar with the technology and related software. For many, there was also the recognition that this would not be an easy task.

It's important… I have to try to push myself to try and keep learning these things and find out what else is available (Adrienne, Interview One)

This feeling appeared to be intensified for some participants who also expressed uncertainty about how best to acquire such expertise, I know how important it is … to become aware of what is out there… I know I need to use it… but it is something that I don't even know where to

start (Angie, Interview One). In contrast, other participants drew confidence from their previous experiences using technology and expressed greater convictions in their abilities to prepare to teach with technology, even if they did not possess specific instructional plans for instruction in content areas.

I've always been able to learn a new software program by myself within a few days - I've done it before and it doesn't scare me but …if I had to teach a group of students right at this moment a lesson about something using technology I know I wouldn't feel very comfortable. (Samantha, Interview One)

Regardless, all participants including the course instructor agreed that this responsibility was a time consuming one that, largely, would not be recognized by either school or university administrators.

You're not getting extra credit for it [teaching with technology]. You are not getting any recognition in terms of your professional growth, tenure or promotion. Why do you teach with technology? I like to do it and find it interesting. Would I advice people to be teaching with technology? Not unless they like extra work" (Instructor, Interview Two)

Instructor's Changing Perspectives and Beliefs

Although initially inspired about the opportunity to teach in the smart-room and optimistic about the prospects of using information and communication technologies as part of the instructional process, the instructor also shared some sense of disillusionment about the feasibility of using technology in the post secondary classroom by the end of the course. Driven by the principle that technology should be an "invisible" enhancement to student learning versus an identified instructional feature, the instructor found that teaching in technology enriched classroom that resulted an increased workload and layers of preparation. Being an instructor in the technology-enriched classroom required learning about the technology and then additional planning for its integration into the lesson.

… all the software that we used.. I had to spend time to learn it… you have to learn how to use it and how to use it effectively.. In the traditional classroom, I'm finding them [instructional sessions] less work. I'm finding them less problematic in terms of struggling with what to do every week (Instructor, Interview One)

…it's a lot more work. I'm finding it to be a lot more work in terms of preparing for classes that are technology focused or underpinned because I'm always thinking, how am I using the technology here? Is it appropriate or is it distracting? What can I do to teach this lesson with technology? How do I use the technology to enhance the lesson but make the technology disappear? (Instructor, Interview Two)

An overriding concern was the unpredictability of using technology and the possibility of unforeseen difficulties during the instructional session. Initially, the instructor worked diligently to prevent such occurrences and experimented with the technology before using it as part of a lesson.

…I actually found it to be much more work in the technology classroom. I didn't think it would be. I really thought that because I had worked with technology for so long, that I could handle it readily. Instead, I had to be much more alert, much more awake because at any time, something could go wrong. (Instructor Interview Two)

There was a concerted effort not to interrupt the flow of a lesson to inform the teacher candidates of any technological difficulties. Instead when such instances occurred, the instructor reverted to a "supplemental" or "back up" lesson plan. In this way, the flow of a lesson was never interrupted and the "illusions" of technological perfection and instructional ease were maintained.

"I try really hard not to let them see… so it's really deliberate on my part to make it look easy. I think I try and make it look easy so that it doesn't distract or frustrate them… What I'm trying to hide from them is the preparatory work that I do beforehand and the things that I do behind the scenes."

"…Any time something goes wrong, I'm fairly well prepared. I switch to something else, I have something else prepared … it's more work though. You have to prepare a double lesson". (Instructor, Interview One)

The instructor's convictions about the value of concealing such difficulties were challenged however when teacher

candidates returned from their teaching placements and discussed the limited use of technology in classroom. As a result of these conversations, the instructor became more inclined to allow teacher candidates to witness any technological difficulties over time, being careful however to deconstruct any challenges in context of classroom teaching. By the end of the course, the instructor came to believe that bringing technological challenges forward to teacher candidates during the instructional sessions provided them with an opportunity to participate in collaborative problem solving and better prepared them for the realities of classroom teaching. He believed that teacher candidates benefited from watching him model and scaffold problem solving associated with the instructional use of technology.

…the advantage of being in that room [technology enhanced classroom] was that it provided a problem and all the tools or resources you needed to solve the problem something that may not be available or possible in regular elementary classrooms. In a normal room you don't always have the resources to solve a technology problem - you have to call someone or get something or wait for both a person and materials. In the technology room I had a technical support person working with me and they saw us dealing with problems as they occurred in routine or systemic ways.

I think that shaped their attitudes about what to expect in their schools and when they didn't see those same resources or systemic solutions at play they were… disillusioned. (Instructor, Interview Two)

I think that the technology room made some of them less anxious. They were more willing to experiment. Why? Because they saw that I was experimenting and trying every week and that when things went wrong, we just moved on and did something else. They know that technology can cause problems. So what! They just move on with what they are trying to do. I think they learned that. (Instructor, Interview Two)

Discussion and Reflective Comments

The findings of this study suggest that these teacher candidates benefitted from participating in non-technology content courses situated in technology-enriched classrooms. The authors believe that participating in such classrooms can serve to heighten teacher candidates' appreciation and understanding of how technology can be used to enhance student learning as well as desensitize them to the challenges associated with using this instructional technology in elementary classrooms. Bai and Ertmer (2008) documented that teacher-candidates' attitudes towards technology and their views about the educational benefits associated with using technology in the classroom became more positive after completing an introductory educational technology course. However, even if such courses are used as a means of providing teacher candidates with technological awareness and experiences, teacher educators cannot assume that these future teachers will use the technology in their classrooms or use it in pedagogically effective ways (Mehlinger & Powers, 2002). Bai and Ertmer and others (Haldane, 2003; Moursand, 1999; Mehlinger & Powers; Vannatta & Beyerbach, 2000) have also demonstrated that having information and communication technologies available in schools where teacher candidates complete their field experience does not ensure its use, especially if mentor teachers or practicum supervisors do not model its use or advise teacher-candidates about how to work with these technologies.

Li (2007) documented that while practicing teachers' attitude towards technology use in schools tends to be negative, teacher candidates' and students' attitudes towards these technologies tends to be more positive. Lam (2000) examined the reasons why some teachers avoid the use of technology in their classrooms and suggested that the perceived 'technophobia' of teachers can often be associated with their personal beliefs about the benefits or dangers associated with technology. Lam also observed that most of these teachers had little or no experience working with technology in their classrooms so their fears were largely based on belief rather than any real fear or luddite resistance to technology. More positively, the messages that teacher candidates receive about technology from other educators may be less

important than their experiences working with technology in shaping their attitudes about its value as an instructional tool (Bai & Ertmer, (2008). The authors believe that having teacher candidates experience technology-enriched instruction as part of non-technology oriented courses (such as the educational psychology) can be especially effective in emphasizing the potential of technology as a teaching tool across the whole curriculum versus technology-specific subjects (i.e., computers, science and technology) and constitutes effective instructional practices for teacher preparation programs.

Teaching with technology needs to be an integral component of teacher education programs, not restricted to occasional use or "special" occasions and certainly not simply talked about in a "what I say" rather than "what I do" fashion (Bei & Ertmer, 2008).

Unfortunately, the findings of this study also suggest that the reality of teacher education programs, or at least this particular teacher education program, is far removed from this ideal. Beyond the use of power point presentations, participants reported limited experiences involving the integration of technology into their classes.

The findings of this study also challenge teacher educators to consider how best to integrate technology as an instructional tool, especially with respect to balancing the illusion of "technological transparency" and promoting the use of technology as a "instructional tool" versus "instructional focus" with modeling the problem solving skills required to address technological difficulties and/or failures during the instructional process. Teacher educators also need to sensitive to the "disconnect" between the plentitude of resources and supports available at the postsecondary level versus the rather limited resources and supports found in many elementary classrooms. They must be careful to prepare teacher candidates to teach in the classrooms of today while providing them with the knowledge and skills necessary for teaching in the "technologically enriched" classrooms of tomorrow.

Educators in faculties of education who teach with technology need to work with associate or field teachers to promote and support their confidence in the use of technology in the field on a daily basis. Faculty need to provide and support in-service opportunities for elementary teachers with respect to using technology in content specific ways, integrate technology into the regular classroom setting (versus laboratories) and providing opportunities for long-term professional development. Researchers have argued that the willingness of teachers and teacher candidates to use e-classroom technologies is dependent on their experiences as recipients of these technologies (Woodbridge, 2004), their pedagogical beliefs and perceptions about their value (Darling-Hammond, 2000; Li, 2007), and their teacher education and ongoing professional development experiences (Van Braak, 2001). Until teacher education programs address and model the use of technology in the classroom, the onus will remain with individual teachers to champion its use in the classroom.

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