Modeling Effective Technology Integration Practices for Pre-Service Teachers

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Today's pre-service teachers are expected to possess an ever-expanding array of skills that they can bring to bear within their classroom. One of these skills is the ability to make productive use of technology in their planning and preparation of daily lessons, as well as to integrate technology into the teaching and learning of their students. Many school districts now include these skills as part of their application forms and hiring processes. This study examines the methods employed by our University pre-service teacher education program over a two-year period at every level of their program to do this. The study focused on each different practicum level, tracking students as they progressed through their program. Using consultation with field teachers and faculty members active in the area of classroom technology integration, as well as drawing upon current research in pre-service teacher technology education, modifications to the current programs were suggested and tested.

This presentation is the culmination of three years of the Faculty of Education's most recent effort in trying to increase the technology integration practices of the Faculty's pre-service teacher education program. Our focus has been in working with Faculty, Teacher Mentors and students involved in our professional practicum semesters. Our approach with each level of practicum has been to encourage Faculty members to model the integration of technology into their classes. At the same time we worked with our Field Experiences Office to get in contact with our Mentor Teachers and inform them of our research and ask for their assistance in encouraging the interns to use more technology in their teaching. At each level, students provided feedback in the form of on-line surveys and this data was correlated with baseline data from students from previous semesters in order to gauge the efficacy of our methods. These results were then used to make recommendations for future semesters.

The methods that we employed all had a strong foundation in past research. Resta (2002) states very clearly in his UNESCO document *Information and Communication Technologies in Teacher Education: A Planning Guide* that the key component that is necessary in order to realize success in integrating technology into pre-service teacher education programs is the infusion and use of technology at all levels of the teachers' education. The ISTE builds upon this thinking with the recommendations that they set out in their NETS standards (ISTE, 2000) when they state that students must also be placed into situations in which they can see the technology modeled in the environment in that they are working and can attempt to make meaningful use in their own teaching. Pope, Hare, and Howard (2005) draw upon the work of a number of the doctoral dissertations within their program at Mississippi State University to support the statements of both Resta and the ISTE documents. A 1999 study found that only 20 percent of teachers in the United States felt well prepared to integrate technology into their daily teaching strategies. (CEO Forum, pp. 13). Based upon this number it would stand to reason that the belief that our students will be exposed to teaching and learning with technology in the field is grossly in error. Liu makes an excellent observation in the statement that "the prospective teachers face double jeopardy. Not only can't they see much modeling from their cooperating teachers during field experiences, neither do they see much modeling within their teacher preparation curriculum" (Liu, 2001, pp 571).

Our research began by looking at the current practices of our Faculty members and mapping out the technology-based assignments and activities that were being used within our Professional Semester I and II (PS I & II) programs with over 220 students in each. This map was then shared with the Faculty involved with these programs so that they had a clearer picture of what was being done with the students outside of their class with respect to technology integration. It should be noted that as a whole we were impressed with the diversity of technology integration activities that were being incorporated into the teaching and learning process. The problem was that there were gaps in the program in which certain instructors were doing and excellent job of integrating technology while others were not at all. This created situations where some students were receiving some excellent opportunities and modeling of the use of technology while others were not. This information was passed along to the PS I and II

coordinators in hopes that these issues would be addressed within the course specific groups of instructors. For the PS III students, we focused on a cohort of 12 students to remain within the Faculty of Education supervision model for internships. These students were placed with teachers who had been identified as technology leaders by their District Superintendent. We held an orientation meeting prior to their internship starting and invited their Mentor teachers and even District Administration and IT staff. The method of delivery for the course was discussed at this meeting as well as brief presentations from the Canadian Space Agency Teacher Outreach program as well as the Mirror Image cyber safety program. Students were also provided with copies of the DVD-based video series Water Under Fire and Global Change to use in their classrooms.

Prior to the beginning of PS I and II, we assisted with the delivery of Teacher Mentor workshops in the field. The intent of these workshops were to inform teachers who would be taking intern students about the expectations of our program and our students during their internships. We took this opportunity to encourage these teachers to support the interns in their use of technology in their teaching where it was applicable. We also asked that they spend some time discussing the use of technology in teaching and give the interns their views and feelings towards this issue. It was important that we let the teacher mentors know that this was not a central focus of either of the professional semester programs, but rather something that should be considered in their daily planning and teaching.

The students were contacted via email and asked to complete an online survey at the beginning of their on-campus courses, another at the completion of their on-campus courses and a final one at the end of their practicum. These survey instruments were designed to gather feedback on their view of the technology integration modeling and guidance that they received during the entire term. This information was compared to data collected from the previous term of students.

We also tried to encourage the students in different ways during their practicum. A web-based series of major specific resources were prepared. The science majors were provided with DVD based resources that they could use to help integrate technology into their teaching. The PS III students were provided with laptops to use for their planning and delivery if they did not have their own. They also participated in a bi-weekly series

of face-to-face and Videoconference professional development sessions that focused on different types of technologies that can potentially be integrated into their teaching.

Based upon the data we received and the observations that were made during our bi-weekly sessions and site visits, the following conclusions were made:

While it is vitally important to provide common opportunities for pre-service teachers to integrate technology (specifically Information and Communication Technology Outcomes) into their classrooms, the occurrence and success of these attempts still remains contingent upon the motivation of the individual pre-service teacher. Motivation from Faculty mentors and Mentor teachers can support this motivation, but the pre-service teacher has to feel a need to integrate technology facilitated learning strategies into their daily planning or it is simply an exercise to fulfill a requirement.

The preconceived notion of a lack of access to the necessary technology proved in fact to be a misconception in most situations. While it was true that some of the interns reported having limited or no access to technology, many more reported having ample to abundant access. In these cases the issue was not access to the necessary technology but rather how to use that technology as a tool to enrich student learning.

While we did observe a marked increase in overall use of technology (both within our study group and within the control group), the question we were left to ponder was related to the quality of learning experiences that were being created. In many situations the technology was being used as a presentation and research tool (which are basic skills and uses). The move to using the technology as a tool for synthesis and constructive thinking with the students was unfortunately still evolving.

As we had anticipated, many of the interns used technology at a very basic level with their students until later on in their practica. This was directly related to the necessity to get themselves established in the first classroom that they have been able to call their own as an educator. To begin with, most focused on the basics of their teaching, and for many this did not include the use of technology. It was observed that as the interns became more comfortable with their students and themselves as the teacher they used a wider variety of teaching strategies with their students.

The model that we used within this study would not be sustainable for future Faculty members (and this was not our intention). Our intention instead was to create a framework that would be sustainable on a program wide basis that allowed the Faculty mentor to create and support a community of learners using the tools that they are most comfortable with and that best fit the group of interns that they are working with at the time.

It was observed that the further removed the students were geographically from the University and the Faculty mentor, the more effective the technology mediated tools were in creating a sense of community. We believe this was directly related to the intern's motivation to use those tools in order to stay connected. The interns who were able to meet with others in the group in a face-to-face environment occasionally were far less motivated to use the discussion forums and course website to interact with each other. This supports our belief that while technology mediated communication tools are getting better all the time, they are still not the preferred method of communication for many people. It is only in the absence of traditional alternatives that technology mediated solutions become attractive to the interns involved.

The importance of face-to-face orientation meetings before the internship begins was really highlighted during this project. The opportunity to clarify roles and expectations for everyone involved in the internship as well as to answer any questions that the involved parties might have was a large contributing factor in the success of this project. This observation only underscores the importance of communication between the University and the Mentor Teachers and School Administration to the success of our interns in their practica and their ability to effectively integrate the ICT components.

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