

Teacher-Candidates' Attitudes and Orientations To Technology: Comparing "Technology Rich" and "Traditional" Classroom Settings .

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Introduction

The use of information and communication technology (ICT) as a learning and instructional tool has become commonplace in most postsecondary institutes across North America (Richards, 2005; Johnstone, 2005, DiPetta, Novak & Marini, 2003). In fact, most universities world-wide currently conduct some number of undergraduate classes in so-called "smart-classrooms" or "e-classrooms" where internet access, electronic projection and display systems, wireless laptop computers, electronic "clickers" for recording class votes and responses, hand-held computers, I-pods and even cell phones can be used by students to download lecture notes, participate in on-line simulations, and interact with instructors, other students and remote resources within the classroom or around the globe. Combined with other information, communication and presentation technologies such as, conferencing software, "touch screens" and software that enables students to create and share graphic concept maps of ideas and lessons, smart-rooms are a means for instructors and students to create new and personalized understandings of traditional content areas.

Although not as prevalent or as convenient as in postsecondary institutes, the availability of information and communication technology for instructional and learning purposes has increased significantly in elementary schools across North America. In fact, both Canada and the United States boast having some form of access to computers and the Internet in virtually all public elementary and secondary schools in their jurisdictions (Corbett, B. & Willms, J.D., 2002; Smerdon, B., Cronen, S., et al., 2000)

Just as basic information and communication technology has become commonplace at all levels of North American schools, e-classroom technology is now making its way into elementary

school classrooms. Unfortunately, most elementary school teachers and pre-service teacher-candidates in the elementary stream feel largely unprepared for working with these technologies and teaching in technology-rich environments (Kirkwood, 2002; StatsCan ICT in Schools Survey, 2003/04). In part, the willingness of teachers and teacher-candidates to use e-classroom technologies as part of their instructional practice depends on their personal experiences as learners using such technologies, their experiences in teacher education programs, their pedagogical beliefs and their perceptions about the value of technological innovation (Woodbridge, 2004; Van Braak, 2001; Darling-Hammond, 2000).

This study explored a group of elementary level teacher-candidates' attitudes and beliefs about the role of smart-room technology in their teacher preparation program and their views of the use of such technology in their own practice. A group of teacher-candidates enrolled in an educational psychology course as part of their pre-service teacher preparation program was randomly placed in a "technology-rich" classroom where information and communication technologies were used routinely as an instructional tool to enhance student learning experiences. Another group of teacher-candidates taking the same educational psychology course with the same instructor was placed in a more traditional classroom setting, one without e-classroom technology. The perceptions of the two groups of teacher-candidates with regard to the use of technology in their teaching practice and the general role of technology in teaching and learning were compared, before and after their teaching practicum in area schools and at the end of the program.

Specifically, this study explored the effect of the teacher-candidates' learning experiences with information and communication technology, in either the technology-rich classroom or the traditional classroom setting, on their beliefs about the use of such technology in teaching and learning. Moreover the study examined the effect of their high or low tech classroom experiences on their willingness to work with information and communication technologies in their own classrooms. The study sought to establish the participants' orientations to the use of e-classroom technologies and their views on when and how these technologies might be used when working

with elementary school students. Finally, in order to better understand the issues and concerns associated with teaching the use of technology in pre-service programs, the instructor for both classes was interviewed at the beginning and end of the course, to gather his perceptions of, and reactions to, teaching with technology in the technology rich classroom and teaching about technology in the traditional classroom setting.

Methodology

Participants:

As part of the university administration and registration process for the teacher preparation program at the subject school students are assigned to attend required courses in particular classrooms. Educational Psychology is a required course for all teacher-candidates in the program. Accordingly some twenty-eight teacher candidates were assigned take the educational psychology course with the co-researcher in a technology-enriched classroom and thirty other teacher-candidates were assigned the course with the same instructor but in a traditional classroom setting that lacked the high-tech amenities of the smart-room. All fifty-eight teacher-candidates in the co-researcher's educational psychology course were invited to participate in the study and all completed an initial "technology use and comfort level" survey that established their self-assessed level of individual ability for and comfort level with using information and communication technology.

Teacher-candidates in both traditional and smart-classroom settings completed identical curriculum with respect to their educational psychology courses during the in-class component of their teacher-preparation program. The manipulated variable in the study was the venue for the course which varied between traditional or technology-enriched as a function of the randomly assigned classroom. Teacher-candidates assigned to the technology-enriched classroom received technology-supported instruction which included opportunities to download lecture materials, participate in on-line simulations, complete on-line assignments and quizzes and use interactive

technology to communicate with each other and the course instructor. Teacher candidates in the traditional classroom received identical course content but participated in more “traditional” instructional techniques including formal note taking, instructor-led demonstrations, pen-and-paper assignments and whole-class and small-group discussions.

Data Collection and Analysis:

All 58 teacher-candidates in the two educational psychology classes taught by the same instructor completed a pen and paper survey about their technological experiences prior to and including their teacher preparation program. As part of this survey, teacher candidates were asked to describe their current use and comfort level with various technologies, their beliefs about how technology should be used in teacher preparation, and their future intentions with respect to using technology in their own classrooms. The survey was Likert-based but included a number of short answer questions about the participants’ experiences with, and reactions to, technology in their own schooling.

The second phase of the study invited three teacher-candidate volunteers from each of the two classrooms to participate in a series of open-ended interviews where they were asked to elaborate on their experiences with technology, their beliefs about how instructors could use technology to support or enhance student learning and their intentions towards using technology in their professional careers. In total, these participant volunteers completed three sets of interviews: one at the beginning of the teacher-education program, another following the first teaching practicum and a summative interview at the end of the program. Similarly the course instructor also completed an initial survey and was interviewed at the start, middle and end of the course.

The survey transcripts and initial interviews were analyzed manually and using SPSS to isolate common themes and ideas. The themes which emerged from the initial data generally reflected teacher-candidates beliefs or attitudes towards information and communication technology’s use in elementary education and their personal concerns about preparedness for

working with technology in their own classrooms after graduation. The emergent themes were used as the focus of more detailed questioning in subsequent interviews.

Emergent Themes:

Three major themes were drawn from the data collected through initial surveys and interviews for this study. The themes either reflected participants' attitudes and beliefs about technology in education or they contributed to shaping participants' attitudes and beliefs about technology in education. The three major themes are: attitudes towards technology generally and technology in education specifically, concerns about initial and ongoing preparedness for working with technology in education, and beliefs about the professional risks or pressures participants associated with working with technology in education.

Initial responses across both groups around the first theme, attitudes towards technology in education, presented a range of variation extending from what might be called generic "motherhood beliefs" about the positive value of technology in education to generic "luddite-like" apprehensions about technology. Findings around the second major theme suggested that both groups struggled with a general lack of confidence about their "practical preparation" experience in working with information and communication technologies for teaching. This sense of need with regard to practical preparation or practice with using technology to teach specific subject matter in the classroom was offered by almost half (48%) of the participants as a limitation of their pre-service programming. Moreover, a majority of both groups expressed concern that the amount of technology training and exposure they received during their pre-service program served to only heighten their anxiety about using technology appropriately in their own classrooms. The third theme too seemed to remain fairly consistent throughout the study's initial, mid and summary phases. In fact as the study progressed to the summary stage interviews participants from the technology enriched class strengthened in their belief that if teachers, old or new, were going to use information and communication technology effectively in classrooms and courses, they needed to be self-directed in terms of their own learning about technology and institutionally supported in

their use of technology in the classrooms. Furthermore, after their practicum experience in schools participants in both groups expressed the view that as they were at the beginning of their professional careers they were unwilling to experiment with technology in their classrooms since they would have many other things to worry about and they didn't want to be worried about technology too. The concerns that they expressed for using e-technology or even new software in their classrooms included the amount of time and work involved in learning new programs or skills for teaching with technology, the work involved in planning lessons that focused on the use of technology to help students understand content in new ways and the difference between the level of institutional support they felt they would need and the level they would get from their schools. The findings for this study are presented and discussed in terms of these three major and inter-related themes.

Findings and discussion:

Beliefs about teaching and learning play an important role in how classroom teachers react to and use technology in their classrooms (Ertmer, 1999). According to social constructivist theory teacher beliefs about teaching and learning are socially mediated and contextually situated (Condon, Clyde, Kyle, & Hovda, 1993; Schon, 1987). For teacher-candidates this means that beliefs about teaching are largely based on their own learning opportunities and past experiences filtered through in-depth examination of educational theories and practices introduced in their preservice preparation programs. Teacher-educators are, or should be, therefore, the logical role models for preservice teachers in integrating technology into their teaching practices (Carlson & Gooden, 1999; Wills & Tucker, 2001; Yildirim, 2000). It follows that teacher-candidates use of technology or their attitudes and beliefs about the use of technology in education are shaped by the

experiences and learning opportunities presented in their preservice preparation programs and the modeling and instruction of their teacher educators that encourages reflection, dialogue, critical thinking, and understanding about technology in subject specific contexts. There is ample support in the literature for the claim that teachers' beliefs about learning and technology have a powerful influence on their instructional decisions about technology and its use in classroom practices (Windschitl and Sahl, 2002; Lam, 2000; Pajares, 1992).

Aiken (1980) used modeling theory to analyze the development and change of attitudes for professionals and he noted that,

“many attitudes are not the result of direct reinforcement but are learned by observing the activities of people who are perceived as significant” (p. 16).

It is reasonable therefore, to expect that teacher educators who have different pedagogical beliefs will deliver instruction in different ways, which in turn, will have different influences over preservice teachers-candidates' pedagogical beliefs. This study's exploration of teacher-candidates beliefs about technology in relation to their preservice program's technology experiences helps illustrate the influence teacher-educators may have on their students' beliefs about technology, pedagogy and their actual use of technology in their classrooms in the future.

The teacher-candidates for both groups in this study, received approximately twenty hours of formal computers in the classroom training as part of their preparation program. However, the “technology-rich” group of students received an additional 20 hours of modelling and application of technology use in their educational psychology class. The amount of formal and informal training with technology that these groups received therefore compares well with the 12 hours on average of technology training provided as in-service professional development for North American teachers (Anderson, 2002) but it seems inadequate to prepare classroom teachers to deal realistically with the demands of using the newest technologies and software effectively in specific subject areas. In fact many K-12 teachers across North America report finding themselves ill-

equipped to teach with computers or new instructional technologies in their classrooms (NCES, 2002).

According to the StatsCan report on, Connectivity and ICT Integration in Canadian Elementary and Secondary Schools: 2003/2004 elementary school principals across Canada, felt that most of their teachers possessed the required technical skills to use ICT for preparing report cards, taking attendance or recording grades. However, slightly less than half of school principals felt that the majority of their teachers were adequately prepared to engage their students effectively in the use of ICT to enhance their learning. (StatsCan Reports no. 17 ([81-595-MIE2004017](#)), Dexter, Anderson and Becker (1999) have observed that although a vast majority of teachers and schools in North America have access to ICT and teachers generally view these technologies as a positive educational force, technology integration in North American classrooms has yet to become the norm or a priority for most teachers and schools (Dexter, Anderson & Becker, 1999). Understanding why ICT or new technologies aren't used more routinely in elementary school classrooms begins by examining the lessons that can be learned about attitudes towards instructional technologies from the personal experiences of teacher-candidates in teacher preparation programs? What are the attitudes of teacher-candidates about information and communication classroom technologies based on what they learn and see in their teacher education programs and what they see practiced in schools during their practicum experiences?

The challenge for teachers, teacher-candidates and teacher education programs according to the participants in this study is not one of having access to technology but rather the challenge is one of knowing or learning what to do with technology in teaching specific subject areas in ways that improve or build on students understanding of those subject areas and technology. It is the same difficult pedagogical question that has been raised by researchers and educators about technology since the introduction of computers into schools in the early 1980's. The participants in this study are by no means technophobes or afraid of technology. In fact most own computers and other technologies such as cell-phones, digital cameras and I-Pods with which they feel

comfortable and competent in using. However, the majority of teacher-candidates in this study, 85% in the traditional classroom group and 74% in the technology-rich classroom group expressed a strong sense of inadequate experience and preparation for working with technology in the classroom as a subject-specific teaching approach or methodology . Well over three-quarters of the members of both groups reflecting on their experiences with technology in their own schooling expressed limited interactions with technology in elementary grades with increasing interactions in higher grades, secondary school and especially in their post secondary experiences. One participant stated that in elementary school she,

“...occasionally got to play some concentration-like games and shoot-em-up reading or typing games on a computer but only as a treat or when there was time and when the whole class went to a lab or a class was held in the library where the computers were.”

Other participants mentioned that while they didn't use computers much in their elementary schools they had computers at home and used their home computers increasingly as they moved into secondary and postsecondary education. Interestingly, by the time the participants entered the teacher-education program some 85% had purchased a computer and had internet access from their homes or residences. But what does all this ownership of technology mean for actual classroom practice. Despite the statistical data that suggests that information and communication technology is commonplace in schools ICTs are most often used by teachers as "add-ons" in their classrooms and lesson plans (Richards, 2005, Mitchell, DiPetta and Kerr, 2001). Teachers may recognize, as the teacher-candidates in this study suggest, that interesting and well-planned lessons using information and communication technology are worthwhile and can enhance traditional lesson formats but the reality is that recognizing something and doing something about it are two separate and often distinctly different tasks. For example everyone knows that cigarette smoking is bad for you and yet for many smokers giving up cigarettes is one of the most difficult things that they will ever have to do. Similarly acknowledging the benefits of information and communication

technology is easier than learning how to work with technology to enhance student learning around specific curriculum or to achieve specific learning goals.

According to the instructor in this study the classroom modelling of technology in teacher preparation programs that is so necessary for technology integration and adoption by teacher-candidates is often constrained by a variety of factors. The instructor suggested that technology modelling in practice is dependent on the motivation, commitment and resourcefulness of individual instructors who act as champions for the technologies in their respective schools or departments. The research literature on technology integration in schools supports this view (Windschitl and Sahl, 2002; Mitchell, DiPetra & Kerr, 2001). An observation made by the participants from the technology-rich classroom setting interviewed for this study was that other than the modelling done for the technology-rich class formal technology training in the teacher-preparation program was limited to one computer class where instruction was lab-based and limited to exploring various software or Internet sites for teacher resources and materials. Participants for both interview groups noted that most instructors did not model the use of new technology as part of content-based classes or lesson-planning assignments. All participants acknowledged that technology was not used extensively or creatively by the majority of faculty. Interview participants from both groups commented that a few instructors provided some discussion about how technology might be implemented as part of lessons but for the most part there was little discussion of this nature.

It was also noted by participants from both groups that while all teacher-candidates had to take the computers-in-the classroom course as part of their preparation program the class was very generic or introductory in nature. Respondents believed that this was the case because the computer course had to address a range of ability, knowledge and experience levels with respect to technology use and this limited the depth of information that could be covered in the class.

When asked to speculate on why so little modelling of technology use occurred in program classes participants from both groups observed that many of the faculty teaching within the

teacher-preparation program were retired teachers with little hands on training or experience in working with these new technologies and programs in actual classrooms. The observation about who makes up the majority of Faculty of Education instructors in North America seems to agree with Lederman's (2007) research which suggests that full-time, tenured faculty in universities are on their way to extinction, accounting for only 30 percent of all instructors in programs. But are part-time faculty or adjunct faculty teaching in the teacher-preparation program adverse to or uninterested in working with technology in the classroom? The instructor for the courses in this study spoke with a number of part-time faculty teaching in the program and found that most were interested in working with new technologies but they believed, much as the teacher-candidates did, that they were ill-prepared to do so. The part-time or adjunct instructors all suggested in fact that they should be provided with training and support for working with technologies in the classroom if they were going to be asked to teach how to work with technology in their specific courses. Interestingly the instructor reported that he developed and offered a number of training programs and opportunities for other instructors to learn about how to work with technologies such as Smartboards, hand-held computers, and document cameras and the greatest interest and participation in this training came from the part-time or adjunct faculty members. All interviewee's commented that they felt that there was a great deal more to learn about working with new technologies in the classroom and that they would have to do this on their own or in their schools when they got their own classes. Five of the members of the technology-rich class actually enrolled in a weekend robotics training course at their own expense after having seen the technology demonstrated by their instructor and then going out on their practicum where they saw their schools participating in a national robotics challenge program.

The sense of needing to be self-directed in terms of learning about technology was reinforced for almost all of the study's participants when they went out on their practice-teaching practicums and realized how the use of technology in schools is often dependent upon a particular individual teacher taking the initiative to develop and promote a particular technology project or

initiative such as the robotics challenge. After the practicum all of the interviewee's also commented that they felt the amount of work they would have to do to learn to use technology effectively during their first year or two teaching seemed very daunting and all but one suggested that they would not be willing to undertake any technology experimentation during these first few career building years. The technology-rich class participants commented that while participation in this study provided them with opportunities to see new technologies and that a variety of technologies were modelled in some of their classes they generally felt that they still needed more hands-on time before they would feel comfortable enough to use the technologies unassisted or unsupported in their own classrooms. The traditional classroom group's survey responses after the first practicum showed little change in their views about how technology could be used in schools. Most of this group, over 80% continued to have very basic ideas about the uses of technology in classrooms suggesting as they did in their first survey responses that technology was a resource for lesson planning or a means gathering teaching resources and other instructional materials from the Internet. Moreover, the traditional classroom group continued after the practice teaching block to view student interaction with technology as a function of game playing, word processing or as a means of conducting basic research. Alternatively the technology enriched classroom group at the very least demonstrated more elaborate notions of how technology could be used in the classroom and more than 65% of this group viewed technology as a tool that could enhance students' learning experiences rather than simply an instructional resource. Unfortunately the technology enhanced groups practicum experiences, rather than reinforcing their positive views of technology, seems to have left 53% of them concerned about the support available to them on a day-to-day basis if they wanted to experiment with using technology to enhance student learning and about how difficult such experimentation could be as they were starting their careers. It is not surprising given their responses to the questions about support available for working with technology during their practicum that participants in both groups requested that they be provided

with more hands-on opportunities to work with these technologies even if they had to work with them at home or away from school.

The three general themes that emerged from this study, participant's attitudes to and understanding of technology use in education, concern about how prepared and supported participants would be in working with technology in their own classrooms and their views of potential risks or dangers inherent in working with new technology at the start of their teaching careers are consistent across both groups and throughout the study. It was clear that members of both groups saw their understanding of using technology for teaching and learning in subject specific ways as superficial rather than expert and their need for support as a limitation at least at the start of their careers and this made them anxious and unsure of using technology in their classes at the beginning of their careers. The suggestion that teacher-candidates wanted more opportunity to work with technology raised the question of how they would get this training or experience when they were in their own schools and had their own classes. Participants from the traditional classroom group acknowledged that they were unaware or had no strategy with respect to how they would improve their technology-related knowledge and skills. Some of these participants acknowledged that they feared it would be difficult for them to acquire such knowledge and skills as adult learners. The technology-enhanced group participants were more confident about their ability to acquire new technology-based knowledge and skills and "experiment" with it in their own classrooms although they do mentioned that they might not be willing to experiment in their few years on the job. The attitudes towards technology and learning about technology that were expressed by both groups are interesting in light of the general public's attitudes and ideas about technology. A visit to almost any university website in North America as well as many secondary schools websites will enable a student or parent to see what kind of computer technology is available or recommended for students to have while attending that particular institution. However, while only 25% of higher education institutes in Canada and the United States require students to purchase their own

computers over 80% of undergraduates either own their own computers or state that they will soon be purchasing a computer in support of their education. With regard to elementary school requirements for computer ownership in Canada it is reasonable to suggest that most parents view technology as something that will benefit their children and Corbett (2002) reported that at the turn of this century more than 85% of parents of elementary grade students across Canada were either considering purchasing or had already purchased computers for their homes. The impact of such widespread mythology around the value of computer and ICT ownership for learning is bound to effect teacher attitudes towards and beliefs about their own abilities to work with these technologies. From the first survey and interviews at the start of this study teacher-candidates in both the technology rich classrooms and the traditional classroom settings supported the view that technology was generically a good thing – only four participants out of the total 58 expressed any doubt or concern about the benefits of ICT in elementary grades and these were largely aimed at the effect of too much video gaming or computer use on social skills development in early grades and the impact of too much sitting on obesity and physical development. It is interesting to note that while participants depth of awareness of what technology could realistically be used to do in an educational sense was very limited belief in the potential of technology to be used for educative purposes ran high. Only one person from the traditional classroom setting commented on the benefits associated with assistive technologies for students with learning disabilities and other exceptionalities. Participants from both groups noted that technology in the classroom could motivate students and make school more enjoyable for them, serve as a reward for behaviour, act as a link to students home and lives outside of school and function as a means of increasing communications with parents. Both groups also expressed concern about technology overshadowing content information however. Participants from the traditional group argued that an emphasis on technology could detracting from students' acquisition of basic skills and one noted that the “bells and whistles” in programs such as PowerPoint could distract students from presenting solid facts or research by blinding them with amusing yet meaningless things to play

with. Members of the technology-rich group also expressed concerns that technology could overshadow physical and social interactions. One member of this group suggested that very young children need to manipulate things and experience things in a physical sense that technology might be preventing that. The participant noted that video programs such as “Baby Einstein” which seem to hypnotize her 6 month old baby for extended periods may be a mixed blessing in terms of providing some quiet time for parents but little physical interaction for the child. Approximately a third of the technology enhanced group members mentioned that they had concerns about their abilities to “keep up” with advances in software and after their practicum more than half expressed concern about infra-structure and the ability of individual schools to support the use of technology in the classroom. All participants acknowledged the need to stay current with respect to advances in technology as something that teachers would have to contend with in the future and all participants acknowledged a need for teachers to be aware of technology being used by students at home, as well as, in the classroom. After their practicum all participants noted that there were few instances where technology was used as part of instruction in their elementary classrooms. Computer technology use was restricted to computer class or to library or lab use through special bookings in lab-based classrooms. Moreover, the use of technology was restricted by high administrative demands (e.g., forms, bookings, logging-on, restricted time) and when participants (from the technology rich classroom) made efforts to use technology they received verbal encouragement but few actual resources or protocols for working with technology available. Thus many of the participants from both groups expressed some sense of disappointment with respect to technologies available to them for use in classrooms. Many of the technology-rich group participants reported being uninspired by the types of technology currently being used in classrooms and they were less optimistic about their abilities to use cutting edge technologies as beginning teachers. However, all participants continued to acknowledge the important role of technology in the classroom for teaching and learning.

- ✓ Examining teacher-candidate attitudes and ideas around the three themes that emerged in this study suggests that support for learning how to work with technologies for teaching and learning is something that all higher education institutes need to teach. In higher education one of the most extensive studies of information and communication technology's use in teaching and learning, The Survey of European Universities Skills in ICT of Students and Staff (SEUSISS, 2001-2002) concluded that there is a real need to integrate basic information and communication technology skills use into most subject and content areas while at the same time “working with the grain of strong preferences by most individuals for informal over formal training in ICT skills” (pg. 78). If higher education institutes need to formally integrate ICT use into specific subject and course work then shouldn't preparation for working with ICT be an institutional requirement with a formal process? The simplest answer of course is yes preparing instructors and students to work with technology within specific content or subject areas is a necessary step if any education sector seriously wants to use ICT to enhance teaching and learning. However, an answer that better captures the nature of how educational organizations work and learn, as the participants in the SEUSISS study have noted is that there is no one approach to learning to work with technology that fits all teachers or students and until teachers feel adequately prepared and comfortable working with new technologies they will continue to avoid using them. Teacher preparation programs face a number of complex challenges when presenting information and communication technologies for instruction. The first challenge is a design issue that at its core Di Benedetto (2005) suggests need to be both practical and based on current research about learning. Di Benedetto notes that technology should increase productivity by facilitating complex tasks within an institution but technology use in the classroom also needs to be evidence-based reflecting current understandings of human cognition and learning theory thereby “scaffolding” student efforts towards advanced thinking and problem-solving. In other words the problems

associated with new technologies in education reflect the need to balance pedagogic and institutional concerns, technologies need to be pedagogically based and institutionally cost-effective. Sometimes it has seemed that cost has had more influence than pedagogy on technology decisions within education (). Perhaps the reason for this is that purchase decisions are considerably easier to make and justify than pedagogic decisions and applications. **However within the constraints that teacher-preparation programs in higher education or elementary schools have to learn to live there are a number of things that the participants in this study suggested need to be done if teachers are to learn to work with technology in their classrooms.** Participants acknowledged the need to be “immersed” in technology as part of their teacher education training. Participants stressed that instructors needed to model the use of technology in content-based courses, versus, provide a brief overview of the possibilities of using such technologies. Participants requested greater access to technologies and opportunities to “experiment” with them. Greater attention to learning about “hardware” and software and learning how to teach specific subjects with technology. One participant commented that a computer course should be a prerequisite for entry into teacher education programs. Greater opportunities to participate in elective courses in technology that accommodated individuals’ prior knowledge and skills. Greater “support” for teachers while in the field when using technology. Greater support and encouragement for individuals who want to use technology. Participants also recommended that teacher-candidates need to help themselves by acquiring as much knowledge about computers as possible, not relying on technologies provided at the institution and being prepared to purchase technology for personal and professional use. Members of both participant groups also suggested that teachers should be prepared to view technology as a continuous learning process and recognize the importance of technology in students’ lives .

Conclusion

The instructor interviewed for this study suggested that faculty in teacher education programs need to be more involved in the modeling of technology across the curriculum. He noted that if we want teacher-candidates to see technology as an integral part of their future teaching then technology needs to be an integral component of preservice programs and not restricted to occasional use, “special” workshop occasions or short-term multi-ability level classes. Moreover it was suggested by both the instructor and participants from both groups that faculty need to promote and support the use of technology in the field by helping associate or adjunct teachers use technology in ways that enhance student learning in subject specific areas to achieve quantifiable learning goals. 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. Faculty need to be sensitive to “disconnects” between resources available at the university and those found in the elementary classroom . As one of the participants in the technology-enhanced group stated,

“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. I hope my next one has a whole bunch of different programs for the kids to use and for me to use in my lessons.”

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