An Exploratory Mixed Methods Study:

One-to-One Technology in the Elementary Classroom

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CHAPTER 1

INTRODUCTION

Introduction

Technology is all around us. It is embedded into our daily lives and has changed the way we live (Li, Worch, Zhou, & Aguiton, 2015). Children are no exception to this occurrence. They are growing up using technology from a very young age. Technology is something that is natural for them.

Emerging technologies are transforming education (Li et al., 2015). Having access to one-to-one technology in the classroom can have a significant effect on students. It is relevant to them and can provide meaningful learning experiences (Costly, 2014).

The amount of districts striving to implement one-to-technology in their schools is increasing each year. With such important factors at stake, we need to explore how it is being used in the classroom.

Statement of the Problem

Technology alone will not help students to achieve more. Simply placing technology in a classroom is not going to magically transform the experience for those students. This is not enough. Technology can be looked at as a tool and when used effectively, it can dynamic and effective (Costly, 2014).

Despite knowing its potential and having it available to use, some educators do not embrace using technology in their classrooms (Eteokleous, 2008). By observing what goes on at

a specific grade level, the researcher can create a tool to measure what is going on in the other grade levels. The data can be analyzed to study how the one-to-one technology is being used in the district and the factors that go along with the success of its implementation. The data can be used to create a strategic plan to move forward with effective change regarding one-to-one technology.

Purpose

There are many advantages of utilizing technology in the education (Costly, 2014). The Purpose of this study is to explore and gauge how teachers are using technology in a newly adopted one-to-one technology environment, as well as examine teachers' attitudes and beliefs regarding one-to-one technology and how they perceive their students to be adapting to the environment.

The findings of this study will be able to determine if teachers are adequately prepared or if they need further professional development in order to create an environment that stimulates an increase in higher-order thinking skills.

The data will make a generalized conclusion regarding if the one-to-one technology is being implemented effectively throughout the elementary school in the district. The findings will help the district know what they need to do to move forward to make sure that the implementation of one-to-one technology is meaningful and a success.

Research Questions

The following questions are primary focus this study:

1. What kind of professional development was given to teachers in order to prepare them for a one-to-one technology environment?

2. How is one-to-one technology being used in the classroom?
3. What are the attitudes and beliefs of teachers about a one-to-one technology environment?
4. Do teachers recognize any differences in their students' motivation, behaviors or achievements during the one-to-one technology initiative?

Limitations

The nature of the design method requires the sample size to be small. The research will take place in elementary schools located in one suburban town in New Jersey. The findings may not be generalized to other school districts.

CHAPTER 2

LITERATURE REVIEW

Introduction

There have been many studies that have reported on advantages of using technology in the classroom (Kurt, 2010). Immersion into a one-to-one environment can stimulate a better environment in schools which in turn impacts student's learning (Charleston, 2017).

One of the goals of this mixed methods study is to measure how teachers in the Sunnyville Public Schools are using technology in their newly implemented one-to-one technology environment, as well as investigate teachers' attitudes and beliefs regarding one-to-one technology and how they perceive their students to be adapting to the environment.

Relevant Studies and Theory

In order for technology to make a significant impact on student learning, it needs to be used frequently (Kozma, 1991). Teachers will most likely not use technology in their instruction if they do not feel prepared or comfortable with it. Which is why professional development experiences play a role in the success of a one-to-one technology environment. There are several factors that can equate to whether or not professional development activities are favorable. The amount of time is one factor. Teachers that were exposed to professional develop for at least nine hours are more likely to use technology because they feel comfortable with it (Penuel, 2006). The type of professional development is another factor. Teachers need to feel that applicable to what they are teaching and aligns with their standards (Penuel, 2006).

Another factor is the ease of availability. When teachers are restricted to only using computers in a centrally located lab it directly affects the amount of time that teachers spend

using technology (Adelman, Donnelly, Dove, Tiffany-Morales, Wayne, & Zucker, 2002). The rapidly growing one-to-one technology phenomenon is enabling this mindset to change.

Directives from the United States Department of Education and the New Jersey Department of Education are major factors that are influencing the integration of technology in education. The Common Core Standards and the New Jersey Learning Standards are also helping to further push technology initiatives along (Charleston, 2017).

Socioeconomic status should not be a factor in students having access to readily available technology. The National Technology Plan (NETP) is helping to ensure this by calling for equity, engaged and collaborative use to make "all-the-time learning possible" (United States Department of Education, 2017). With the amount of of technology devices are becoming increasingly more affordable, it is getting easier than ever for districts to implement one-to-one technology initiatives. Between the amount of economical mobile learning devices that are available and the ease of wireless capabilities, these technology initiatives are increasing quickly (Penuel, 2006).

It is important to explore how technology is being used in the classroom. Classrooms that seamlessly integrate one-to-one technology into their daily activities find that students have a better understanding of technology skills and literacy, which reportedly helps them to be more successful in their core subjects (Penuel, 2016). An effective one-to-one environment can easily promote individualized learning, self-directed behavior, critical thinking skills, collaborative learning (Charleston, 2017).

If technology is available and not being used in the classroom on a routine basis, it is important to examine why. Studies have shown that circumstances that usually impact whether

or not a teacher implements technology in the classroom are either personal, professional, or organizational (Eteokleous, 2008). Another study showed that self-efficacy was an influential factor in the use technology for participants and teachers (Li et al. 2015). This is why it is important to explore the teachers' attitudes and beliefs and to investigate if they recognized differences in their students since the implementation of the one-to-one technology initiative.

The teacher is an important part of a one-to-one classroom because, in the end, it is usually the teachers' decision about if and how to integrate technology in the classroom (Kurt, 2008). Without teacher buy-in, it is very difficult to establish a successful one-to-one technology initiative.

Summary

Research shows that technology can be beneficial. It can significantly impact student achievement and collaborative behaviors (Oliver & Corn, 2008). In order to effect change, districts need to strategically push past traditional methods and adequately prepare students for the jobs that will be available for them when they graduate.

It is essential to examine technology programs to make sure that they are effective. Understanding what is working and what is not, will give districts crucial information to help one-to-one technology environments flourish. This is important in order for a district to move forward. There is too much at stake to ignore this.

CHAPTER 3

METHODOLOGY

Introduction

This chapter outlines the research design and discusses the population, sample and procedures that will be used to conduct the research. This focus of this study intends to explore one-to-one technology in elementary classrooms.

A mixed method design uses various types of data and is useful when a researcher is trying to provide a complete story that can be done better with both qualitative and quantitative data (Creswell & Creswell, 2018, p. 17). An exploratory mixed methods approach will be used in this study. This design is useful in order to generalize the qualitative findings to a larger group (Creswell & Plano Clark, 2011, p. 87). This is believed to be the best method that would adequately address the following research questions:

1. What kind of professional development was given to teachers in order to prepare them for a one-to-one technology environment?
2. How is one-to-one technology being used in the classroom?
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Research Design

In order to be able to generalize the results to a larger sample size, the exploratory mixed method design was chosen as the specific method for this study. It is an appropriate method

when you want to explore a topic to evaluate if the quantitative results generalize the qualitative results to a larger sample size (Creswell & Plano Clark, 2011, p. 151).

This design allows the researcher to delve right into collecting data without having a preselected set of variables (Creswell, 2015, p. 547). This type of design is completed in two separate, sequential phases. The first phase will be qualitative. This exploratory qualitative phase will involve observations of eight sixth-grade classrooms. The researcher will use the International Society for Technology in Education (ISTE) Classroom Observation Tool (ICOT) Checklist (Appendix) during observations in the classroom (ISTE, 2011). The data will be later entered online. The ICOT is a free resource aimed to help observers evaluate technology use and implementation in the classroom (Stelar Stem Learning and Research Center, 2017).

Following the observations, the researcher will meet with teachers individually and conduct semi-structured interviews. The researcher will allow the teacher to elaborate on anything that happened during the observation, as well address any questions that the researcher had during the observation. Upon completion of the first phase, the researcher will analyse all of the data and then identify for themes (Creswell, 2015, p. 546).

The goal of this study is to see if the finding from the qualitative phase can be generalized to a bigger population (Creswell & Plano Clark, 2011, p. 87). Therefore, a survey will be created based on the data that was discovered in the qualitative phase. The goal of the survey is to gather data from a larger sample size.

The priority of this design will be placed on qualitative data (Creswell, 2015, p. 546). This design will useful in discovering whether or not the findings in the sixth-grade classrooms can be generalized throughout the entire district.

Population & Sample

This study took place at the Sunnyville Public School District in Sunnyville, NJ. Purposeful sampling was used in this study in order to be able to obtain necessary qualitative data (Creswell & Plano Clark, 2011, p. 173). The qualitative phase of this study will be conducted in eight sixth-grade classrooms that have one-to-one technology. Creswell & Plano Clark (2011) state that a separate sample should be used for the follow-up qualitative phase (p.181). The quantitative phase will involve all 48 of the Kindergarten to grade five teachers that have one-to-one technology in their classrooms. This larger sample size will allow the researcher to make claims regarding the whole population.

Procedures

The researcher will first seek permission from the Sunnyville Public Schools' Superintendent and Board of Education. The next step would be to get approval from IRB (International Review Board) at New Jersey City University. Upon receiving approval, the researcher will set up a meeting with the building principal in each school. The researcher will explain the study to the principal and also request a list of the teachers' names and contact information.

The qualitative phase of this research study will be conducted through semi-structured interviews and classroom observations in eight sixth-grade classrooms using ICOT. Once the data is transcribed, it will be sent to each teacher to verify the validity of the information. Another measure to ensure internal validity will be analyze it for emerging themes and to triangulate the data (Creswell & Creswell, 2018, p. 208).

Upon examination of the data from phase one, the researcher will create a quantitative survey instrument that will build upon the findings that were discovered during the initial phase (Creswell & Plano Clark, 2011, p. 86). The survey will be emailed to the remaining teachers in one-to-one technology classrooms in grades kindergarten to fifth-grade.

Table 1

Triangulation Matrix

Research Question	Data Type	Data Source
What kind of professional development was given to teachers in order to prepare them for a one-to-one technology environment?	Quantitative	Survey
How is one-to-one technology being used in the classroom?	Qualitative & Quantitative	Observations, interviews & survey
What are the attitudes and beliefs of teachers about a one-to-one technology environment?	Qualitative	Interviews & survey
Do teachers recognize any differences in their students' motivation, behaviors or achievements during the one-to-one technology initiative?	Quantitative	Interviews & survey

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Appendix

ISTE Classroom Observation Tool (ICOT) Technology Checklist

ISTE Classroom Observation Tool (ICOT): Technology Checklist
http://iste.org/icot

1. Setting		
Date:	Observation Start Time/End Time:	# Students:

(You can track technology use by three-minute intervals throughout the observation using the three-minute chart at the end of this form.)

2. Room Description and Student Characteristics

3. Student Groupings (check all observed during the period)	
☐ Individual student work	☐ Small groups
☐ Student pairs	☐ Whole class
☐ Other (please comment):	

4. Teacher roles (check all observed during the period)	
☐ Lecturing	☐ Interactive direction
☐ Discussion	☐ Facilitating/coaching
☐ Modeling	☐ Other (please comment):

5. Learning activities (check all observed during the period)	
☐ Creating presentations	☐ Test taking
☐ Research	☐ Information analysis
☐ Writing	☐ Simulations
☐ Drill and practice	☐ Hands-on skill training
☐ Other (please comment):	

9. Oregon Technology Standards (choose all standards that apply):

- ☐ ET.1 Creativity and Innovation: Students demonstrate creative thinking and problem solving skills to develop innovative products and processes using (digital) technology.
- ☐ ET.2 Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, across the global community, to support individual learning and contribute to the learning of others.
- ☐ ET.3 Research and Information Fluency: Students select and apply digital tools to gather, evaluate, validate, and use information.
- ☐ ET.4 Critical Thinking, Problem Solving and Decision Making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
- ☐ ET.5 Digital Citizenship: Students understand human, cultural, and societal issues related to digital technology and practice legal, ethical, and responsible behavior.
- ☐ ET.6 Technology Operations and Concepts: Students utilize technology concepts and tools to learn.

Comments:

10. Three-Minute Chart

During each 3-minute period, was technology *in use* by students and/or teachers, and was the time spent with technology used *for teaching and learning* (as opposed to recreation or routine tasks, such as boot-up and log on)?

Technology is:	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	24-27	27-30	30-33	33-36	36-39	39-42	42-45	45-48	48-51	51-54
Used by students																		
Used for learning																		
Used by teacher																		
Used for learning																		

11. Estimated Time Technology Used (if 3-minute chart is not used)

Total minutes technology used by students:
Minutes students used for learning:
Total minutes technology used by teacher:
Minutes teachers used for learning:

12. Any other comments?

6. How essential was technology to the teaching and learning activities?	
☐ Not needed; other approaches would be better.	☐ Somewhat useful; other approaches would be as effective.
☐ Useful; other approaches would not be as effective.	☐ Essential; the lesson could not be done without it.
☐ Other (please comment):	

7. Technologies used by teacher (check all observed during the period):			
☐ Blog	☐ Calculator ☐ CD-ROM	☐ Database ☐ Data Projector ☐ Desktop Computer ☐ Digital Camera ☐ Document Camera ☐ Drill/Practice	☐ E-mail
☐ Graphics	☐ Interactive Whiteboard	☐ Laptop Computer ☐ Library Database	☐ Mobile Learning Device
☐ Netbook	☐ Outliner	☐ Podcast ☐ Presentation	☐ Response System (Clicker)
☐ Science Probe ☐ Simulation ☐ Spreadsheet	☐ Tablet Computer	☐ Video Camera ☐ Videoconferencing	☐ Web Authoring ☐ Web Browser ☐ Web 2.0 Tool ☐ Wiki ☐ Wireless Slate ☐ Word Processing
☐ Other (please comment):			

8. Technologies used by students (check all observed during the period):			
☐ Blog	☐ Calculator ☐ CD-ROM	☐ Database ☐ Data Projector ☐ Desktop Computer ☐ Digital Camera ☐ Document Camera ☐ Drill/Practice	☐ E-mail
☐ Graphics	☐ Interactive Whiteboard	☐ Laptop Computer ☐ Library Database	☐ Mobile Learning Device
☐ Netbook	☐ Outliner	☐ Podcast ☐ Presentation	☐ Response System (Clicker)
☐ Science Probe ☐ Simulation ☐ Spreadsheet	☐ Tablet Computer	☐ Video Camera ☐ Videoconferencing	☐ Web Authoring ☐ Web Browser ☐ Web 2.0 Tool ☐ Wiki ☐ Wireless Slate ☐ Word Processing
☐ Other (please comment):			