

Laptops and Teacher Transformation

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INTRODUCTION

Since the first 1:1 laptop program was introduced in 1989 at the Ladies' Methodist College in Australia (Johnstone, 2003), there have been numerous studies conducted on the benefits of 1:1 computing with school-aged children. Bebell (2005), Fadel and Lemke (2006), Livingstone (2006), and Russell, Bebell, and Higgins (2004) have all reported on increases in student achievement especially in writing, analysis, and research while Stevenson (1999) has noted improvement in standardized test scores. In fewer than twenty years, 1:1 computing programs have thrived in North America, Europe, Australia, and South America. The clear benefits to the students using laptops have been well documented to the extent that the professional literature demonstrates myriad advantages to using laptops in the classroom.

As this study will show, there has been little discussion in the professional literature on how using laptops in the classroom affects the teachers. To this end, this chapter will outline my research findings with 12 laptops teachers who are transformed through technology. For the purposes of this chapter, I will define 1:1 computing classrooms as learning environments where every person in the classroom has a laptop computer with wireless Internet and printer capabilities for at least fifty percent of the day.

BACKGROUND TO THE STUDY

In 2005, the BC Ministry of Education invested 2.1 million dollars across 12 school districts in order to investigate the benefits of 1:1 computing in the classroom (BC Ministry of Education, 2005). From the Ministry-funded 12 school districts, I chose one school district that represented a unique research opportunity. Nisga'a School District had been using 1:1 computing for three years but, of particular interest was the fact that every teacher and student in grades four to twelve had a laptop. There were 45 teachers and 440 students

in the district and 120 adult learner students with approximately five Instructional Technology Support personnel. In 2003, four Grade Six classes were chosen to pilot 1:1 computing and each year an additional grade was added until 2006, when all classroom teachers became 1:1 computing teachers. The first few years were district funded but the BC Ministry of Education provided funding in 2005 to assist in 1:1 computing. All schools in the district are members of the Network of Performance-Based Schools.

For the purposes of this study, four of the five schools in the district were chosen for site visits. The District Principal identified 12 teachers who used the laptops in their daily teaching and these 12 teachers were contacted for a participation request and were emailed an informed consent form. All 12 teachers completed the on-line questionnaire and were interviewed during my site visits.

Each participant in the study completed an informed consent form which had been approved by the respective university and school district ethics committees. Teachers were told that they could withdraw at any time for whatever reason. They chose their own pseudonyms but were also assigned alternates should their choice not be conducive for research reporting. For instance, one teacher chose "Mickey Mouse" so, for the purposes of reporting her results, the alternative was used. Those chosen or assigned pseudonyms are used in this chapter.

RESEARCH METHODS

Using an adapted model of my previous research paradigm (Kitchenham, 2006), I conducted the study with the 1:1 computing teachers. I used three research tools: an on-line questionnaire, a semi-structured interview, and researcher field notes. The teacher questionnaire informed the semi-structured interview and my field notes filled in gaps among the other data instruments. That is, each data source added to and expanded on the other data sources so that the pooled data revealed

significant results in relation to the degree of perspective transformation.

I asked the teachers to complete an on-line survey that requested their ranking of specific statements dealing with transformative learning. In particular, they dealt with their perceptions of 1:1 computing in relation to alternative understandings of a new problem, contexts of problems, critical reflection and critical self-reflection, testing new beliefs, coping with anxiety, taking action, and engaging in critical discourse. To ensure a clear distinction in the degree of perspective transformation, the teachers rated their responses on a 10-point agreement scale; a choice of "1" (Strongly Disagree) meant a low degree compared to "10" (Strongly Agree) indicated a high degree of perspective transformation. The teachers were given three weeks to complete the survey and, as part of the response, indicated when they were available for an interview.

As well, each participant was interviewed based on his or her responses to the questionnaire. For example, if a teacher responded on the questionnaire that she critically self-reflected on her 1:1 computing evidenced by a response of 8, 9, or 10, that teacher, in the interview, was asked to provide concrete examples of the reflection in relation to 1:1 computing. Each interview lasted 30 to 90 minutes and was transcribed. The transcriptions were returned to each teacher for any clarifications and were returned to me within one week of emailing the documents.

The researcher field notes augmented the other sources and provided me the opportunity to record my own reflections on the teachers' perspective transformations and other related information. For instance, after teaching a mobile lab lesson to her Math 9 students, Gladys indicated that she saw her role changing from one who stood at the front of the class to one who never stayed in one place for more than a minute or two. That comment was recorded in my field notes as it clearly related to a change in frame of reference; a necessary part of a perspective transformation.

A mixed-methodology approach (Tashakkori & Teddlie, 2003), combining qualitative and quantitative research methods, was appropriate for this study. The qualitative method allowed for the coding and categorization of the rich responses from the 18 participants. The quantitative method allowed for the inclusion of frequency counts to describe the degree of perspective transformation.

RESULTS

In the analysis of the data, only comments related to teacher transformation were extracted for further examination so that any comments dealing with other influences from 1:1 computing were ignored. For instance, some discussion occurred about student achievement but, unless they dealt with teacher transformation, they were not subjected to further analysis. It should be noted that, in British Columbia, there is one principal investigator who is collecting data on student achievement in laptop schools so I was conscious of any researcher interference throughout the study.

There were four male and eight females in this study. Fifty percent of the teachers had been at the school for three to five years and 42% had been teaching for the same amount of time. Before the research projects began, 17% of the participants rated themselves as "developed" in technology but 67% ranked themselves the same category at the time of the study. In short, the use of 1:1 computing transformed these teachers to the extent that they perceived themselves as being more competent than previously. As well, age does not appear to be a variable for transformation as 50% of teachers were over the age of 36 and 25% were between 46 and 55 years old.

The data from the on-line questionnaire were analyzed for the degree of perspective transformation that had occurred. It was decided that a teacher experienced a high degree of perspective transformation if he or she chose an 8, 9, or 10 on the 10-point rating scale. For the purposes of discussion and to factor in some degree of error, only the statements that received 75% or higher will be elaborated upon in this chapter.

An overwhelming number of teachers (92%) demonstrated a high of perspective transformation is present for these teachers. Eighty-four percent of the participants indicated that they understood the origin of their beliefs and that they critically reflected on their assumptions related to their established beliefs. Seventy-five percent of the teachers indicated that they coped with anxiety when they had taken action which was predictive of comments discussed during the semi-structured interviews. These data, considered collectively, indicate a high degree of perspective transformation which, in turn, supported the comments in the interviews.

All written data, from the semi-structured interviews, on-line questionnaires, and researcher field

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