

**Do not cite without the permission of the authors.

Preparing Preservice Teachers for Teaching in a Digital Age

Susan Gibson segibson@ualberta.ca
Brenda Dyck dyckba@shaw.ca

Key words: preservice education, pedagogy courses, Web 2.0 technologies, technology infusion, practice teaching

Purpose and Objectives

Educating our youth for the digital age requires teaching that is not only infused with the latest in technological tools, but that also develops digital citizens who are able to use technology to locate, evaluate, and ethically use information, to think critically and creatively, to problem solve and make decisions, and to collaborate with others while engaged in learning experiences. Accordingly practicing teachers need to have both awareness of and skill with Web 2.0 technologies such as wikis, blogs, podcasts, in order to effectively use these tools in their teaching. It is paramount that teachers entering the field are also familiar with the potentials of Web 2.0. In order to prepare our new teachers for the infusion of technology into their teaching, they need educational experiences that model the use of these technologies in their teacher preparation programs. While a stand-alone technology course can assist with the development of technological skills, preservice teachers also need deeper understandings about how a technology rich environment can help to develop subject-specific knowledge.

The objective of the research project was to examine the impact that technology-enriched, preservice social studies pedagogy courses could have on both beginning teachers' willingness to use Web 2.0 tools as well as their approach to the use of technology in their teaching of social studies during their practice teaching experience. The research questions were: What is the nature and extent of preservice teachers' technological knowledge and skill for teaching social studies subject matter both prior to and following their pedagogy courses, and, What impact does modeling of new technologies in our social studies pedagogy courses have on student teachers' willingness to and interest in using those tools during their practice teaching?

Perspectives/Theoretical Framework

A critical factor in the successful integration of computers into teaching and learning is teacher training (Crocco, 2001); however, preparing preservice teachers for technology use in the classroom is a difficult process that requires frequent opportunities for developing understanding and competencies throughout a teacher education program (Angeli, 2004). In

addition to becoming adept at using a variety of technology tools, preservice teachers also need help to determine where technologies fit into their philosophy of teaching, including their beliefs about the nature of students and learning (Windschitl & Sahl, 2002). They also need opportunities to examine why, when and how to use the various technologies while they are developing subject-specific knowledge structures and thinking about pedagogy (Dexter & Riedel, 2003). They need to understand how engagement in active, cooperative, constructive, intentional and authentic learning experiences with technology can be more meaningful for learners (Jonassen, Howland, Moore, & Marra, 2003). Preservice teachers can also gain knowledge-transfer skills and cognitive flexibility as they experience teaching and learning concepts and instructional issues in authentic settings and from multiple perspectives with the assistance of technology tools (Brown, Collins, & Duguid, 1989). Doering, Hughes and Huffman (2003) talk about the importance of teachers developing a "thinking with technology" perspective. Specifically this "thinking with technology" perspective comes from experiencing technology being used for the following purposes: as a mindtool (Jonassen, 1995), for fostering metacognitive thought, to deepen understanding of abstract concepts, and as a mode of representing learning. As well, they need opportunities to practice technology knowledge and skills in authentic settings to become more familiar with their use and to see their potential for enhancing students' learning (Jacobsen, Clifford & Friesen, 2002). Finally, direct exposure to and practice with technology can help beginning teachers to develop self-efficacy and increased comfort with technology use (Magliaro & Ezeife, 2007).

These recommendations from the research literature were used to shape the technology experiences provided for preservice teachers in their social studies pedagogy courses.

Setting the Study Context

Students majoring in elementary social studies education in the Faculty of Education at our large Canadian university can take two pedagogy courses related to social studies teaching and learning. In one course, technology is being used to expand students' knowledge and understanding of key social studies concepts such as citizenship and diversity, as well as teaching approaches such as constructivism and concept development. Students are introduced to examples of technology-supported best practices including video clips of expert teachers working with elementary students. Teacher tools such as rubric generators, lesson plans, and repositories of primary sources for teaching history are also investigated and evaluated. Student assignments introduce technology-supported modes of representing learning, supporting metacognitive thought, and deepening understanding of abstract concepts using tools such as weblogs, digital mapping, podcasts, video interfaces and VoiceThreads. A Wiki serves as the hub of the class by providing a space to host course content as

well as a collaborative environment for students to construct their knowledge and reflect on their learning.

In the second social studies pedagogy course, two-way audio and video technology is used to bring the realities of classroom teaching into the course. Students are connected synchronously to elementary classrooms in which practicing teachers and children are engaging in social studies lessons. These videoconferencing sessions allow preservice teachers to share a common observation of skilled teachers, which can then be discussed in class, as well as the opportunity to see how a tool like videoconferencing can be used in the elementary classroom to promote collaboration and communication.

Research Methods

The study used a mixed method design and took place over the 2008 – 2009 calendar year. On the first day of class in the fall 2008 term, students in four undergraduate social studies pedagogy courses were asked to voluntarily complete an online survey about their entering knowledge of and skill with technological tools as well as their understanding of how these tools might be used to support and enhance children's learning of social studies content in elementary classrooms. An exiting survey was also administered at the end of the courses to identify changes in thinking as a result of the course experiences. Both surveys were created using Zoomerang. Twelve self-selected students [CP1] were interviewed for a half an hour at the midpoint of the 13-week course about their understandings and perceptions of the Web 2.0 tools they were being introduced to in their courses and their comfort level regarding the use of these tools in their own future teaching of social studies.[CP2]

In the winter term (2009), six self-selected students [CP3] who participated in the surveys and who would be completing their 12-week Advanced Placement Term of in-school practice teaching volunteered to continue with the study. They were provided with a laptop and a data projector to use during their student teaching. They were interviewed before the practicum began about their plans for using technology in their teaching and then upon completion of the practicum regarding what they were able to accomplish and the successes and challenges they experienced. All six participants were also visited in their practice teaching schools. Of particular interest was how the participants planned for their integration of technology into their teaching of social studies, what influence their pedagogy courses had on that planning, and the changes in their understandings, perceptions and attitudes regarding technology integration.

Results

The questionnaires conducted in the fall identified that for the most part by the end of their course work our students were feeling prepared and ready to use technology in their teaching. They indicated that they were more familiar with Wikis and blogs, digital mapping and storytelling tools, audio and visual

recording tools like podcasts and VoiceThread, and videoconferencing. They also reported feeling more comfortable with how to find quality educational web sites and they saw the value in using the internet as a news source. Of particular interest to the researchers was the finding that half of the survey participants continued to feel nervous about using technology in their teaching particularly when it comes to what do when there are glitches with the technology. It would appear that preservice teachers need more frequent opportunities to experiment with the various technologies in order to become risk takers and problem solvers who can 'think on their feet' and deal with computer-related problems.

During the midpoint interviews the 12 student teachers shed some further light on this finding. They were able to articulate the benefits of using technology in their teaching, including enhancing children's interest in their learning, engaging them in discovery learning and exploration, allowing for increased interaction in the classroom both between the teacher and the students and student-to-student, and incorporating multiple perspectives on issues through easy access to a wealth of information in a variety of formats; and, they were able to identify a range of tools that would allow them to accomplish these things using various tools. However, they also identified a number of concerns about attempting to integrate technology into their teaching such as having to deal with technology glitches, classroom management issues, how to ensure the safety of children in an online environment, having access to equipment in the schools, having a supportive mentor teacher, and needing to learn more tools. One additional concern raised was a perceived lack of preparedness to teach social studies due to time "lost" while focusing on technology. Students perceived that the social studies pedagogy courses addressed technology integration in the place of social studies content, rather than seeing the technology as a tool to learn about the 'what' and 'how' of social studies teaching. Comments such as: "I do not feel prepared to teach social studies; technology is fine, but there is a time and a place for it. I need to find out more about teaching social studies" and "I think it's fantastic using technology, but I want more insight into how I'm supposed to have children understand what I'm trying to say and how I can be a good teacher with the units and the resources I can use to meet the different learner outcomes" were typical.

Analysis of the information provided in the three interviews with the six participants during their student teaching term points to the following results. Overall the participants felt prepared and ready to use the laptop and data projectors provided through the study in diverse ways as they began their practice teaching. All six of the schools where they did their practice teaching were in smaller and, in several cases, rural school districts. All of their schools had limited access to technology and none of their classrooms had wireless access to the internet. The only computer available in each classroom was on the

teacher's desk. School labs were available in each case but scheduling was limited, internet access was slow, and many labs were outdated. All six of the mentor teachers were making limited to no use of computers in their teaching. While none of the mentor teachers refused to let the student teachers use technology in their teaching, they also did not encourage its use nor make suggestions for further use beyond what the student teachers wanted to try. The student teachers mainly used the laptop and data projector provided to plan lessons and units, to create a class wiki, to show students pictures captured from the web, to provide students with access to websites related to topics under study, to play online games, to show videos, and for graphing, poster design and digital mapping activities.

The student teachers were able to see a number of benefits for the children's learning arising from the use of the laptop and data projector in their teaching including: increased excitement and interest in what was being learned; the ability to make the children's learning more concrete; the ability to extend and relate learning to the children's worlds; the ability to increase the students' feeling of controlling their own learning; increased communications between the teacher and the students and between the home and the school; and the ability to meet the needs of visual learners. However, the student teachers also encountered challenges such as: school district restrictions on access to the web, to email and to connecting their personal laptops to the school network; inaccessible and/or slow internet access in the classrooms and in rural homes; classroom management issues particularly in a lab setting; outdated applications, computers and data projectors in schools; lack of student computer skills; computer lab booking issues; and, lack of technical support in schools. They were also surprised by the amount of time outside of classroom teaching that it took to prepare to use the technology.

Computers and technology learning outcomes have been a part of schooling for a significant number of years now. Given the lengthy history of computer usage in schools, we were quite discouraged about the inaccessibility of the technology in the schools in our study and the tendency of the school districts to significantly limit access to the internet which was a detriment to both the children in terms of doing research as well as the student teachers who were unable to use many of the sites they had learned about in their social studies and other pedagogy courses on campus. We were also concerned about the lack of mentor teacher modeling of technology tools in their teaching. It is very difficult to get preservice teachers to buy into the value of technology infusion into their teaching if they don't see it reflected in what is happening in the classroom with children.

Conclusions and Recommendations

It would appear that our technology infused, preservice pedagogy courses did assist in increasing our preservice teachers' understandings of a variety of ways to approach the use of various technology tools in their teaching as well as their

willingness to use them during their practice teaching. However, in order to address the concerns raised in this study in future courses, our instructors will need to put more and continuous emphasis on the fact that the various technologies are being introduced as a tools for helping children to learn the important skills of social studies including locating, evaluating, and ethically using information, thinking critically and creatively, problem solving and decision making, and collaborating with others. Perhaps this will help to clarify for our students that they are not being taught about digital tools in the place of some other important social studies subject area knowledge. Also to address our students' concern about dealing with glitches when using technology and to ensure that more preservice teachers are willing to experiment with technology during their student teaching, we need to help them to develop as risk takers and problem solvers when using computers.

While the preservice teachers in the second phase of our study were able to experiment with some of the tools they learned about in their courses during their practice teaching, the schools presented many unexpected barriers to that use. They were poorly equipped and were not using the digital tools that student teachers were exposed to in their social studies pedagogy courses. Teacher education institutions and school districts need to work together in order to present a consistent vision of technology integration. The schools need to provide environments that encourage and support technology use in tandem with our integration efforts in our preservice pedagogy courses in order for our preservice teachers to truly see the benefits. Even though technology integration appeared to not be a priority in the schools in our study, it is still imperative that education professors continue to model the integration of technology and to prepare student teachers for teaching with technology in ways that enhance children's learning if we hope to encourage schools and teachers to make change in this area.

References

- Angeli, C. (2004). The effects of case-based learning on early childhood preservice teachers' beliefs about the pedagogical use of ICT. *Journal of Educational Media* 29, 139-151.
- Basham, J. D., Lowrey, K. A., & Jones, M. L. (2006). Making use of the net: Internet based videoconferencing and online conferencing tools in teacher preparation. In C. Crawford, D. A. Willis, R. Carlsen, I. Gibson, K. McFerrin, J. Price & R. Weber (Eds.), *AACE Handbook* (pp. 1440-1444). Retrieved September 25, 2007 from ED/IT Lib.
- Brown, J., Collins, A. & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher* 18, 32-42.
- Crocco, M.S. (2001). Leveraging constructivist learning in the social studies classroom. *Contemporary Issues in Technology and Teacher Education* 3, 386-394.
- Dexter, S. & Riedel, E. (2003). Why improving preservice teacher educational technology preparation must go beyond the college's walls. *Journal of Teacher Education* 54, 334-346.

Doering, A., Hughes, J. & Huffman, D. (2003). Preservice teachers: Are we thinking with technology? *Journal of Research on Technology in Education* 35(3), 342-361.

Jacobsen, M., Clifford, P., & Friesen, S. (2002). Preparing teachers for technology integration: Creating a culture of inquiry in the context of use. *Contemporary Issues in Technology & Teacher Education* 2(3), 363-388

Jonassen, D.H. (1995). Supporting communities of learners with technology: A vision for integrating technology with learning in schools. *Educational Technology* 35 (4), 60-63.

Jonassen, D., Howland, J., Moore, J. & Marra, M. (2003). *Learning to solve problems with technology*. Upper Saddle River, NJ: Merrill Prentice Hall.

Lehman, J. D., & Richardson, J. (2007). Linking teacher preparation programs with k-12 schools via videoconferencing: Benefits and limitations. Retrieved from http://p3t3.education.purdue.edu/AERA2007_Videoconf_Paper.pdf.

Magliaro, J. & Ezeife, A. (2007). Preservice teachers' preparedness to integrate computer technology into the curriculum. *Canadian Journal of Learning and Technology* 33(3), 95.

Windschitl, M., & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal* 39(1), 165-205.

[CP1]How will these students be selected?

[CP2]Or rather, their understandings, perceptions, attitudes and/or comfort level regarding technology integration?

[CP3]Same comment as above.

Gibson & Dyck NECC 2009 Research Paper