Attitude Change and Knowledge Transformation

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Abstract

This study analysed the changing attitudes and beliefs towards technology of two classes of in-service and pre-service teachers who were enrolled in courses on technology in second language education at a university in western Canada. The data consisted of analyses of surveys, class and online assignments, class and online discussions, course evaluations, questionnaires and interviews. On the basis of students' assignments and interviews, this study found that at the beginning of the course pre-service teachers were very mixed and varying from negative to neutral in their attitudes towards the importance of mastering educational technology for their language teaching careers. Further, their attitudes towards technologies changed during the course as they became convinced that technologies can play an important role in enhancing student learning, motivations and outcomes. These changes were due to particular opportunities to actively participate in interesting online activities and to use online technologies during the course which facilitated online participants' knowledge transformation. However, many were not convinced they would be able to implement technology in their classrooms due to the inertia in the educational system and the lack of advanced technology in schools during their practicum.

Key terms: teacher preparation, the effective use of information technology, attitudes towards technology, online learning, collaboration

Introduction

The National Educational Technology Standards for Teachers (NETS•T) requires that all candidates seeking certification or endorsements in teacher preparation should meet the NEST educational technology standards. It is the responsibility of faculty and the Teacher Education Programs and cooperating schools to provide opportunities and support for teacher candidates to meet these standards (NETS for Teachers 2003).

Although advanced learning technologies have become increasingly available for a decade and some teacher educators have expected their students to arrive at university with basic competencies in learning technologies, research has consistently shown that this has not been the case for many students nor has this been the students' perception of their own competence in learning technology over the last decade (Kellenberger, 1996; Watson, 1997; Wetsel, 2004). Well- prepared teacher candidates are one of the keys to K-12 student use of technology in the classroom. However, only one-third of the graduating student teachers perceived themselves as prepared to teach technology applications. This finding was based on a survey of 89% of all pre-service teacher education programs that provided some form of information technology education in the United States. Two-thirds of all in-service teachers felt that they were not at all prepared to use technology in classroom teaching (Kerry, 2000; Wetzel, et al, 2004). Findings from Watson's (1997) research showed that many student teachers had low self-efficacy with learning technology and negative attitudes towards technology. Similarly, student teachers with

different levels of technological experience had different levels of self-efficacy: the novice students appeared to have been the most negative while the more experienced were the most positive toward the learning potential provided by technologies.

However, Kellenberger's research (1996) revealed that pre-service teachers experienced increased self-efficacy with digital learning technologies after training in the teacher preparation program with technologies. The factors that affected pre-service teachers' self-conception of their competency with digital learning technologies include:

1. The amount of hands on experiences with technology and the possibility of choosing assignments that required technology skills.
2. The frequency of pre-service teachers who were less proficient in an area being paired with a peer who was more proficient.
3. The opportunity for pre-service teachers who were very knowledgeable in a given topic to choose to be a facilitator for peers for assignments that required technology skills.
4. The opportunity for pre-service teachers who had difficulties with technology skills to ask for help and support from their more knowledgeable peers.
5. The availability of enough facilitators, including the instructor, and technicians, who could address a given need as quickly as possible, if none of the peers knew how to solve a problem.

Pre-service teachers enter teacher education programs with different levels of experience and ability with emerging technologies such as digital technology and information and communication technology (ICT), and teacher-educators should be aware of the student-teachers' incoming attitudes and needs. Some students felt emerging technologies were completely foreign, while others might have a wide range of experience using computers and other emerging technologies, and their prior experience is likely a predictor of students' attitudes. Researchers (Koohang, 1987, 1989; Loyd & Gressard, 1986; Hunt & Bohlin, 1993; Pepper, 1999) found that those students who believed technological literacy was vital for living in today's society held positive attitudes toward technology; however, many did not perceive that they needed a good command of technology for their future profession and they generally had negative attitudes toward technologies.

Based on findings that suggest experience with computers affects teacher attitudes, research sought to identify the factors that might influence students' attitudes. Savenye (1993) found that participation in the course of technological literacy improved the student attitudes toward computers and their use. After pre-service teachers had gained computer experience, they had reduced the levels of anxiety and had more confidence, and therefore they valued technology more compared to the beginning of the course.

Research Purpose

The purpose of this study is to investigate the status and effectiveness of technology learning and technology practices in a teacher education program for second language teachers and fill the gaps in this research area in terms of what and how second language teachers learn technology in training; and what and how they apply technology in the practicum, and how they intend to apply this knowledge in their future teaching positions. This study focuses on the following questions:

1. What attitude did pre-service language teachers hold towards information technology at the beginning

of the course?

2. How did students respond to exposure to the learning technologies?
3. How did pre-service language teachers use technologies to enhance second language acquisition (SLA) in their practicum schools?
4. How did pre-service language teachers anticipate applying these technologies in their future teaching positions?

Methods

Both the face-to-face components and the online component of these mixed-mode courses were held in a computer lab. A qualitative approach is applied in this study. Data collection and analyses are based on classroom observations, questionnaires, interviews, and narrative inquiry in mixed classes of in-service and pre-service teachers who were enrolled in courses on technology in second language education at a university in western Canada. These second language teachers planned to teach one or more of French, Spanish, German, Mandarin, or Japanese as second languages in secondary schools. There were a total of 38 students in the two classes who were evenly divided between in-service and pre-serve teachers. Grounded theory was applied to analyse data systematically with an inductive approach. The authors initially identified the main topics to be examined as:

1. What attitude did pre-service language teachers hold toward information technology?
2. How did pre-service language teachers use technologies to enhance second language acquisition (SLA) in practicum schools?
3. What attitude did pre-service language teachers hold toward information technology after the course work and practicum?

The authors integrated the different sources of data collected and then eliminated redundant results by a method of constant comparison of the data. The constant comparison is inductive and allows the analysis to shift from specific information to a broader, more inclusive conclusion (Strauss & Corbin, 1990).

Data Analysis and findings

Guo (2006) reported there was a statistically significant difference in attitudes toward ICT between males and females in the Pre-Program Surveys 2001 and 2003, but no evidence to show significant difference in attitudes toward ICT between males and females in the Post-Program Surveys 2002 and 2004 in the teacher education program at the University of British Columbia. This can be accounted for by the fact that female student teachers' attitudes toward ICT changed as their confidence in ICT competences increased. This study was based on the assumption that pre-service teachers' success in using technologies is partially dependent on their attitudes towards technologies. The regression analyses showed that the strongest predictor for the Pre-Program Surveys was student teachers' attitudes toward ICT. The linear regression results indicated that the variable ICT competencies and attitudes were strongly related in the Pre-Program Surveys 2001 and 2003 and ICT competencies varied with attitudes.

At the beginning of the course, most students held negative attitudes toward information technology and hesitated in using it. Students were given instruction in the use of WebCT electronic bulletin boards (BB) and search engines for finding language teaching resources and also given lists of appropriate websites in addition to assigned readings. The students were required to use the WebCT online bulletin board to discuss each of

the assigned chapters and their in-class presentations as well as their autobiographies on language/culture/identity. These activities were designed to help the student teachers collaborate in developing their personal philosophy of language acquisition/teaching. In the first classes the students greeted each other online and then posted their autobiographies to reflect their languages/culture/identity/pedagogy development and acquisition from childhood to the present. The construction of their autobiographical narrative was designed to facilitate the student awareness of their own individual exposure to teaching methodologies and contribute to their understanding of the formation of their language/culture/identity, and to help them develop a personal theory on second language acquisition and their preferred teaching methodology. The posting of this autobiography and subsequent online discussion was also found to greatly facilitate the formation of an online community as well (Carey & Guo, 2003; Carey & Morgan 2005). Soon after the student teachers became familiar with the computer lab working environment and their use of the WebCT electronic forum for discussing their language identity autobiographies, the professor informed the students online how to form student groups for each of the several languages to be taught by the teachers:

> "After today's lab experience I think you can see how you could form a group of colleagues who teach a common second language that could continue to collaborate and help each other by finding online language teaching resources throughout this course that you can use for the teaching of your particular language. This resource group will be very useful to you and you can continue to find and evaluate teaching resources throughout the coming year of teaching, starting in September."

Collaboration

I. Group Work

Each language groups was encouraged to collaborate and pool pedagogical resources found on the Internet for their particular language teaching and post these on the bulletin board so the student teachers could efficiently build a collection of language teaching resources. The following samples of the data indicate that the student teachers in each particular language group were excited about the useful resources that they found from the Internet as they told their peers to search and explore these resource treasures for teaching:

Spanish: "Hola. There are a ton of great webquest activities that would be soooooo easy to use in the classroom. The best part is that they are self- run. That means less prep time for us. Also, when you go into Vivisimo, there are several sights that have online tests for students which would be great review for tests. Check them out. Hopefully the grades in Spanish will pick up."

Mandarin: "Let's get together virtually one day and find some more useful websites for teaching. They are really helpful."

French: "Look for my homepage on this thing for awesome links!"

German: "…Do you think online activities like that would be useful in your German class? Would students in core German enjoy the opportunity to try to communicate simple messages in German?"

"I think using bulletin board is very useful, you can encourage students to have very simple chat or communication with each other."

Because of space limitations, only these few examples are provided to demonstrate how students appreciated the empowering use of the internet to find their individually preferred resources for their particular language and their particular program. This also demonstrated their change of attitude from neutral or negative to strongly positive towards the use of technology for teaching second languages. Through group work, the student teachers not only found academic support from each other, but also built their strength in technology skills and developed their fellowship. Some of the online participants even expressed how they were eager to maintain their online community and keep in touch after the course was completed.

II. Online Cooperation

The WebCT Bulletin Board not only provides a way to encourage organized collaboration in the online community, but also allows the participants to support each other whenever they found there was a need. For example, one of the classmates found that a peer was absent from classroom instruction. She posted a message to offer help: "…because you were away today you missed a bit of stuff...We learned about different search engines for finding teaching tools. Come to me to get a copy of the handout we got today…" Messages like the above one were commonly posted by students to help other students who occasionally missed the classroom instruction.

The online discussion also provides a space for the professor and student teachers to exchange their interpretations of the text content covered in the classroom meetings. The following message from the professor gave an explanation of the conceptions by theorists in the fields of linguistics and socio-linguistics. It conveyed the professor's interpretations and also encouraged student teachers to develop their critical thinking skills through further online discussions:

> …The discussion on how collaboration can aid SLA is fascinating because it puts into practice the theoretical works of Piaget, Vygotsky and much of information processing. These chapters offer the potential for conducting SLA classes that could result in much more rapid SLA. However, they also point out that learning of anything requires active reflection, analyzing and critical thinking on the part of the students. How much time does the average student really spend on critical thinking? Critical thinking requires motivation, interest and concentrated effort. I hope you will "collaborate in a discussion on collaboration" on our electronic bulletin board so that you can judge personally how a BB could be so useful in promoting reflection, critical thinking and thereby learning in a second language. There are some great quotes in these chapters that are gems of learning and worthy of negotiated meaning oriented discussions. Hope to hear from you in the bulletin board.

The in-service and pre-service student teachers shared their learning experiences and teaching experiences. They finally all agreed that technology is a worthwhile instrument for teaching and stimulating their students' learning interests during their course and practicum. An in-service teacher realized the importance of applying different means to stimulate the students' interest in learning a language: "We have been boring students to death with too much rote learning. It's no wonder so many students dislike SLA. I think that we can revitalize our SLA classes by making them more interesting for the students. And one of the best ways to do this is to provide them with the opportunity to really think about what they are learning through reflection, analysis, and critique."

Other students replied indicating that technology provides a way for learners to learn in a relaxed environment:

> "I think that a BB has a lot of potential to enhance this process and provide a forum for it. I have found personally that it is quite easy to express my thoughts on this BB. It is also really nice to have the time to think about what I am going to say prior to writing it and sending it - it takes the pressure off and means that I can say everything I want to say. It's also nice to think about what others have said and come back later to respond after I have had enough time to really reflect on it. The more I use the BB, the more worthwhile and interesting it is becoming for providing an opportunity for learning a second language."

One of the pre-service teachers applied learning technologies, including educational games, to stimulate student learning motivation. She found that even the students who was not doing well in the traditional education settings could be engaged with their educational technology and, therefore, could complete the assignments as required:

> "In my practicum I had opportunities to try using technology such as CDs in the classroom. As I became more comfortable with the class I tried using a Webquest that worked wonderfully. I completed my practicum with a game of Who Wants to be a Millionaire. Both of these exercises went over incredibly well proving that technology really captivates student attention. Even my poorest students completed the assignments on time and received good grades."

In summary, both pre-service and in-service second language teachers developed positive attitudes toward technology after the course work and their practicum. They were convinced that technology was worthwhile and important to help enhance learning outcomes and they said that they were likely to expend more energy in using it. They also shared the belief that as language teachers they should evaluate every website or a piece of software before deciding to use it in their teaching.

Discussion

Pre-service and in-service teachers enjoyed doing projects with technologies and they found that due to the collaboration and participatory learning they learned more than they expected. During their assignments they became more interested in looking at other internet links for resources which helped them to learn even more. While in-service teachers at the commencement of these courses on technology education initially acted neutrally or negatively towards technologies for language teaching, their interest in this specialization grew as the courses developed. The pre-service teachers became more enthusiastic about the possibilities of implementing their new knowledge and skills, however, the majority doubted they would be able to use this knowledge in their teaching positions. The primary obstacles they stated to implementing technology in their future classes included:

1. The lack of computers they had found in their schools when they did their practicum;
2. The lack of positive attitudes towards technology expressed by their supervising teachers in the schools;

3. The lack of emphasis on the importance of technology expressed by some of their professors in the teacher preparation program;
4. Beliefs that computers and technology were incapable of providing the venue to foster human interaction and affective second language learning;
5. Their belief that technology was competing with their specialization as teachers and that technology would displace their power and status as teachers;
6. Their fear that their students would be more advanced in technology and thereby technology would undermine the teachers' authority and ability to control their classes.

In spite of this teacher preparation program that advocates a general student-centered constructivist approach and promotes socio-cultural theory towards second language acquisition and general education, many of these in-service teachers felt that it was important for them to maintain control of the agenda and to practice highly structured instruction. There was a rather systematic agreement that whereas the in-service teachers believed that they would personally like to have had a more student-centered education and very much supported the student- centered and socio-cultural approach in these teacher education classes, in general they did not feel they could implement such an approach using technology in school systems that were currently using curriculum materials that were incompatible with such a constructivist and student- centered approach. They felt there was a disconnection between these forward looking approaches and the more traditional approaches strongly present in the schools. Several of these teachers expressed an unwillingness to give up the power and control that they had over the students. They also felt that giving the students such power and independence would threaten the teacher's authoritative role.

Conclusion

In sum, both the in-service and pre-service teachers changed their attitudes toward technology by the end of the course being convinced by their own experience with technology. They realized the pedagogical roles of technology in educational settings. First, the postings of the online language/culture/identity autobiographies had a dramatic effect in rapidly transforming the in-service and pre-service student teachers into an online community that was eager to exchange information and learn from each other. Because all students were required to develop their autobiographies on how their personal languages/cultures had been taught and acquired both within and outside of schooling, students were able to discuss and evaluate the diverse methods and pedagogies that can contribute to language learning. This produced a great interest by all students on the diversity of language teaching methods that were described for the several different languages in several different cultures. Students were eager to read these online autobiographies and compare them with their own. This online activity was instrumental in changing the initially indifferent or negative attitudes towards the use of technology for teaching and learning of language related activities to a more positive attitude. The students rapidly saw the advantages of being able to communicate online with anyone in the class about their individual language history and how languages were taught in a different culture. Second, many of the students came to see how they could use such online activities to practice a second language because unlike in face to face conversation where one has to respond immediately, online they had time to reflect on the construction of their message in a second language and to consult sources for grammar and information sources prior to posting their message online. This provides an ideal opportunity to develop second language writing skills. Third, the skills obtained from online discussions also transferred to the oral presentations in the classroom. Also, because

some pre-service teachers from Asian cultures experienced learning a language through a rote learning style and some Canadians experienced immersion French program, they discussed how a language teacher needs to use as many different approaches as possible to teach a language in our multicultural schools. Fourth, they also saw through their collaboration with the language groups how technology could be a great tool for enhancing learning by allowing students to be engaged in the cultures of the target language. Fifth, the electronic BB in these two courses provided a much more student-centred orientation in which each student could engage with other students or the professor on specific questions that were particular to that student. Finally, students also found it very useful to communicate online and evaluate the numerous online resources, and through consultation with the others, be able to select the very best for their use in teaching. It is also suggested from this study that before making a decision on the use of technology for teaching a language, an evaluation on the software or courseware is necessary for its effectiveness in pedagogical use. These factors were successful in convincing the student teachers that these technologies could be very useful in learning and teaching and knowledge transferrable.

However, the student teachers did not find these attitudes supported in the schools where they did their practicum because there was little availability of computers in the language classrooms where they taught and there was almost no use or mention of advanced technologies in these classes. Typically, there might be one computer in the classroom but there were no instances where there were sufficient computers for the students. Furthermore, even if there were computer labs somewhere in the schools, there were no language classes which used these facilities. Thus students were exposed to traditional teaching methods during their practicum and came to see the technology classes at the university as a world apart from the reality of the teaching they would be doing in the schools. Similarly, their practicum teachers in the school were not familiar with technology for second language teaching and did not seem to think that the advent of computers for second language learning in the schools was forthcoming. According to the interviews, teachers in the schools were simply not interested in the student teachers' ideas about technology and language learning and the students saw how they would have to assimilate to the traditional teaching culture of the schools. Consequently, while advanced technology is increasingly available for the schools, there is much change that would have to be implemented in the entire educational system. Advanced technologies need to be further incorporated into the curriculum plans by the Ministry of Education and further technology hardware and software needs to be available in the schools. While progress is being made in this direction and there are many websites and resources available for teachers, there needs to be a systemic change in the ways the ministry, the schools and the teachers promote these technologies for students if the potential of technology is to be realized. Nevertheless, there is room for hope if we compare the technological ability of contemporary students coming to the University with that of students coming to the University a few years ago. Presently, students are becoming more computer literate as the incidence of home computers has so rapidly increased. Therefore, we are likely to see a rapid use of technologies in the school in the next few years, but only if online learning can be made as exciting and in-depth as we found with the online tasks students experienced with their posted language/culture/identities. This resulted in critical thinking on how future teachers would be able to use this information to pursue an eclectic approach to second language teaching that takes into account the variety of backgrounds of our students in the contemporary multilingual and multicultural classrooms (Carey 2002). Therefore the goals of NETS.T referred to in the introduction are attainable, but will require higher degrees of cooperation between education Ministries, school boards and university teacher preparation programs. Finally, it is critical to promote the acceptance of technology in the entire educational system, and the best way to do this is to produce innovative programs that can optimally

demonstrate the great strengths for learning that technology can help provide. Technology presents a challenge because it requires not only a change in the entire education system but a constant change to keep up with the increasingly rapid change in technology. If this is not done, there will be a growing gap between the educational system and technology.

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