Technology Use in the Elementary Classroom – A Help or a Hindrance?

By

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Abstract

This qualitative study analyzes teacher perceptions on the use of technology in the elementary classroom. This study was completed in order to elicit the opinions about and implementation of technology in the classroom by in-service teachers, with previous literature highlighting self-efficacy, teacher training, influence of the principal, and perceived usefulness as key determining factors of technology use. This research study was conducted through two semi-structured interviews with two participants working for the Toronto District School Board. Upon finishing the interviews, they were transcribed, and then further coded into codes and themes. The major themes that arose from the interviews were preparedness, influence, and usefulness. Although previous literature stated that educators do not find a use for technology, both participants spoke very highly about technology and its place within education. Lastly, this study makes practical recommendations in order to remedy gaps in the field that were identified by the participants.

Key Words: technology, elementary, preparedness, influence, usefulness
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Chapter 1: Introduction

1.0 Introduction and Research Context

Computers, SmartBoards, and iPads; technology has made many miraculous advances in modern society. It has affected our daily lives, as well as the functionality of our public services sector, from retail business through to the medical profession. Technology has become increasingly more prevalent in the education sector. Growing up, I remember having a computer lab, either in its own dedicated room or integrated within the library, as well as the use of overhead projectors. There were never any computers or smart devices used in my classroom learning – it was purely the traditional methods of textbooks and worksheets. Now, after having done placements in public schools since 2012, it is quite shocking to see how the landscape of learning has shifted. This is what has inspired me to research this topic of technology use within the classrooms, as I believe it is certainly a topic that is very relevant to us as educators, and for the education of our future students.

I am interested in more closely examining how elementary educators perceive the use of technology in the classroom. Although there is a plethora of technology available for use, it is ultimately up to the classroom teacher to implement that technology, which is why I am interested in exploring how teachers themselves feel about technology use within the classroom. This study aims to draw insights on how elementary teachers both use and feel that technology acts as an educational support by obtaining in-depth data about their thoughts, opinions, and feelings on the matter. It is my hope that the findings I derive from this study will possibly inspire further research in this exciting topic.
1.1 Critical Approach

The approach that will be utilized as a framework for my research is the collective case study approach. This method allows the researcher to focus on one issue, and allows for multiple participants to respond with the same focus (Creswell, 2013, p. 99). I want to hear the viewpoints of teachers about technology and its implementation in the curriculum and classroom. Through these conversations, I hope to gain their insights on the use of technology, and shed light on possible solutions to any challenges they might be encountering. By using the collective case study approach, I am to allow “the logic of replication, in which the inquirer replicates the procedures for each case” (Creswell, 2013, p. 99). This will provide me with multiple perspectives revolving around the same set of questions, possibly providing a more diverse set of data.

Through this lens, I will conduct this research through a series of in-person interviews with 2-3 participants. The participants will be teachers who are currently educators of elementary grades (grades kindergarten-6) in Toronto schools. I am not putting any restriction on the age of the teacher or the amount of time they have been teaching, as I believe getting a diverse array of experiences will be more beneficial than narrowing my focus too specifically. The interviews will be done in-person and typically in the classroom/other area of the school that the teacher deems appropriate. Although ideally this research would benefit from as many participants as possible, due to time and logistical restraints the amount of participants will be limited to 2-3. Participants will be provided in advance with full disclosure about the purpose of the study, the scope of their involvement, and will be informed of their ability to withdraw from the study at any time.
1.2 Research Questions

The literature related to the use of technology in the classroom has revealed four overarching themes: feelings of self-efficacy directly affect how much technology is implemented by teachers (Ciampa & Gallagher, 2013; Cox, 2013; Levin & Wadmany, 2008; Moore-Hayes, 2011), the amount of training they have received will determine technology use (Ciampa & Gallagher, 2013; Cox, 2013; Levin & Wadmany, 2008; Wilson, Notar, & Yunker, 2003), the attitude of the principal affects the extent to which teachers will implement technology (Ciampa & Gallagher, 2013; Levin & Wadmany, 2008; Miranda & Russell, 2011; Wilson, Notar, & Yunker, 2003), and the perceived usefulness of the technology in the classroom (Cicconi, 2014; Levin & Wadmany, 2008; Miller & Robertson, 2011; Proctor & Marks, 2013; Roush & Song, 2013; Rushowy, 2012; Serow & Callingham, 2011). With the rapid pace that technology is evolving, it is understandable how overwhelming its use can be; software, Internet sites, and apps that are current and applicable in one school year can become obsolete the next. Although training in how to use technology effectively in classrooms is available, some educators do not see its value. Although teachers may possess a high level of proficiency, they simply do not like to use technology (Levin & Wadmany, 2008), or they do not see the educational value in utilizing technology (Proctor & Marks, 2013). I believe, as reflected through the literature, that it is imperative to get feedback from those on the frontlines to help identify strategies to assist educators in a practical sense.

The key question that I will be trying to answer in this study is “how do teachers perceive the use of technology in the elementary learning environment?” By leaving this question open-ended, it is my hope that educators can speak honestly and candidly about their opinions. Branching off from this main question, there are sub-questions that I
believe will help provide specific insight towards finding answers to the key question: How has the learning environment shifted since the implementation of technological learning aids?; How do teachers implement technology in the classroom (if at all)?; What processes are in place for teachers who are lacking training with certain technology?; and What is the overall attitude towards technology use in the classroom?

1.3 Background of the Researcher

My interest in this topic comes from two main sources, one being personal, and the other professional. I will briefly discuss how each of those different aspects has affected me and sparked the flame that is currently my passion for researching this topic.

In terms of my personal connection to this topic, I grew up as a video game kid, owning all of the gaming consoles throughout childhood, adolescence, and adulthood. I can still remember getting my first computer in 2001, and finally being able to connect to and explore the fabled Internet that I had the chance to explore only in my school library. My only interaction with computers at schools, however, was in the school library (grades 5-12), or the designated computer lab I had in my school in grade 4. When I re-entered post-secondary education 3 years after high school, I was amazed to encounter PowerPoint presentations – what a difference it was from the trusty overhead projector! I was beginning to see how rapidly technology was changing, and with my already avid love of video games and Internet-related activities, it was not surprising to see that I had developed an interest in how technology helps shape our reality. I do not think a day goes by where I am not interacting with technology in some way, shape, or form, and I am fascinated by how it is making its way into the early learning environment.

In the third year of my university program of Early Childhood Studies, I took a Research Methods and Applications courses. For our culminating project in Methods, we
had to do a literature search which contained upwards of 20 sources related to a topic. My group members were also very interested in the area of technology, and we researched how it was used in the educational setting. In the following semester, in Applications, four out of six people from my Methods group happened to be in the same Applications class. We were all still very interested in the technology topic, but decided to look at it from the perspective of how parents perceived the use of technology as an educational tool in their homes. We ended up surveying around 30 parents of varying ages, socio-economic backgrounds, educations, etc. It was exhilarating to be able to conduct research on something that I was genuinely interested in. Coming into this program, I wanted to take that same idea, and take it a step further by looking at technology use from the perspective of the teachers in elementary classrooms, and to understand their viewpoints on the matter.

Overall, I am definitely an avid consumer of technology and appreciate the benefits it brings to our daily lives; I believe that technology can be used to elevate learning opportunities for children. I am interested in hearing the opinions of the educators in the field; I believe we learn far more from a mosaic of differing viewpoints than an amalgamation of the same perspective.

1.4 Overview

The structure of this Master of Teaching Research Project (MTRP) falls within five chapters. This first chapter is the introduction which contains a general overview of the research, as well as my personal investment in the project. Chapter two will contain a more in-depth look at the literature as it pertains to my topic. The third chapter will also provide a more detailed account of the methodology and instruments used to conduct the research. Chapter four will report the results of the interviews and will extrapolate the
underlying themes and insights that are found. Lastly, the fifth chapter will take the data that is found from the results section and translate it into a more ‘big-picture’ discussion and how it will make an effect on the teaching profession.
Chapter 2: Literature Review

2.0 Introduction

Technology is a topic that is very current in everyday life, especially within the learning environment. Being tech-savvy in modern society is a concern that continues to be prominent in the job market. In order to answer the question of “how do teachers perceive the use of technology in the elementary learning environment?”, a literature search was conducted around the area of technology use in the elementary classroom. While looking through the literature, four major themes appeared that are important to consider when discussing the perception of technology use within the classroom. These four themes are: feelings of self-efficacy, teacher training, attitude of the principal towards technology, and perceived usefulness of technology.

2.1 Feelings of Self-Efficacy

Self-efficacy is defined as “teachers’ beliefs about their own capacities as teachers” (Moore-Hayes, 2011, p.2). Essentially, how one believes they will perform in a certain area will have a direct effect on how (or if) they will perform in that area. Much of the literature reviewed cites teacher self-efficacy as being one of the biggest factors in the use of technology within the classroom (Ciampa & Gallagher, 2013; Cox, 2013; Levin & Wadmany, 2008; Moore-Hayes, 2011). In each article, teachers have stated that they are reluctant to use technology because they do not know how to fully use it themselves; Moore-Hayes found in her research that “a teacher’s perception of his or her knowledge of educational technology along with the capacity to integrate technology into teaching has a direct impact on self-efficacy beliefs” (2011, p.3).

This is understandable as it is human nature to not want to attempt something at the risk of appearing unprepared or foolish. The difficulty with self-efficacy lies in the
ever-changing nature of technology. Technology is a field that is rapidly evolving; what might be current one year, can suddenly become obsolete the next. In Cox’s research (2013), he interviewed teachers about the difficulties they faced with technology. One striking quote came from a teacher who said “the software programs (are) updated over time, so to be able to cope with all the updates… it makes it difficult” (p. 212). While in my first practicum, I witnessed this first-hand as an application the school had purchased for their iPads at the end of the 2014 school year had already needed to be replaced by a better app the following fall. Moore-Hayes (2011) notes a different angle which is the actual selection of technology to be used within the classroom. In her research study, most teachers did not have as much difficulty actually using the software, but when it came to evaluating and implementing where the use of technology would be appropriate, teachers tended to falter (Moore-Hayes, 2011). When teachers are placed in the constant flux that is the world of technology, it can become overwhelming to deal with, which leads into the next key theme of teacher training.

2.2 Teacher Training

This is one of the critical components towards achieving success with effective technology implementation in the classroom. As already mentioned technology is such a rapidly changing field that technologies can become obsolete and replaced quickly. Wilson, Notar, & Yunker (2008) note that “technology available in education has increased more quickly than many educational programs’ ability to incorporate new tools into teaching and learning experiences” (p. 262). As a result, teachers constantly need to update their knowledge and skills to accommodate the influx of new technology. One of the greatest factors that affect feelings of self-efficacy is the amount of training teachers
receive in dealing with the technology (Ciampa & Gallagher, 2013; Cox, 2013; Levin & Wadmany, 2008; Wilson, Notar, & Yunker, 2003).

Ciampa & Gallagher (2013) used a combination of surveys to determine teachers’ feelings of self-efficacy before and after providing a series of workshops designed to help teachers become more familiar with the technologies that are available in their classroom. They did so through collaborative team workshops which tried to create an environment that was non-threatening and community learning-based, as opposed to an expert teaching their less-abled students. Their results showed that “collaboration within the context of the professional learning sessions was the part that made the technophobic teachers more confident and comfortable to teach” (p. 215). Although teachers may want to improve their skills, it can be an intimidating environment to do so in.

Cox (2013) also looked at teacher efficacy, and drew similar findings to Ciampa & Gallagher (2013). In his research, he interviewed three teachers with over ten years of experience. One of the biggest themes he found was that “identifying and addressing teacher concerns and perceptions of technology integration could help empower teachers to further engage with technology in their classrooms” (p. 214). Coupled with Ciampa and Gallagher’s point, when teacher concerns are brought forward, it is important to isolate them and provide targeted resolution to help address these concerns.

Lastly, Wilson, Notar, and Yunker (2003) discuss how technology training is the most demanding area for elementary school teachers, and that it “should focus on software application and software evaluation to help teachers incorporate the use of computers in teaching and fit individual needs of subject content and grade level” (2003, p. 257). As previously mentioned, evaluating software is equally as important as implementing it, and teachers certainly need training in that regard as well.
In contrast to this theme, Levin & Wadmany (2008) had interesting results from their research. They did a study on six teachers relating to self-efficacy. Similar to Ciampa & Gallagher (2013), they designed a series of training sessions that would help address specific areas relating to technology that these six teachers needed assistance in. Once they completed this training, the teachers reported that their feelings of self-efficacy increased as they became more competent with the technology. Interestingly, this did not translate to actual implementation of the technology within the classroom. Although some of the teachers did continue to find meaningful implementation of technology, some of the educators simply opted to not use the technology at all, even though they were fully capable of doing so. During their discussion, Levin & Wadmany (2008) noted that “the conditions teachers believe will facilitate the use of technology in teaching, and the changes that occur in their beliefs and in their actual classroom practices, are linked to different patterns in their learning” (p. 256). This is an interesting point to consider: until this point I had assumed that teachers want to include technology into their curriculum, and this research study had shown the opposite.

2.3 Attitude of the Principal

As the main administrator on-site at the school, the principal serves as the manager and visionary for how the school will be run, and the type of atmosphere that will create the school climate. This translates to how effective teachers can be when running their classrooms in terms of technology use. In many of the reviewed studies, the attitude of the principal is one of the key factors that determine successful implementation of technology within the classroom (Ciampa & Gallagher, 2013; Levin & Wadmany, 2008; Miranda & Russell, 2011; Wilson, Notar, & Yunker, 2003). In Ciampa & Gallagher’s (2013) study, they sum up the role of the principal quite nicely in that
“teachers are unlikely to embrace change without clear expectations and support from their principal” (p. 203). If the principal’s vision does not include a focus on technology and using it inside the classroom, it would logically follow that teachers will not see that as a main priority in their lessons, and will therefore not go out of their way to ensure technology is present in their lessons. Miranda & Russell (2011) also found this in their research, noting that the “principal’s reported use of technology appears to have the strongest effect on teachers’ reported use of technology” (p. 317). This is not so much an issue if the teachers have a particular fondness and expertise themselves for technology; however, the impact of the principal’s focus is critical if the teachers do not feel comfortable with technology. Teachers will not be pushed to integrate it into their practice if the principal does not see it as a benefit.

Similar to the teachers, the comfort level with technology of the principal will also affect how they direct teachers. In many of the studies reviewed, the focus of the sessions and questionnaires were on teachers, and how they felt their principal had a direction (or lack, thereof) towards technology. Ciampa & Gallagher’s (2013) study actually extended to provide training sessions for not only the teachers, but the principal as well. The researchers note that “the special challenge for the principal is being a technology leader as well as encouraging the development of teacher and student technology leaders” (p. 213). Principals need to cope with the idea that they may not be tech-savvy either, and instead overcome this barrier. Professional Development (PD) is a tool that is at the disposal of schools, and should certainly be utilized. The principal from Ciampa & Gallagher’s study provided a very poignant note about PD: “an appropriate balance of pressure, time, collaboration, support and resources for professional learning is needed to effectively facilitate technological change” (2013, p. 214). The principal needs
to provide the time and support necessary to achieve meaningful PD for teachers.

However, even with training, there is a certain buy-in that is necessary for teachers to successfully implement technology meaningfully into their programming, which leads into the last theme to be discussed.

### 2.4 Perceived Usefulness of Technology

In order for something to be used, the user has to have a sense of trust in that object; the same correlation can be made with technology and teachers. If the teacher does not see or understand the educational benefit of technology, then it would logically follow that those teachers would not put forth much effort to try and understand technology. One main factor that can affect this is how teachers envision technology will aid their teaching practice. Serow & Callingham (2011) note in their research that “many teachers focus only on technical issues as opposed to pedagogical engagement in an attempt to incorporate the technology” (p. 161). Technology should be used to engage and enrich an already existing program, not as the focus of a lesson in and of itself. Perception of usefulness is an extremely important factor to consider when analyzing how technology will be used in the classroom (Cicconi, 2014; Levin & Wadmany, 2008; Miller & Robertson, 2011; Proctor & Marks, 2013; Roush & Song, 2013; Rushowy, 2012; Serow & Callingham, 2011)

Overall, the literature has revealed a positive reception towards the inclusion of technology within the classroom. In Cicconi’s (2014) research, she notes several online services that are available to facilitate the teaching of mathematics. The big factor that she emphasizes is that technology facilitates an online world for children to explore at their own comfort level. Some children might be shy in a classroom setting, and technology allows them to engage far more in a virtual world where they are given more
time to think. This is especially important for children with special needs. Cicconi notes that “in addition to prompting collaboration from children who are less inclined to work with peers in the traditional sense, virtual collaboration also acts as a haven for students who find it difficult to do so due to cognitive functioning concerns” (2014, p. 61). Rushowy (2012) also reported similar findings in her newspaper article. She interviewed teachers at a school for children with special needs, and they were astounded at how much the iPads that the children used were helping them display their thinking (Rushowy, 2012). Miller & Robertson (2011) did a study involving a video game called “Dr. Kawashima’s Brain Training” and how it affected mathematical competency. In their research, they found that there were “higher gain scores for the game consoles group in each case” (p. 859) compared to the group that received no support with the game. Roush & Song (2013) discuss the use of clickers (multiple choice buttons) in the classroom. They found that the students were able to use the clickers as a way to check their understanding of the material in a setting that was non-threatening. Instead of the traditional ‘raise your hand and answer’ method, children are able to anonymously give their responses and check to see what the correct answer is – this allows both student and teacher to gain a check of the understanding of the content. Lastly, Serow & Callingham (2011) noted that although there was some initial hesitance from their teacher subjects when it came to using technology, the overall response from the children was so positive that it outweighed the difficulty of learning and understanding the technology itself.

Although there are certainly great advantages with using technology, there are still some factors to consider when looking at successful implementation. Levin and Wadmany (2008) noted in their research that although the teachers received training, this did not necessarily mean they were going to implement it in their classrooms. Through
their research, one of the conclusions they drew was that “teachers’ views on the use of technology in their school and their actual practices with information technology are adaptive and dynamic” (p. 255). Even when presented with training and learning opportunities, this does not necessarily mean that their mindset will shift to finding meaningful implementation of technology into their practice. Proctor & Marks (2013) found similar results in their study. They polled 259 teacher respondents who had won a teaching award in the United States about their practices; the results are quite similar to Levin & Wadmany (2008) in that the teachers all reported an above average comfortability with the technology, but rather, that they did not see the educational value in using technology.

Lastly, it is important to remember that technology does not solve all problems in education, and that should be used as a means to assist teaching, not be the teaching point itself. Miller & Robertson (2011), as well as Roush & Song (2013), both note that although there are some great benefits, there are still areas to address. Miller & Robertson (2011) found that even with the improved computational speed with mathematics, there was “no significant change in mathematics self-concept or academic self-concept in either group” (p. 859). This was certainly unexpected by the researchers, and can certainly put doubt in the mind of the users if the benefits outweigh the downside. Roush & Song (2013) also found that although the clickers helped gauge understanding of material, it “did not seem to help motivate students to prepare more before class” (p. 27). In addition, there was some extensive time required to set-up the program for the clickers, which some educators may find cumbersome, which related back to the overall usefulness – do the benefits outweigh the work required to use the technology?
2.5 Conclusion

Through the literature, my key question “how do teachers perceive the use of technology in the elementary learning environment?” has gained some more contextualization. The themes that arose during the literature review (feelings of self-efficacy, teacher training, principal buy-in, and perceived usefulness) will help formulate questions for the interviews that will address these issues. The last theme is directly related to my question, and it will be important to consider both sides of the technological debate. In terms of gaps in the literature, much of the supposed fixes have come from the researchers, and not a lot of it seems to come directly from the teachers. One of my foci will be to actually hear practical solutions from the teachers themselves as to what strategies will help improve overall efficacy and integration of technology in the classroom.
Chapter 3: Methodology

3.0 Introduction

This chapter examines the methods that were used to conduct this research project. Firstly, the research approach and procedure will be briefly discussed, followed by the instrument for data collection. Participant involvement will then be explained in the criteria required to participate, the way in which the participants were recruited, and finally a short biography detailing the history of the participants. Next, the method for analyzing the data will be discussed, with ethical considerations followed up afterwards. Lastly, the methodological strengths and shortcomings will be analyzed, and concluded with a brief overview of Chapter 3 and a preview of Chapter 4.

3.1 Research Approach and Procedures

This research project was conducted as a qualitative study involving the review of pertinent literature relating to my research topic and followed-up by conducting semi-structured interviews with teachers from the Toronto District School Board [TDSB]. Qualitative research was used for this process due to its “interpretive, naturalistic approach” as well as its ability to impact and “transform the world” (Creswell, 2013, p. 44). The qualitative approach, compared to quantitative, is far more personable and in-depth. A qualitative study allows you to find answers to the problem you are seeking, using the experience and knowledge of your participants (Creswell, 2013). Building on the idea of the natural approach, Denzin & Lincoln (2011) quite eloquently state that “qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them” (p. 3). Being able to have these personal and in-depth conversations will allow meaning making between both the participants as well as the researcher.
Qualitative research attempts to remove the barrier between researcher and the researched. Creswell (2013) notes that qualitative research is conducted “when we want to empower individuals to share their stories, hear their voices, and minimize the power relationships that often exist between a researcher and the participants” (p. 48). Comparative to quantitative research, qualitative allows (and even celebrates) the ability to have a personal connection with your research participants, as opposed to the removed and sterilized nature of quantitative research. Making that connection with the participants is imperative towards achieving the type of quality responses that will help shed light on the questions being asked in this research project. Wolcott (2010) discusses the transparency required in qualitative research, and states that “our readers have a right to know about us… what prompts our interest in the topics we investigate, to whom we are reporting, and what we personally stand to gain from our study” (p. 36). As much as we are selecting our participants based on their perceived investment in our topics, the participants deserve to know our returned investment. Qualitative research allows this transparency, which ultimately allows us to retrieve this rich and personalized data.

3.2 Instruments of Data Collection

The interviews were conducted in a semi-structured format. This means that although there are set questions, the dialogue between the interviewer and interviewee can guide, shape, and even change the direction the conversation and questions flow (Brinkmann, 2014). According to Brinkmann (2014), semi-structured interviews allow for “much more leeway for following up on whatever angles are deemed important by the interviewee” and that “the interviewer has a greater say in focusing the conversation on issues that he or she deems important in relation to the research project” (p. 286). This dual nature allows flexibility on both the part of the participants as well as the researcher.
Although there are set questions the researcher is looking to explore, further elaboration can be obtained depending on the interest level or the participant, researcher, or both. This type of interview was effective in order to foster a warm and safe environment where opinions and viewpoints are respected, and being flexible and willing to explore tangents will allow the participants to feel comfortable doing so. As a safe environment to conduct the interviews is imperative, emphasis was placed that the participants be comfortable in the interview setting. This could have been in their own classroom or another location designated by the participant. Creswell (2013) recommends “a quiet location free from distractions” (p. 165) which is imperative in order to establish the rapport required.

3.3 Participants

In this section the criteria for participant recruitment have been outlined, the methods taken to obtain the participants, as well as a short introduction detailing participant history.

3.3.1 Sampling Criteria

For this research project, teachers who fulfill the following criteria were being recruited:

- Are currently a Primary or Junior-grade teacher.

Due to the fact that a majority of the literature reviewed pertained to elementary level classrooms and educators, it was logical to continue to focus on that age range and how it impacts children in that age bracket. Additionally, the age group that I am looking to teach is at the elementary level, so this research will directly impact my future practice.
• Are currently working in the Toronto District School Board [TDSB].

The TDSB is the board I grew up in and where I plan to teach, so the findings and significance drawn from the research are going to directly impact the environment in which I teach. The knowledge obtained is also beneficial for any new teacher to present when applying for positions.

• Have experience using technology in the classroom.

Even if the educators have little experience with technology, hearing them speak to its effectiveness is critical. If they have not used it whatsoever, they would be basing their responses on assumptions and not lived experiences, which goes against the aim of qualitative research.

There are no direct restrictions on teacher experience. Finding both a teacher who has several years of experience in the field, as well as a teacher that is relatively new to the field could be beneficial. With technology still being a relatively new field, it would be interesting to see how the amount of experience and years in the field will affect how technology is used in the classroom with the children. Additionally, there are no restrictions on age or gender of the educators.

3.3.2 Sampling Procedures – Recruitment

The main method of recruitment for this research project was convenience sampling.

Convenience sampling saves time, money, and effort, as you have already established a connection with that participant; credibility and information, however, may be jeopardized (Miles & Huberman, 1994). In terms of convenience sampling, I contacted previous teacher candidates that I had placement with. From my experiences with them, I already knew that they fit the criteria I was looking for in a participant, so I
did not need to waste time determining eligibility. Additionally, I had already established a good working rapport with them, so I believed they would feel more comfortable disclosing more personal accounts than if I were a complete stranger. I did not believe they would withhold or dampen the credibility of the information they were providing.

Due to the fact that this is a small-scale research project, and my professional network is quite limited, convenience sampling was the most realistic way to obtain research participants. I do not believe there was any ethical concern with the sampling method. The only concern could be the fact that I already knew the educators I interviewed. As stated above, I believe this it was a benefit as opposed to a hindrance; I am completely transparent about the fact that I have spent a significant time working in the field with them, and thus have already established a relationship with them.

3.3.3 Participant Biographies

Participant A (Mary) has been teaching for 28 years, and has taught all elementary grades, including grade 4 and 5 gifted. She has always taught within the TDSB.

Participant B (Shelley) has been teaching for 10 years, and has taught full-day kindergarten [FDK], and grades 1, 2, 4, and 5. She has always taught within the TDSB.

3.4 Data Analysis

After the interviews were complete, the vocal recordings were transcribed into hard copy. Once in written form, they were analyzed for codes, which are “small categories of information” (Creswell, 2013, p. 184) and for themes, which are “broad units of information that consist of several codes” (Creswell, 2013, p. 186). These codes and themes are typically recurrent or important ideas that work toward answering the key questions. Although there were certain categories that were searched for, analyzing the transcription allowed for the development of emergent categories, which are codes that
develop from the analysis of the transcription, and are not preset by the researcher (Crabtree & Miller, 1992).

Each transcript was coded both individually as a stand-alone piece of data, and then was further compared with the other transcript to find recurrent themes amongst the interviews. These themes have been extrapolated from the data, and will be further discussed in the Findings and Discussion chapters.

3.5 Ethical Review Procedures

This research project has followed the ethical guidelines set out by the Ontario Institute for Studies in Education [OISE] Master of Teaching program. This entails that participants were given a full and thorough explanation of exactly what they were participating in, with full transparency given to any possible risks associated with participating in the research project. Full transparency is crucial, as “this disclosure helps build rapport” (Creswell, 2013, p. 154) – the more upfront and honest the researcher is, the less the participant feels that they are misinformed. This was achieved through a Letter of Consent (please see Appendix A) which details what their interview responses were used for, their right and assurance of confidentiality, approximate length of interview, as well as their right to withdraw from the research at any time without penalization. Participants signed and agreed that they were fully aware of their scope of participation prior to being interviewed.

In terms of confidentiality, all identifying factors (personal name, name of school, name of principal, etc.) were changed to pseudonyms to ensure that none of their answers could be traced back to the respondent. Interviews were conducted in the classroom of the teacher (Mary) and the school boardroom (Shelley). Before the interviews began,
although the consent form was signed, the participants were once again reminded of their right to withdraw and assured that their information would be confidential.

Risk of participation for this research project was relatively low. Due to the fact that pseudonyms were used, the data is virtually untraceable back to the respondent. In addition, participants were given the option to: 1) receive the interview questions ahead of time (please see Appendix B), 2) pass on any question they did not feel comfortable asking, 3) change or edit their given answer at any time, and 4) review the transcript of the interview once completed to ensure that everything transcribed represented their words correctly. As aforementioned, if participants felt at any time that they were uncomfortable, they were able to withdraw from the study without pressure or penalization from the researcher. Data was stored on my personal laptop in which only I have the password for, and will be held either: 1) up to five years after the research is conducted, or 2) when the Master of Teaching paper is published, whichever occurs first.

3.6 Methodological Limitations and Strengths

There are a few limitations that are important to discuss when reviewing this research project. Firstly, due to the constraints of the blanket ethical approval provided to us by OISE, the only people eligible to be interviewed were teachers, and specifically about their own practice; it was not permissible to discuss children or parents in specific, or to utilize our own classroom observations. Secondly, the time constraints for completing this research project limited us to only conduct a small amount of interviews as opposed to drawing from a larger sample size. As a result of these two factors, generalizability is low. However, in the qualitative field, Creswell (2013) states that “the study of more than one case dilutes the overall analysis; the more cases an individual studies, the less the depth in any single case” (p. 101). As such, it is more readily
accepted that generalizability is going to be lower compared to a large-scale quantitative research project as qualitative researchers are looking for fewer quality responses as opposed to numerous generic quantity responses.

In terms of strengths, relying on fewer sample sizes allows the researcher to do a more in-depth and focused analysis of the findings. Qualitative analysis of the themes that arise from coding allow for “complex reasoning through inductive and deductive logic” (Creswell, 2013, p. 45). Whereas a quantitative report gives you one single answer, a qualitative interview gives rich data that is open to multiple interpretations depending on one’s perspective of analysis. This type of research also allows educators to get their opinion heard on matters that pertain to them. Although it may not directly impact their specific teaching practice, it is hoped that it will influence further research on this topic at a later point. Additionally, having teachers vocalize their thoughts is a good way to be reflective of their own practice, and perhaps bring up themes that they had not previously been self-aware of. Lastly, qualitative interviews are flexible and allowed for a natural flow of conversation. Certain themes or topics that may not have initially been on the agenda arose from the conversation, and qualitative methods are always looking to delve deeper into topics. This conversational-style method of extracting data usually lends itself to a warmer and more engaging research environment.

3.7 Conclusion

This chapter has outlined the methodological framework for how this research project was designed. Using a qualitatively-focused study, and semi-structured interviews, data was gathered from elementary teachers in the TDSB who have experience using technology in their classrooms. Teachers were found through a convenience sampling, and were provided with a Letter of Consent detailing the extent of
their participation, including ethical considerations, risks, and ability to withdraw from the study.

Chapter 4 will detail and analyze the coding and themes that were extracted from the transcriptions. Themes will be compared both individually, as well as collaboratively, to highlight unique or consistent data.
Chapter 4: Research Findings

4.0 Introduction

This chapter discusses the data that was retrieved from the interviews conducted with Mary and Shelley. After conducting the interviews, the data was analyzed and coded into categories, and further into themes. For organizational purposes, the three themes that were extrapolated from the data are analyzed individually, and are as follows: preparedness, influence, and usefulness. Furthermore, these themes are further broken down into the sub-themes observed. This is supported with quotes from Mary and Shelley, as well as connections to the literature that was previously reviewed.

4.1 Preparedness

This theme discusses the notion of how prepared teachers feel to use technology in the classroom. Preparedness is at the heart of any career – the more prepared one feels, the more confident one will be. With technology moving to the forefront of education, preparedness becomes an increasingly more difficult task. The theme of preparedness is split up into two sub-themes, which are efficacy and support.

4.1.1 Efficacy

Teachers’ feeling of self-efficacy is one of the single highest factors that contribute to how successfully teachers will implement technology into their classroom (Ciampa & Gallagher, 2013; Cox, 2013; Levin & Wadmany, 2008; Moore-Hayes, 2011). Without a sense of confidence in one’s abilities, it becomes increasingly more difficult to integrate the unfamiliar into our practice. With the ever-evolving landscape technology presents, it is certainly difficult to remain current and informed about the many possibilities technology brings to our classrooms. In terms of efficacy, there were very different views brought forward by Mary and Shelley. These polarizing views help
consolidate the notion that all of our teachers are not fully comfortable with technology in the classroom.

Mary felt that although she did try and include technology in her practice, she still struggled with how much and how often it changes. When asked what her comfort with technology was, Mary responded that she felt to be “6 ½ out of 10; a C+” in terms of personal technology comfort, and a “2.5 out of 3” in terms of classroom technology comfort. She also referred to herself as an “old dinosaur” in terms of technological understanding. She spoke to the fact that she has a teaching partner (she currently teaches grade 6, and shares the space with the grade 6 gifted program teacher) who she turns to when she needs help. However, if no one is available, Mary stated, “I’m so kerfuffled, and I don’t know where I’ve landed, I tend to throw my hands up and say ‘Screw this!’” This statement rings true to the notion of self-efficacy driving technology use – if the inclusion of technology feels like more frustration and work than beneficial, then the successful inclusion of technology into the teaching practice becomes compromised (Ciampa & Gallagher, 2013). Overall, Mary certainly acknowledged many benefits of technology, but her recognition of the many problems technology pose highlighted her lack of efficacy, which leads to her frustration with technology.

Shelley was far more confident in her use of technology. She spoke about how often she used technology before she started teaching FDK, and how much it helps the children learn. For her personal rating, she gave herself “3 ½ out of 5,” stating that “there’s a lot of stuff I don’t know how to use… because I’m comfortable and willing to use it, and willing to learn how to use it, that’s why I would say 3 ½.” She told an anecdote about not being able to connect the Bluetooth in her car to her phone, but overall seemed to have a demeanor that suggested an embracing of technology. In terms
of her teaching comfortability, she gave a “4 out of 5,” stating that she has been using technology in her class since she got a job in teaching. Overall, Shelley spoke very positively about technology. Shelley seems to have displayed a higher level of efficacy when compared to Mary, hence why the tone of the interview seemed to be more on the positive side for technology.

Although there were different levels of efficacy amongst the participants, the importance of efficacy is apparent nonetheless. For Shelley, who was far more confident in her technology use, she did not speak to much frustration when using it, when compared to Mary who shared many anecdotes (which will be discussed later). In terms of Mary, her experience speaks directly to Cox, and Moore-Hayes’ research. In his article, Cox (2013) states that technology can create more trouble than it is worth, and that “this may be especially true for tenured teachers” (p. 214). Additionally, Moore-Hayes (2011) states that “in-service teachers, especially those who have been teaching for several years, may be challenged with an expectation to adapt to the changes brought about by the rapid growth of technology” (p. 6). Although Mary did not display an unwilling attitude towards technology, there was a certain level of frustration that was apparent.

4.1.2 Support

When teachers do not have feel that their self-efficacy is at the appropriate level, they must turn to the available support network they have. Before even entering the field, many teachers receive training at their education institution regarding some of the technology they will encounter. Furthermore, if that training is not enough, there are several venues that can be accessed in which training and support can be obtained. Levin & Wadmany (2008) note that when seeking support, it can be viewed as “the interplay
that occurs between the teacher’s personal strengths and weaknesses when adopting an innovation” (p. 244). Both Mary and Shelley spoke very positively about the supports they have available.

Both educators spoke of the plethora of options available to them in terms of support for learning technology. They each spoke about school and board-run initiatives, as well as the importance of asking the tech experts within your own school. Mary specifically referenced her teaching partner and the school librarian, saying that they both support her a lot, which helps give her a sense of confidence; if she runs into a problem, they will be there to assist. Shelley spoke about the importance of taking initiative: “you have to take the initiative to obtain that support;” “take the initiative to sign up for it[workshops];” “there are people who know how to use it – go and take the initiative and find out.” Additionally, both spoke about the importance of perseverance, and willingness to try new things. Mary, who admits that she gets frustrated by technical glitches, spoke about how important it is to “hang in there, and try new things in new ways.” Although Mary’s efficacy may not be as strong as Shelley’s, with her support network she is able to have confidence that she can be successful with technology.

The importance of support cannot be understated. Especially for Mary, her support network is part of what helped her establish comfort with technology. Ciampa & Gallagher (2013) speak about teacher training sessions and assert “Collaboration within the context of the professional learning sessions was the part that made the technophobic teachers more confident and comfortable to teach” (p. 215). Although Shelley states that she is comfortable with technology, she still notes that there are a plethora of training sessions available, and that she knows how to access those sessions if she needs to.
4.2 Influence

This theme analyzes the influences that surround teachers’ decision to use technology in their classroom. There are many areas that cause influence towards the inclusion of technology in our practice. This theme analyzes both the external and internal factors that affect how we use technology in our classroom.

4.2.1 External Factors

External factors are forces that are imposed upon us from sources outside of our control. In terms of teaching, there are several factors that influence our technology use in the classroom. Most notably, the principal’s attitude towards technology is one of the single highest factors that affect technology use in the classroom (Ciampa & Gallagher, 2013; Levin & Wadmany, 2008; Miranda & Russell, 2011; Wilson, Notar, & Yunker, 2003). Furthermore, Ciampa & Gallagher (2013) note that “the special challenge for the principal is being a technology leader as well as encouraging the development of teacher and student technology leaders” (p. 213). Without the buy-in from the principal, teachers who are not tech-savvy are not likely to include it in their practice: “teachers are unlikely to embrace change without clear expectations and support from their principal” (Ciampa & Gallagher, 2013, p. 203). For those who are tech-savvy, this is not a factor that will affect them. However, for those that are resistant to technology, the principal’s influence is key.

In speaking with Mary and Shelley, they both felt that their principal supported the use of technology in the classroom. Mary has worked with her principal for several years, and has noted that “her number 1 priority in spending tends to be in the technology area.” Mary speaks to the difficulty of maintaining a school budget, and that the principal has to carefully assess what technology will be used in the classroom. Shelley, who has
only been working with her principal since the beginning of the 2015 school year, notes that “I think she definitely welcomes tech… I think she is definitely keen on having staff members who can use technology, and can model it to the students and other teachers.” Although there is money that is directly being attributed to purchase technology, both Mary and Shelley state that they do not feel there is a pressure to include technology in their classrooms. In terms of her practice, Mary comments that “she listens to what our needs are, or what we’re interested in… she doesn’t just blitz something in, throw it at you, and say ‘here, use it.’” Shelley also notes that “I don’t think there’s necessarily the expectation always to use it, but I think that it is welcomed, and it is valued if you do use it.” In both of these situations, the participants have noted that that principal supports the use of technology while still maintaining the autonomous choice for the teachers to use technology how they see fit in what makes sense for their classrooms.

On a more macro-level focus, a factor that Shelley speaks about is that the Toronto District School Board has placed a renewed focus on the STEM approach, which is an educational focus on science, technology, engineering, and mathematics. With this approach in mind, the inclusion of technology in the classroom is becoming of ever-increasing importance for educators. Shelley notes that “TDSB is going in that STEM approach. So, there will be more tech in the schools.” As a result, teachers need to be prepared to include technology in the practice. From her understanding, Shelley did not say there would be a minimum amount of technology required, just that it would be expected to be included somehow. This model, should it carry forward as described, will help support their principal’s focus on autonomy and allowing teachers to use technology at their discretion.
Following this, the interest of the children themselves helps guide technology use in the classroom. Mary speaks to her desire to help include the interests of her children in her practice: “the kids influence me, because I love listening to what they’re interested in, and what they’re doing, and try and engage them that way.” Shelley also notes that “kids are more tech-savvy, and I think if we can use that, but use it to our advantage in our teaching, it will be really practical.” Both of these teachers have pinpointed how using technology in a way that supports and interests their children will help affirm the use of technology. It is important that technology is used as a means to support the learning, and not be the lesson itself. Levin & Wadmany (2008) note that it is necessary for teachers to shift their thinking from “concentrating on specific and technical issues of technology use, to becoming aware of and transforming one’s own education views” (p. 244). By doing so, teachers may begin to see the technology as an aid to support them, and not as something that is meant to be a roadblock. However, technology is not necessarily the answer to all our classroom problems. In speaking about technology use in the classroom, Shelley asks herself “does it make sense for my teaching? Is it practical? Does it help the kids understand a concept? Does it help them apply it?” In some instances, technology does not achieve the lesson objective, and we need to mindfully use it.

Lastly, the accessibility factor is one that plays a huge role in how teachers incorporate technology into their classrooms. When asked about access, Mary and Shelley each responded with a different focus, both of which bring interesting discussion points. Mary’s focus was about the accessibility of technology on a macro-level. She discusses the availability of technology across the city: “If you are in a well-to-do school… they get whatever they like. There are other places that are in TDSB that are crying and have no class set of anything. It’s still, no matter what the resource is, it’s
equity.” She notes that the school she works at does have access to a lot of learning devices, and yet there are schools where the classroom teacher does not even have a computer to check their email on. The sheer cost of technology is an extremely prohibitive factor when it comes to integrating technology – if you do not have it, you cannot use it. Shelley, on the other hand, discusses the micro-level in terms of availability of technology within the school: “it has to be shared, which is not a problem, but if you all need it or want it at the same time you have to devise a plan to use it.” Certainly, if you are working at a school that does not have an ample amount of technology, incorporating it can be prohibitive based solely on the fact that it can become a huge hassle to arrange to have the technology in your classroom. Coupled with the timetable and when teachers get their prep time, working within a strict schedule can be very limiting when it comes to finding opportunities to integrate technology.

Whether it is the principal’s focus, the school board’s focus, the children’s interests, or the accessibility of technology in the school, the external factors are certainly powerful influences over teachers and their decisions to use technology in the classroom. Although there are numerous factors present, both participants spoke about these as factors that exist, but do not seem to place them under any duress. Especially with regards to the children, both participants spoke to their inclusion of technology as a way to help include their students, and felt it was manageable to include technology in a way that was not overbearing. Miranda & Russell (2011) speak about the factors that affect teachers’ technology use, and they note the following: “principal’s technology discretion and enforcement… principal’s use of technology… perceived pressure related to technology use” (p. 312-13). Although the principal did have a technology focus, the lack of pressure for necessity has allowed the teachers to retain their autonomy over their
practice, and has left technology use to be seen as a positive and not a regiment enforced upon them.

4.2.2 Internal Factors

Internal factors are decisions that are based solely on one’s own beliefs. As opposed to external factors, in which we generally do not have any control over what is imposed upon us, internal factors are standards that we hold ourselves to that are dependent on an individual’s notion of what we believe to be right. Both participants mentioned internal factors that affect their teaching, though Mary had a very powerful message that she spoke about.

In terms of Shelley, she feels that the children in her class are tech-savvy, so she wants to be able to ensure that she is meeting their demands in terms of technology use. As a result, she is adjusting her practice in order to ensure that she is operating at the same level as her children are, as they will look to her as a resource. Mary’s philosophy of technology has a plan with a lot of foresight. She speaks to the preparation of her kids’ futures when she uses technology in her classroom:

You have to prepare the kids for their workplace of the future. So you really have to think 15 years down the road of what their skills will need to be when they are a functioning employed adult. There is a lot of group work, a lot of problem solving, a lot of underpinning skills that I think are inherent in using technology that they will need to take with them forward... I think the more you can schematically build all kinds of connections for kids, they’ve got just a lot more of a repertoire to rely on. So, I mean, heaven knows – there are days when the whole system shuts down, and there are days when the electricity goes out, and there are ice storms, and you do have to prepare them for life without electricity
and fun gadgets – but, everybody’s got a cell phone, everybody’s wired, everybody has to learn how to manage in multi-platforms. That’s what we need to do too.

This quote really highlights Mary’s understanding of the bigger picture. Although she may struggle with technology herself, she can see the value of technological learning, and she ensures that she is including as much as she can in order to set her students up for success not just in her classroom, but also for life.

These internal factors are certainly powerful in that they are intrinsically motivated by what these educators each feel is important. It is evident both participants have shown that they have the best interest of their students in mind when they are thinking about technology use in the classroom. Coupled with the external factors (which seem to be a positive motivational force for these participants), Mary and Shelley have found ways to meaningfully implement technology into their practice.

4.3 Usefulness

This theme analyzes the perceived usefulness of technology use in the classroom. As the literature review detailed, there are definite benefits towards using technology in the classroom (Cicconi, 2014; Miller & Robertson, 2011; Roush & Song, 2013; Rushowy, 2012; Serow & Callingham, 2011), but there are also some challenges as well (Levin & Wadmany, 2008; Proctor & Marks, 2013; Roush & Song, 2013). Both participants spoke about advantages and disadvantages of technology use in their classroom; each of these distinctions is reviewed.

4.3.1 Benefits of Technology

A benefit in the classroom is something that becomes a meaningfully positive addition to the programming. Both participants spoke about many different benefits they
have seen from the introduction of technology into their practice. In general terms, both participants noted that technology has the ‘cool’ factor in that it instantly engages children. It is also a great way for children to work collaboratively and develop problem solving and teamwork skills. Lastly, once you become comfortable with it, it becomes a huge time saver, and makes your lesson planning and delivery much simpler after the initial set-up is done. However, its benefits surpass the superficial, and will be discussed in greater detail.

In terms of curriculum and lesson design, Mary spoke about her desire to find ways to incorporate technology into her lessons every time she is reviewing a unit for a new teaching year. She illustrated this with an excellent example about the Olympics. Last year, when the Olympics were happening, Mary utilized iPads and computers to allow children to research a topic. Furthermore, they were able to access a real-time report of the medal count for Canada, track certain athletes in their sport, and even go so far as to stream and watch a live event. Without technology, especially the live streaming, this would just not be possible without technology. She also speaks about doing virtual tours of Ancient Egypt, as the likelihood of a class trip to Egypt is rather slim. In speaking about technology and lesson design, Mary notes that “it’s one of those things where it does open up the world and it opens up possibilities. You just have to learn to be creative in yet another way of planning design.” Shelley also spoke about using technology in her lesson design: “What I did was use different apps on the iPad to illustrate a math lesson. Or I’ve taught multimedia using iPads and different iPad apps.” In both cases, the technology is being used in a way where the lesson could not exist without it. Miller & Robertson (2011) also illustrate this in their research with “Dr. Kawashima’s Brain Training” and how they used a video game to help children practice
their math skills. Math scores improved significantly more for the children playing the game compared to those that were not. Technology can be meaningfully added into the lesson so that it is used as a vehicle to deliver the learning, but does not steal the focus as the lesson itself.

Furthermore, another major benefit that comes from utilizing technology comes in the form of differentiated instruction. In the current landscape of education, there is a broad range of ability that lies within the children we have in our class. For some of our children, writing out their thoughts with pencil and paper is simply not possible. However, they can speak and record their ideas onto an iPad, and achieve the exact same results, but using a slightly different method. Cicconi (2014) notes that “virtual collaboration also acts as a haven for students who find it difficult to do so due to cognitive functioning concerns” (p. 61). By carefully integrating technology into our practice, it can have deeply meaningful impacts on our students. Mary discusses a new iPad app that she had introduced to her this year:

I have an ESL student who needs an app on the iPad that’s called Translator… it has a selection of languages that you can choose from. Everything from Chinese all the way to Urdu. You tap the language, you take a screenshot of your piece of work, whether it’s a math test, whether it’s a piece of reading, whatever it is. And after it takes a screenshot, it translates into whatever language you request… we are doing electricity right now, so he has got to be able to pick things; what’s a circuit? What’s static electricity?... which is a huge time saver because at least it makes the little guy feel comfortable.

In Mary’s example, it is clear that technology is being used in a way that allows the child in her class to participate and be successful in a way that simply would not be possible
without it. Rushowy (2012) reports the story of teachers working with children with autism, and they noted how much of a difference utilizing iPads was for the children to be able to express themselves; this was simply non-existent beforehand. Although Shelley did not have any specific anecdotes of children she worked with, she shared the same viewpoint that Mary did in that technology essentially opens up the classroom for all learners: “I think it makes the classroom more accessible to all learners. So, thinking about ELL learners, kids with LDs, or have Spec. Ed. exceptionalities, whatever it is. But it’s not just good for one, it’s good for all.” Shelley also notes that what helps children with exceptionalities learn also helps neuro-typical children as well.

In regards to lesson design and differentiation, as well as overall positive factors, both participants noted many positive outcomes that have happened due to the inclusion of technology. Furthermore, the accompanying research has outlined how imperative it is for technology to be present, and that certain things are simply impossible without technology being present.

4.3.2 Challenges of Technology

As much as technology benefits our classroom, there are certainly some challenges that come alongside it. Proctor & Marks (2013) found in their research that some teachers do not see the educational value that comes with utilizing technology in their classroom. Furthermore, Roush & Song (2013) noted that teachers find the initial set-up time for using technology to be cumbersome, and that depending on the amount of preparation required, it simply may not be worth it to use. From speaking with Mary and Shelley, they have both strongly indicated that there are vast educational benefits that can be achieved from using technology. However, they both have also experienced frustration with technology.
In terms of the technology itself, both Mary and Shelley shared their stories of frustration from when a piece of technology was having glitches and simply would not work. Mary had experienced several frustrations with technology in her many years as a teacher. Interestingly, though, much of it had to do with the infrastructure of technology, and not so much the use within the classroom. She noted that technology is a rapidly-evolving landscape, and that it is constantly in need of updating. However, due to budgetary constraints, it is not always possible to ensure that the most cutting-edge technology and apps are being used in the classroom. Furthermore, Mary recollected some frustrations with the board support: “Second line of defense is what we fondly call the Help Desk at TDSB, which isn’t very much help, that’s the irony of it. You put in a ticket… sometime within the next three years they will get back.” Although her last statement was hyperbole, Mary goes further to discuss that “most of the time it’s left to you to figure out yourself.” In these situations where the help you are offered ends up not assisting you, it is understandable why teachers would become frustrated with technology.

Lastly, there are some other important factors to consider when discussing technology use in the classroom. Shelley spoke about her time so far this year in her FDK class, and that she finds it hard to integrate technology in her classroom: “With Kindy I find it, not that they can’t do it, but it’s a slower process.” The age group and lack of exposure to technology make it more challenging to integrate technology. Coupled with the fact that the school shares resources, a lot of set-up would need to be done in order to reserve the technology and have it brought to the classroom. Mary speaks to a very different aspect of technology, and that is the danger of over-access. With the Internet, the search possibilities are limitless, and unless carefully monitored, children can be
exposed to things that they should not be. Mary notes that “there are a lot of keywords you can type in that wow are your eyes gonna pop… I would say you have to be even more forward thinking than the kids are.” The importance of this statement cannot be highlighted enough – as their educators, we are responsible for what they inevitably access. Mary and Shelley both discuss the necessity of reviewing the material you are going to use before you use it, and not to assume something is going to be okay. Especially with the Internet, what can seem like an innocuous YouTube video can end up giving you something you did not bargain for. This is something that is extremely important, especially in today’s day and age where there are people who purposely mislead you into thinking something is what it is not. This is something that the literature did not specifically discuss – it has certainly always been around, but perhaps within the last few years there has been resurgence due to new methods of concealing harmful content.

In terms of technological glitches, this is an unfortunate fact of dealing with technology, and we simply need to be resilient and prepared to roll with the punches. Integration with younger children is also something that is up to the discretion of the educator, and can be integrated wherever appropriate. However, the censorship that is required to keep our children safe is something that is totally within our control. We need to ensure that we are doing our due diligence as educators so that we do not jeopardize our professionalism by ending up in an Internet faux pas.

4.4 Conclusion

Through the themes of preparedness, influence, and usefulness, Mary and Shelley have illustrated a positive overall reception towards the use of technology in the classroom. In terms of preparedness, this was the biggest disparity in terms of responses
between participants. Mary’s efficacy was far lower than that of Shelley’s. However, even with this factor at play, Mary still spoke very positively about technology, and shared some very key insights about the topic. The support systems that are in place were both extensively detailed by both participants, and both seem to have a solid understanding of the resources available to them and how to access it.

The influences that determine technology use for Mary and Shelley were also quite positive. Although the research stated that principals can have an imposing effect on teachers, both Mary and Shelley spoke very positively about their principal, stating that she allows them to maintain their autonomy in the classroom and to use technology where it makes sense for them. Shelley’s conscious thinking around the STEM initiative is certainly important when the board is shifting their focus in this direction – it is better to be ahead of the curve than rushing to catch up. The interests of the children were both something that Mary and Shelley seriously considered when planning their lessons, and although Mary had a macro-level focus and Shelley a micro-level, both participants were aware of and spoke in detail about issues surrounding accessibility of technology in schools.

Lastly, both participants spoke in favour of integrating technology in their classroom and the usefulness it brings. Both Mary and Shelley detailed how incorporating technology has changed their lesson design, allowing them to do things that simply would not be possible without. More importantly, the effect that technology has on differentiation is so profound, and this alone is certainly the single greatest thing that technology allows – bringing the ability to be successful to each and every child.

However, as great as these benefits are, there are some challenges that come alongside. In terms of the infrastructure of the support system, Mary found that the help that was
supposed to be present was not so helpful, and both participants encountered their share of technological glitches. Shelley shared her struggles with trying to incorporate technology into her FDK class, Mary recounted her wise words towards moderating the Internet, and both participants stressed the necessity of previewing your teaching material before you use it in the class.

Overall, this fell in line with what much of the literature had detailed in chapter two. One of the biggest differences was that the teachers did not feel pressure from their principal, or the external forces – they acknowledged them, and knew they were present, but they did not feel that they were being constrained by them. Additionally, there was not any literature that spoke about the importance of Internet safety, which is certainly a very important topic to consider.

In chapter five, the implications of this data will be discussed, at both a micro and macro-level. Additionally, recommendations will be made for future educators, as well as for further research to be completed. Lastly, my concluding comments about the significance of this research will be detailed.
Chapter 5: Implications

5.0 Introduction

This chapter expands upon the data analysis of the previous chapter, and discusses the significance of that data to our modern-day practice. Firstly, a brief synopsis of the pertinent themes from chapter four are presented. Secondly, the implications of the data are highlighted in reference to the current field of teaching. Thirdly, recommendations are made in order to help remedy the implications. Fourthly, some areas and foci for possible further research are discussed. Lastly, I will provide my concluding thoughts and comments about this research and its significance to the field of teaching.

5.1 Overview of Key Findings

Chapter four highlighted three key themes that arose from the participants’ interviews. These three themes were: (1) preparedness, (2) influence, and (3) usefulness. This section will provide a recap of the most salient points that arose from each of these themes.

First, the theme of preparedness discussed how ready educators feel to implement technology into their classroom practice. This was then further broken down into two sub-themes, which were efficacy and support. Efficacy examined teachers’ self-beliefs about their technology prowess. Between the two participants, one was not as well-versed in using technology, but still believed in the benefits that it provides. The other participant felt very comfortable using technology, and was very keen on including it in her practice. Although both participants shared a positive view on technology, the teacher who felt they had less self-efficacy shared many more frustrations with technology than her more comfortable colleague. This sub-theme highlighted the importance of how much one feels about how successful we are with technology affects our ability to implement
and use it. Furthermore, the second sub-theme of support played heavily on the participants and their technology use. Both cited their colleagues as a large wealth of knowledge in assisting them with technology they are unfamiliar with. Additionally, they both stated that there are several board-offered workshops that are available to be taken to help develop understanding with a certain technology.

Secondly, the theme of influence examined the factors that played a part in teachers’ ability and willingness to use technology in the classroom. This theme was broken into the two sub-themes external and internal factors. External factors reference people and things that had influence beyond the control of the participants. The most notable, which came up several times throughout the literature, was the influence of the principal. Both participants stated that although the principal certainly had a focus on technology use throughout the school, there was never a feeling of being forced to use it. This helped the participants feel more comfortable in integrating technology in ways that worked for them. One participant spoke about the STEM initiative in the TDSB, and how it is encouraging a greater use of technology in the classroom, whereas another participant spoke about the availability of technology throughout all the schools in the TDSB. Lastly, both participants spoke about the interests of the children, and how they help capture student attention by utilizing technology in their lessons. The second sub-theme looked at the internal factors, which are the influences that are imposed by oneself. One participant spoke about her desire to meet the demands of the children in her class. The other participant spoke about preparing her students for the workplace 15 years from now, and how we are not educating them for the present, but rather, the future.

The last theme of usefulness spoke to the perceived benefits of technology use in the classroom. Usefulness was broken into two sub-themes, which were benefits and
challenges of technology. Both participants spoke very highly of the benefits of
technology use in the classroom. The participant who did not have the highest feeling of
self-efficacy still spoke about many different ways technology positively affects her
classroom, such as iPad apps providing translation for ELL students. They both spoke
about the wealth of resources that can be accessed through technology, which helps
enhance their lesson design. Technology also allows for a huge potential of differentiated
instruction, such as the aforementioned translation app. The second sub-theme analyzed
the challenges of using technology in the classroom. Both participants shared stories of
technological glitches causing them some panic when trying to implement a lesson. One
participant shared her frustrations with the technological infrastructure, in that it is
rapidly changing, so becoming comfortable with something can last a few months before
it becomes replaced with something new. Additionally, the resources in place to assist
with technology can be frustrating in and of themselves, due to the lack of prompt
response time. The participant who is currently teaching FDK shares her struggle with
how to meaningfully use technology with a group that may have trouble understanding
what to do. Lastly, one participant shares her cautionary words of advice of the dangers
of the Internet and what kids can access if not strictly monitored.

5.2 Implications

This section extrapolates the information from the key findings in chapter four.
These findings allow discussion around how they will affect the teaching profession as a
whole, as well as my own personal practice as a teacher. For each set of implications, the
themes and applicable sub-themes from chapter four will be referenced to help situate the
findings.
5.2.1 Broad Implications

Preparedness for using and teaching technology is imperative in order for teachers to feel a high enough level of self-efficacy to use technology in the classroom. Moore-Hayes (2011) stated that “a teacher’s perception of his or her knowledge of educational technology along with the capacity to integrate technology into teaching has a direct impact on self-efficacy beliefs” (p.3). Both participants – although one expressed significantly more challenge with using technology – stated that they actively try to implement technology into their classrooms, and that they are aware of the available supports should they need it. This ties in well with the support aspect of preparedness, and the necessity of being a self-advocate. The implication that this theme speaks to is the importance of resilience and to be an active participant in your own learning. If you are not familiar with a technology, regardless if you are expected to use it or not, there is a certain degree of responsibility that you must take ownership of towards finding a solution. Certainly there is a need for administrative support, but a positive mindset will greatly impact resilience and willingness to keep trying to use technology, even when efficacy is not the greatest.

In terms of influence, the principal was stated throughout several studies as the main factor that influences technology use within the schools (Ciampa & Gallagher, 2013; Levin & Wadmany, 2008; Miranda & Russell, 2011; Wilson, Notar, & Yunker, 2003). Although both participants agreed that the principal had technology as one of their main foci for the school, they both felt that they were not pressured or forced to use technology. Ciampa & Gallagher (2013) discuss the importance of the principal reinforcing the need for PD, and state that there is a need for the appropriate amount of pressure in order to have that vision successfully implemented. The keyword in this idea,
which speaks volumes towards the participants and their sentiments, is ‘appropriate’ – there needs to be a balance where a principal implements what they deem necessary, but also factors in the needs and opinions of their staff. The implication that would arise from this is that administration needs to allow their staff to be autonomous and utilize technology in a way that is comfortable for them. If the pressure is too little or too great, there will be resistance and push-back from the staff, which is ultimately counterproductive towards the overall goal of successful integration of technology in our classrooms.

Lastly, the perceived usefulness of technology was one of the more controversial themes that arose from the literature. Levin & Wadmany (2008) and Proctor & Marks (2013) both spoke about teachers in their studies that, although they had high levels of self-efficacy, did not see the educational benefits of including technology. Although several of the studies in the literature review did show positive reception towards technology, it is important to consider the possibility of the opposite. In their interviews, both participants spoke about the many ways in which technology positively influences their classroom. The most poignant example of this comes from Mary, who shared several stories about her frustration with technology in the myriad ways it affects her. Regardless of all these roadblocks, she still spoke very positively of technology, and despite the struggles that come alongside, the amount of positive influence it brings outshines the shadows that the negative aspects try to cast. The implication that comes through this theme is that there is a very positive reception from teachers towards technology use in the classroom. Mary, who was very candid about her frustrations with technology, still sings praises to the many ways in which it helps transform her classroom for the better.
5.2.2 Personal Implications

Preparedness is something in which I believe strongly. I am very fortunate to have had the opportunity to take an entire course on technology use in my teacher education program. I can certainly appreciate that this may not have been the lived experience for teachers in the past, which would explain why there could be resistance and/or hesitancy to implementing technology. Even though I would consider myself tech-savvy, I am still intimidated by a SmartBoard and the many ways that it can be used in a classroom. Through the interviews, I was given a sense of relief to hear that there are so many supports in place through the school itself as well as the board as a whole in order to provide assistance to teachers who require it. Another thing that really stuck with me is that both participants spoke to the need to take initiative. It is certainly easier to sit and blame the ‘higher ups’ because you do not know how to use a technology, but it takes a teacher who cares about their own and student learning to step up and take responsibility and accountability for your own PD. This implication has strengthened my core belief in the fact that teachers need to be just as current in their education as the education they are providing for their students, and that it is okay to ask for help when you need it.

In terms of influence, I believe I have always had my own internal factors that have influenced my use of technology in the classroom. I enjoy using technology, and am pretty comfortable with it, so I believe it will be a great fit for me and my practice. Additionally, I have seen the increase in student interest when it comes to infusing technology with learning, so I would naturally want to help foster that sense of interest with my students. In terms of the external factors, it was great to hear that my participants did not feel a sense of pressure from their administration in terms of technology use in the classroom. I think that sense of alleviation from the knowledge that someone is not
breathing down your neck naturally lends itself to teachers wanting to include technology on their own terms, based on their strengths and student needs. Although I do not believe this extends to all administration, it is nice to know that although the focus is certainly there, it is not forced upon teachers. Either way, the implication that I draw from this is that as long as I am finding ways to include technology in my practice, all of the parties involved will be satisfied, and I believe the learning will end up being stronger than without.

Lastly, usefulness has never been a question for me in terms of technology use in the classroom. It is challenging trying to remain neutral on something that you feel so strongly about, which was the viewpoint through which this research has been written up until this point. As aforementioned, I have seen the increase in student engagement and understanding from using technology in the classroom. Although there were studies that showed that technology was not perceived to be useful by the educators (Levin & Wadmany, 2008; Proctor & Marks, 2013), or the treatment applied to the learning via technology did not produce any improvements (Miller & Robertson, 2011; Roush & Song, 2013), I have personally witnessed so many successful learning opportunities that simply would not have been possible without technology that I firmly stand by my convictions. This implication has just reinforced that there are educators out there that value and see the importance of technology, and that I want to continue to uphold that legacy within education.

5.3 Recommendations

From reviewing the data on a holistic level, there are three recommendations that this research study will provide in order to help address the areas of concern that both the literature and the participants have mentioned. These recommendations are ones that are
believed to be realistically obtainable, and provide the recipients of the recommendation ample time to complete them:

1) Recommendation for Teachers – it is the recommendation of this study that all teachers have at least one technology-related PD or Additional Qualification [AQ] on their Ontario College of Teachers transcript. It would be unreasonable to expect anyone to be an expert on everything, but for those that are lacking a baseline understanding of using technology in their classroom, these PD or AQ courses will help lay the foundation for which to build upon. It is recommended that these PD or AQ courses be taken within one year of implementation, and that a new workshop or refresher is done every five years. This will ensure that teachers are provided with adequate support for using technology in their classroom, as well as allowing further personal growth within the area of technology. It is also recommended that teachers shift from an ‘I can’t’ to an ‘I can’ mindset. There is a certain level of proactivity that is required in order to obtain this goal, and the more open and willing teachers are to developing their professional knowledge, the better the outcome will be for all parties involved.

2) Recommendation for Principals – it is the recommendation of this study that principals ensure that their teachers are provided with supply coverage in order to attend the necessary workshops to develop technological efficacy. It should not be expected that teachers will complete these workshops on their own time, even if they are willing to do so, and rather it should be considered a part of their job, and as such they should be properly compensated and covered for it. As the recommendation for teachers is that they complete a PD course within one year of implementation, it is important that principals allow ample time for coverage for their teachers. Additionally, it is recommended that principals adopt a similar viewpoint as the principal the participants described. It is
certainly important to have technology as a focus, and as Ciampa & Gallagher (2013) state an appropriate amount of pressure upon the teachers to utilize technology. However, it should be left to the discretion of the teacher when and how the technology is used in their classroom. The principal could suggest a recommended minimum amount of technology, such as 2-3 lessons per week should involve technology, which still allows teachers to maintain autonomy about their own implementation.

3) Recommendation for School Boards – it is the recommendation of this study that school boards work towards providing fair and equitable access to technology across all schools. This will certainly require a fair devotion towards budgetary spending, but it is unreasonable to expect teachers to use technology and support the STEM initiative when there is solely a computer lab of ten outdated computers for the entire school to use. A reasonable recommendation would be to first establish a baseline of required technology within the school (e.g. 2 SmartBoards, 5 iPads, 10 laptops per school (as an example)), and then over the next five years work towards ensuring that each school reaches that minimum amount. By working towards this minimum amount of technology at all schools, there will slowly be a shift towards making sure those schools that are ‘have nots’ are actually provided with tools with which their teaching staff can utilize. Additionally, it is recommended that school boards prioritize the schools that have the fewest pieces of technology, or the schools that receive the lowest funding first. Some schools have an extremely active system of parents that provide a lot of extra resources for the school their children go to. It would be unreasonable to give schools in this position more technology sooner than the schools that have the greatest need for it.
5.4 Areas for Future Research

This section discusses some topics and areas of study that could utilize this research study as a launch point. There are three avenues for future research that would greatly develop the body of knowledge around technology use in the classroom that are directly correlated with this research, and an additional one that comes from a theme that one of the participants discussed.

The first area of research that would logically connect would be the exact same study but simply increasing the number of participants. Due to the constraints of this research study, it was only possible to allow for two participant voices on this matter. As a result, overall generalizability is low due to the inability to make solid claims with only the opinions and experience of two educators. If a future study conducted was able to increase the number of participants, the data collected would provide far more generalizable results. Secondly, although this study looked at elementary implementation of technology in the classroom, it would be interesting to see what the results would be if the research scope was expanded to include intermediate and secondary school students. There is a certain amount of novelty that comes with technology for younger children, but that novelty will start to wear off as children get older. It would be interesting to note how the age difference affects the receptiveness to technology, and how much it affects the interest level and academic achievement for those students. Lastly, the third possible expansion of this research study would be to broaden the area focus for participants. The participants in this study were exclusively from Toronto. To compare the results of this study against those of the greater Toronto area, Ontario as a whole, or even Canada-wise, would be very interesting data to review. All of these endeavours would require research.
teams with ample time and resources to be able to undertake this project, but it would certainly help develop our field knowledge of technology use in the classroom.

The other topic that arose from one of the interviews was the topic of Internet safety. It would be interesting to consider how children view Internet safety, and what supports are in place to help educate children on the dangers of the Internet. This could be done through the viewpoint of both how parents teach their children about netiquette and how schools address Internet safety as a whole. Either one of these topics would yield important data, as it is definitely a current issue in today’s day and age. Children are becoming increasingly more tech-savvy, with children as early as infancy being exposed to and given technology to interact with. With this exposure comes the ability for children to become far more comfortable with technology than we give them credit for, which will allow them to access things that we may not anticipate they would know how to reach. A research study focused on Internet safety would provide valuable insights towards ensuring how our children can stay protected from harmful things they should not be exposed to.

5.5 Concluding Comments

Technology in the classroom is definitely a topic that is extremely relevant to the field of teaching in 2016. Though much of the literature pointed to the profound effects technology has on the classroom, it was even more powerful to witness first-hand how technology has shifted the educational landscape. A myriad of different technological devices have been shown to me by various instructors in our teacher education program, and I have had the pleasure of seeing it being actually used out in the field. My participants spoke very highly about technology and how it has helped their teaching as a whole, which has reinforced my own personal beliefs about the value of technology in
the classroom. Although there have certainly been (and will continue to be) struggles along the way in terms of the glitches and availability of technology within our schools, the fact that the participants continue to implement technology regardless of the frustrations that are accompanied speak to the power of technology to truly transform the learning environment.

Is it my sincerest hope that in-service teachers are able to read this study and think to themselves, “If they can do it, so can I!” The path ahead may not be the smoothest of paths, but the journey is far more enjoyable than the destination. As Ms. Frizzle would say, “Take chances, make mistakes, and get messy!” It is also my hope that principals see this and reflect on their approach to technology. Ensuring that they are promoting a supportive environment, in which their teachers can truly flourish with technology, is imperative in creating a tech-friendly school climate. And lastly, it is my greatest of hopes that the school boards step up to the plate and ensure that all schools in all areas are being provided with the technology required to let their teachers teach. No school should be considered a ‘have not,’ and it is the higher administrations responsibility to ensure that no school has to go without – equal access for all schools.

In conclusion, I truly hope this research study inspires people across all levels of the school system to take action and do what they can to support technology use in the classroom. The benefits that technology has on student learning are so apparent, and we are not doing our students justice if we are not using technology. Teaching with technology is preparing our students to be literate and active members of our 21st century society.
References


Letter of Consent (Appendix A)

Date:

Dear ______________________________,

My name is Jamie Alexander and I am a student in the Master of Teaching program at the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT). A component of this degree program involves conducting a small-scale qualitative research study. My research will focus on how elementary teachers perceive the use of technology in the learning environment. I am interested in interviewing teachers who have experience incorporating technology into their practice. I think that your knowledge and experience will provide insights into this topic.

Your participation in this research will involve one 45-60 minute interview, which will be transcribed and audio-recorded. I would be grateful if you would allow me to interview you at a place and time convenient for you, outside of school time. The contents of this interview will be used for my research project, which will include a final paper, as well as informal presentations to my classmates and/or potentially at a research conference or publication. You will be assigned a pseudonym to maintain your anonymity and I will not use your name or any other content that might identify you, your colleagues, or school in my written work, oral presentations, or publications. This information will remain confidential. This data will be stored on my password-protected computer and the only people who will have access to the research data will be my course instructor Ken McNeilly and myself. You may choose to review the interview questions beforehand; decline to answer any specific question; or to change your mind about your participation at any time, and to withdraw even after you have consented to participate. I will destroy the audio recording after the paper has been presented and/or published, which may take up to a maximum of five years after the data has been collected. There are no known risks or benefits to participation, and I will share with you a copy of the transcript to ensure accuracy if you desire.

Please sign this consent form, if you agree to be interviewed. The second copy is for your records. I am very grateful for your participation.

Sincerely,

Jamie Alexander
416-508-2271
jamie.alexander@mail.utoronto.ca

Course Instructor’s Name: Ken McNeilly
Contact Info: kenneth.mcneilly@utoronto.ca

**Consent Form**

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw from this research study at any time without penalty.

I have read the letter provided to me by Jamie Alexander and agree to participate in an interview for the purposes described. I agree to have the interview audio-recorded.

Signature: ______________________________________

Name: (printed) _______________________________________________

Date: ______________________________________
Interview Protocol & Research Questions (Appendix B)

The interview will begin with a “Thank you again for taking the time to meet with me. Once again, this research is focused on elementary school teachers’ perceptions on the use of technology in the classroom. This interview should take 45 minutes to 1 hour. As a reminder, you are more than welcomed to skip any question you do not wish to answer, and that if you wish to withdraw from the research project you may do so at any time. Do you have any questions before we begin?”

Section 1 – Background Information
a) What grade are you currently teaching? Have you taught any other elementary grades?
b) How long have you been teaching?
c) What is your personal comfort level with technology outside of the classroom?

Section 2 – Teacher Practices (What/How)
d) What sorts of technology do you use inside the classroom?
e) For the technology you have listed, how did you go about including it in your practice?
f) How often would you say you implement new technology-related content?

Section 3 – Beliefs & Values (Why)
g) What do you feel is the benefit to including technology in the elementary classroom?
h) What do you feel are the drawbacks to including technology in the elementary classroom?
i) If you had to place yourself on a scale of 1-5, with 1 being tech-phobic and 5 being tech-savvy, how comfortable do you feel using technology in your classroom? Why do you feel you are a ___?

Section 4 – Influencing Factors (Who)
j) Who (or what) do you feel influences how much you use technology in the classroom?
k) In the research reviewed, the principal’s attitude is cited as one of the single highest factors contributing to technology use in the classroom. Do you find your principal has this as a focus?
l) Also in the research, teacher feelings of self-efficacy directly affect their use of technology in the classroom. Do you feel prepared to use technology in your classroom?
m) What supports are in place to assist you with using technology in your classroom? Is there support for technology you are expected to use but are not familiar with?

Section 5 – Next Steps (What Next)
n) What recommendations (if any) would you make to administrators to help teachers across the board successfully implement technology in their classroom?
o) What personal advice would you give to a new teacher in terms of using technology?
p) Do you have any final questions/comments/concerns about anything we have discussed? Is there anything we have not discussed that you would like to highlight?

The interview will conclude with “Thank you very much once again for taking the time to complete this interview. Would you like to review your interview after I have transcribed it?” After confirming their transcription preference, the interview will be concluded.