

The impact of educational technology on learner interactions: A multiple case study of elementary classrooms

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Abstract. The purpose of this research was to study a selection of elementary school classrooms in order to observe, analyze, and describe the impact of educational technology on learner interactions. As a qualitative research project, the methods employed included observations, personal interviews of teachers, focus group interviews of students, and document review.

Findings from three descriptive case studies indicated that educational technology, when incorporated into traditional teaching practice, resulted in little change in learner interactions but a discernable increase in student interest and motivation. When integrated into lessons that were more constructivist in nature, technology was observed to facilitate higher levels of communication and collaboration between students and teachers. Particularly of interest was a “students as teachers” model that occurred as students shared their knowledge with others, often coupled with teachers allowing students to have more control of the learning process.

The study concluded that integrating technology can positively impact the interactions of learners in elementary classrooms when used as a tool to support constructivist pedagogy. The conclusions also definitively speak to the powerful role of the individual teacher and how their daily instructional decisions are impacted by their personal philosophies, background, pedagogical preferences, and comfort with the technological tools at their disposal.

1. Introduction

The use of educational technology in schools as a means to improve student learning has received extensive attention over the past two decades. With the advent of the internet and a variety of software and hardware applications, school districts have predominantly focused on the acquisition of hardware and computer network infrastructure in the pursuit of educational technology goals. Based on data collected from schools across the nation over twenty years, a dramatic increase has been observed in the availability of computer technology. The student to computer ratio has been reduced from 125:1 in 1983¹ (without internet access at that time) to nearly 4:1 by 2003, with almost 100% of schools now having internet access². Questions have persisted as to the actual impact these technologies are having in the planning and delivery of instruction as well as the perceived benefits to the learning process. The study described in this document was designed to understand the impact technology is having on the way the inhabitants of school classrooms interact with one another as they go about the business of “schooling.”

2. Methodology, Results, Discussion, and Significance

In order to definitively investigate how technology was impacting the learning environment of elementary classrooms, a research design that allowed for direct observation and thorough exploration of the research context was necessary. Consequently, the design of the study evolved from within the qualitative research tradition and is described as a multiple case study. Three separate classroom teachers in one school were selected based upon their varied teaching styles, perceived level of technology integration, and openness to the research project. Such purposeful sampling³ was based on the researcher’s observation and experience as a school-level administrator, and the belief that the selected participants would provide an open and trusting research environment for the study. A particular challenge in the study was that the researcher was also the supervisor of the study participants.

Four primary methods of data collection – observations, personal interviews, focus group interviews, and document review – were utilized during the research to provide a thorough understanding of the interactions between the learners in the selected classrooms. Throughout the data collection period the researcher conducted multiple informal observations in each classroom, acting in what has been called the participant observer role⁴. Three formal

observations were conducted in each classroom as well, with the researcher in a primarily observational role for a longer period of time. Following the observations and nearing the end of the data collection period, personal interviews were held with each of the three teachers in addition to several focus group interviews of students. The constant comparative method of data analysis⁵ was used to look for similarities and differences between and among units of data collected from different sources. Common themes and categories surfaced throughout the research process, and once such labels emerged, each unit of data was coded according to where it fit within these categories; each individual classroom was undertaken as a separate descriptive case study.

The resultant analysis of the three case studies led to a number of conclusions from the following themes that emerged during the research: Teaching Philosophy and Pedagogy, Teacher Comfort with Educational Technology, Learner Interactions and Pedagogical Choices, Learner Interactions and Educational Technology, Learner Perceptions of Educational Technology's Impact on Learning, and finally, Observer Effect on the Research. Of particular interest was the significant impact an individual teacher's guiding philosophy and pedagogical choices had on the interactions between learners in the classrooms. Such beliefs were found to have a far stronger impact on learner interactions than the use of educational technology, as the methods employed with the technology were most often aligned with preferred teaching styles and beliefs regarding student learning and classroom procedures. However, when the individual teachers in all three classrooms engaged in student-centered, constructivist-oriented activities that included educational technology, interactions between all learners (students and adults) in the classrooms and engagement with instructional content significantly increased – often accompanied by a “students as teachers” phenomenon. Additionally, the researcher's dual roles as participant observer and supervisor provided a unique exploration of the evolutionary process seen in one classroom as the teacher utilized the research to strengthen her understanding of the use of educational technology by using the researcher's availability and expertise. A significant conclusion thus found that when appropriate support and encouragement are provided in a climate of mutual trust and respect – and perceived as helpful and non-threatening – teachers are open to learning new skills that will serve to enhance their pedagogy and be meaningful to students. The brevity of this synopsis does not allow for full discussion of the research, but detailed findings and conclusions are available in the full report⁶.

This research has contributed to the knowledge base of how educational technology is affecting the learning environment of students and teachers, thus supporting the process of transforming learning for students who exist in a technology-rich 21st Century society. Additionally, the research has contributed to the field of qualitative research through an exploration of the impact of potentially conflicting roles of the researcher on the researched.

3. Conclusions

The study concluded that integrating technology can positively impact the interactions of learners in elementary classrooms when used as a tool to support constructivist pedagogy. The conclusions also definitively speak to the powerful role of the individual teacher and how their daily instructional decisions are impacted by their personal philosophies, background, pedagogical preferences, and comfort with the technological tools at their disposal. The dual roles of the researcher also led to increased interactions between adults and a partnership that led to deepened relationships and understanding of the teaching and learning process.

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