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# Elementary School Teachers' Perspectives on Utilizing One-to-One iPads to Improve Literacy Instruction

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Walden University
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Abstract

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MA, George Mason University, 2015

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Project Study Submitted in Partial Fulfillment

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Abstract

The appropriate and effective use of one-to-one devices, such as iPads, in elementary classrooms is a growing concern in education due to a lack of understanding of how teachers use this technology. The problem addressed in this qualitative case study was a lack of knowledge of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices in a Northern Virginia school. The purpose of this study was to explore elementary teachers' instructional practices and perceived self-efficacy with one-to-one devices. Mishra and Koehler's technological pedagogical content knowledge (TPACK) framework, which describes the interaction of educational technology, pedagogy, and content to produce effective technology integration, and Bandura's concept of self-efficacy, defined as individuals' confidence in their ability to accomplish a given task, framed this study. Research questions were used to explore how teacher instructional practices and self-efficacy were perceived to affect participants' ability to integrate technology. A purposive sample of 8 teachers with access to one-to-one devices participated in observations and semistructured interviews. Data were analyzed using thematic analyses, and a priori, in vivo, and axial coding. Results indicated that self-efficacy affected technology integration and that teachers desired professional development to improve their skills, grow as individuals, and support student learning. From these findings, a 21-hour professional development was created to address teacher self-efficacy and technology integration. This study contributes to positive social change informing plans for professional development, school-based training, and onsite technical support.

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Dedication

I dedicate this doctoral study to my dad, who has always been my number one fan. Earning this degree would not have been possible without his support, advice, and encouragement. I like to think that my success is his success, and I know that he is beyond proud of this achievement. Thank you, Dad, for always offering your time to listen and your willingness to talk through problems and ideas. You have taught me that hard work pays off, and I will never be able to say thank you enough.

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Section 1: The Problem

**The Local Problem**

Research has indicated that the use of iPads in the classroom offers portability, universal access, and personalized experiences for users (Kirkpatrick, Brown, Searle, Sauder, & Smiley, 2017). The popularity and perceived benefits of technology in the classroom have led schools around the country to adopt one-to-one programs, in which all students are expected to have a device (Kirkpatrick et al., 2017). With the adoption of one-to-one devices in schools comes the need for additional research to determine how teachers appropriately manage the new technologies in the classroom (Harper & Milman, 2016). However, Fraizer and Trekles (2018) stated that there is "little published research that focuses specifically on the one-to-one implementation of technology in elementary schools" (p. 464).

The problem addressed in this study was a lack of understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices in a Northern Virginia school. School A, a K-5 elementary school within one school district, was the single site for this study. It was one of many schools in the northern region of Virginia that had gradually made the switch to personalized student devices, according to the district website. At the research site, teachers and students in Grades 2-5 had been allowed to use one-to-one iPads in school (M. Langley, personal communication, January 9, 2018). Even though the teachers in the school district had been encouraged to incorporate technology (iPads) into their instruction, more

information was needed to determine how best to proceed with instructional practices and the perceived self-efficacy of teachers in the use of one-to-one devices.

From 2011 to 2018, the research school phased in the use of one-to-one devices. In 2018, school board members shared feedback from teachers and parents. The website showed that teachers reported positive experiences with one-to-one devices in the classroom, increased student engagement, and a higher level of connectivity to students inside and outside of school. Some parents voiced concern about Internet safety and questioned how schools in the district balanced technology use and traditional learning (Giles, 2017). Even though there were hundreds of teachers in the district, the meeting notes provided online only highlighted six teacher responses. Missing from the feedback was information related to how and when teacher feedback was obtained, whether or not all teachers in the district had the opportunity to provide input, and how many teachers responded to the request for feedback. The limitations of the feedback described here presented an opportunity for empirical research into the problem. One teacher noted that "teachers are not held accountable...for how and if they are using the devices" (J. Manor, personal communication, April 5, 2019). Additionally, an administrator stated that school leaders were unaware of how teachers were using the devices (C. Bowen, personal communication, June 2018). These comments also provided evidence of the local problem.

The low level of professional development that was devoted to technology also evidenced the problem in this local context. One teacher stated, "Unless teachers are self-motivated to seek professional development and outside opportunities then there are not

opportunities for growth in technology within the school district" (B. Kerr, personal

communication, April 5, 2019). Similarly, in the initial phases of the device rollout, one

teacher shared that she had been part of the iPad pilot program in 2013. She said,

"Professional development was promised to us in 2017, following the full adoption of

iPads; however, that professional development never came" (F. Hall, personal

communication, April 5, 2019). Professional learning opportunities can address the

challenges and barriers that teachers face when trying to integrate technology into their

classroom instruction (D'Agostino, Rodgers, Harmey, & Brownfield, 2016). The

instructional technology coach (ITC) at School A stated that "the teachers did not have a

plan for using technology and held a common misunderstanding that technology

integration should involve doing something different from what they were already doing

in their classrooms" (M. Langley, personal communication, January 9, 2018).

Professional development that is not continuously supportive of faculty indicates that a

gap in practice exists between current and recommended technology pedagogy (Machado

& Laverick, 2015).

The research problem is also evident in the broader educational discipline. In

2014, Digital Promise reported that although classrooms across the country had engaging,

motivating, and nurturing teachers, a significant gap still existed. Some teachers were not

comfortable using technology, and some schools had not used their resources to provide

adequate technology and professional development for teachers (Digital Promise, 2018).

Despite the proposed advantages of using iPads in the classroom, Sung, Chang, and Liu

(2016) found that very few studies had addressed how to use this technology effectively.

Sung et al. indicated that many mobile learning projects did not result in constructive thinking, reflection, or communication, serving only as reinforcement tools. The authors indicated that the divergence between research-based instructional strategies and current pedagogy constituted a gap in practice that should be addressed through additional research. Similarly, Harper and Milman (2016) and Fraizer and Trekles (2018) reported the need for further research into the use of tablets and how teachers manage technologies appropriately within the classroom.

While the popularity of one-to-one devices has grown in schools across America, Maich, Hall, van Rhijn, and Henning (2017) expressed concern about the limited amount of research to support their use in schools. Likewise, Chambers et al. (2018) stated, "there is a need for further research regarding the specific use of iPads" (p. 74). Overall, in the local and national setting, there was an unclear understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. This constituted a gap in practice between research-based teaching and current practice.

Christensen and Knezek (2018) claimed that many barriers to appropriate technology integration existed for teachers, including low self-efficacy beliefs. Blackwell, Lauricella, and Wartella (2014) argued that teachers' self-efficacy beliefs regarding technology were intrinsic barriers that limited the use of technology in the classroom. Because device implementation was in its early stages in the research district, many teachers needed time to develop their level of comfort with technology. Simply having access to technology did not mean that teachers believed that they were ready to

use the devices to their fullest potential. Kondos (2018) implied that teacher self-efficacy with technology is an area that merits additional study.

**Rationale**

The use of iPads in the classroom is a concern in the field of education, as well as in the local setting, which prompted the need for this study. Administrators did not have a clear understanding of teachers' instructional practices. They wished to understand how teachers used the technology because of the district's investment in one-to-one devices for students in Grades 2-12 (C. Bowen, personal communication, June 2018). The importance of understanding how teachers used technology in the classroom was supported by the findings of Ditzler, Hong, and Strudler (2016). Ditzler et al. found that even though teachers may use technology regularly in the classroom, many are not successful in their integration of technology in teaching and learning. If district and school leaders do not know how technology is being integrated, two problems arise. First, without knowing how technology is being used, leaders in the school district and administration cannot identify whether technology use is effective or ineffective for student learning. Second, appropriate action, such as professional development or increased support from ITCs, cannot be implemented to provide teachers with more strategies to make integration more successful.

A synthesis of current research supported the relevance of this problem in the broader educational discipline. Kent and Giles (2017) stated that given the enormity of responsibility associated with teaching, teachers struggled to integrate technology during their first year, and veteran teachers reported feeling inadequate in their ability to

implement the technology. Husband and Schendel (2017) found that many teachers were willing to embrace the worldwide change toward technology but struggled with this paradigm shift due to a lack of appropriate professional development. Hsu (2016) discovered four barriers that deter teachers from using technology in the classroom: students' lack of technology skills, lack of training, limited time for implementation, and the absence of technical support.

Minshew and Anderson (2015) supported the use of technology in the classroom, saying that it helped teachers improve their practice while simultaneously supporting students' learning and knowledge. However, the shift to digital technologies often challenges teachers to reconceptualize instructional delivery (Sofkova-Hashemi & Cederlund, 2017). Sofkova-Hashemi and Cederlund (2017) posited that the integration of technology in literacy instruction places teachers between two paradigms: traditional print-based instruction and newer screen-based practices. Studies have indicated that early literacy instruction privileges print-based practices, with technology treated as a supplemental resource (Sofkova-Hashemi & Cederlund, 2017).

Bebell and Pedulla (2015) stated that many of the schools whose leaders choose to engage in iPad integration programs do not participate in formal research or evaluation efforts, and even fewer have published findings on their programs' effectiveness. Despite the increased popularity of iPads, research is scarce (Bebell & Pedulla, 2015). Kirkpatrick et al. (2017) agreed with Bebell and Peduall (2015) that although the use of devices with school-age children is more prevalent than it was 5 years ago, the research on this practice remains sparse. McKnight et al. (2016) argued that one potential reason

for the lack of research is the absence of documentation on how teachers have used technology to improve learning. Milman, Carlson-Bancroft, and Boogart (2014) argued that although there was limited research on iPads in the K-12 setting, there was a solid base of information from which to work.

McKnight et al. (2016) suggested that technology use in the classroom yielded positive outcomes such as learner-centered experiences, hands-on learning, increased social interaction, and collaboration among peers. However, there has been little research addressing the long-term effects of technology-based tools (Cordero et al., 2015). Although authors such as Chaudron (2015) have indicated that children are accessing technology at an increasingly young age, research on the benefits and challenges associated with technology use for elementary-age children is limited. Lu, Ottenbreit-Leftwich, Ding, and Glazewski (2017) examined research related to the use of iPads in early childhood education. Their findings indicated positive learning outcomes, early literacy, and social development linked to iPad use. Although their examination of the research yielded positive conclusions, Lu et al. noted that teachers struggled to find age-appropriate iPad applications to support student learning and to track student progress. Sung et al. (2016) found that very few studies had addressed how to use technology effectively in schools even though there were many proposed advantages of this practice.

Currently, at elementary schools in a Northern Virginia school district, teachers have the opportunity to utilize one-to-one iPads with students to improve learning and instruction. Teachers at School A are excited about their access to technology and show interest in learning new ways to incorporate iPads into instruction to enhance student

learning (A. Pendo, personal communication, March 2018). The purpose of this study was to understand elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices.

**Definition of Terms**

Technology in education has changed dramatically in the past decade, with a shift from outdated policies and blackboards to newer technology, such as laptops, iPads, and connectivity for all devices (Kondos, 2018). For these reasons, it is necessary to define any terms that may not be readily understood by those who are not familiar with the standard terminology used to discuss the use of technology in K-12 schools.

*Digital Promise*: An organization created to accelerate the innovation of technology in education to improve learning opportunities for all individuals (Digital Promise, 2018).

*Educational Technology Plan (ETP)*: The 2018-2023 ETP is a recent revision of long-range technology plans adopted by the Board of Education in Virginia, which aims to increase technology integration in schools across the state.

*One-to-one device*: This term refers to the idea that each student in a classroom has access to his or her device. The device follows the student through each grade level and holds all of a student's school accounts.

*Self-efficacy*: Defined as individuals' confidence in their ability to exert control over their motivations and behaviors (Bandura, 1977).

*Technology integration*: The incorporation of technology resources and technology-based practices into daily routines, work, and school (National Center for Education Statistics, n.d.).

## Significance of the Study

The findings of this study may generate a deep understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. This study may lead to positive social change because leaders in the school district for School A are currently deciding whether to continue the one-to-one device initiative (Airey, 2019). The school district collected information that indicated that iPads are being used during roughly half of class time, and the majority of teachers and students reported positive outcomes from the one-to-one initiative on their website. However, county leaders also indicated that the lack of resources and direct supports is among the barriers faced by teachers that inhibit effective use of the technology. This study may provide a better understanding of how the iPads are used across grade levels to support student learning and may inform decisions by district leaders about the continuation of the one-to-one device initiative.

This study may also inform the development of frameworks for research. McKnight et al. (2016) studied how teachers used technology to develop a framework that other researchers could incorporate into technology use studies. The researchers found that technology improves access to up-to-date resources for teachers and students and enhances communication and feedback between students, teachers, and parents. Additionally, they found that through technology, teachers were able to spend less time

on whole-group instruction and grading papers and more time on one-to-one coaching with colleagues and side-by-side learning with students.

The findings may contribute to positive social change through improved instruction of students with special needs and younger students. Use of iPads has had positive outcomes for special education teachers and children with disabilities (Anderson, Griffith, & Crawford, 2017). Access to iPads has enabled special education teachers to combine evidence-based pedagogy with technology-enhanced practices that are best suited to individual student needs and goals. Lu et al. (2017) reported that the use of iPads with young students could support literacy instruction as a pedagogical tool to enhance student engagement and reading comprehension. When used in developmentally appropriate ways, the iPad can facilitate personalized learning experiences for students (Lu et al., 2017). Milman et al. (2014) stated that iPads improved the reading, writing, and content area skills of school-age children. An examination of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices during instruction may contribute to improved learning for students.

**Research Questions**

The following research questions were developed to explore the perspectives, perceived self-efficacy, and practices of teachers regarding one-to-one devices in the classroom to improve student learning.

RQ1: How do the teachers in Grades 2-5 describe their classroom practices regarding one-to-one devices to increase student learning?

RQ2: How do the teachers describe their self-efficacy beliefs regarding

classroom use of one-to-one devices to increase student learning?

**Review of the Literature**

The available technology in schools has drastically changed since 2000.

Classrooms have transitioned through overhead projectors, televisions, computer labs,

mobile laptop carts, and most recently, iPads. The evolution of technology has continued

to affect how people learn, live, and work (Sullivan & Bhattacharya, 2017). Research that

focused on the use of iPads in the classroom did not begin until after Apple's release of

the iPad in 2010. Due to the short span of time that iPads have been available to schools,

there have been a limited number of studies focused on the effective use of iPads with

students (Fraizer & Trekles, 2018), how teachers have adapted to the era of technology

integration (Howard & Gigliotti, 2016), and what supports school districts need to put in

place to help teachers navigate the use of technology in the classroom (Liu, Tsai, &

Huang, 2015). The lack of available research and the identified gaps in local practice

served as evidence for the currency of this study.

Guiding this study was Koehler and Mishra's (2009) technological pedagogical

content knowledge (TPACK) framework and Bandura's (1977) concept of self-efficacy

from his social learning theory. The TPACK framework provided insight into teachers'

ability to combine their knowledge of technology with pedagogy and content knowledge

to create seamless technology integration lessons. The concept of self-efficacy provided

insight into the reasons why some teachers quickly adapt to integrating new forms of

technology into their teaching, while others struggle to take advantage of the skills, strategies, and academic enhancement offered using one-to-one devices.

Three main themes emerged from the available literature. The first was research related to teachers' experiences with technology in the classroom, including the perceived experiences of preservice teachers (Çoklar & Kabakçı, 2017; Han, Shin, & Ko, 2017). Much of the literature included explanations of the ways that veteran teachers integrated technology into their teaching and how preservice teachers were prepared in teacher preparation programs to incorporate various technologies into instructional practices. The second theme involved the barriers that teachers face when asked to integrate technology into their lessons (Airey, 2019; Walsh & Farren, 2018). Self-efficacy is the most common barrier described in the literature. The final theme was the impact that technology has on students. The literature addresses the potential benefits that technology has for students' development of 21st century skills, academic achievement, and interpersonal skills (Kirkpatrick et al., 2017; Thieman & Cevallos, 2017). Much of the research focused on technology integration in math, science, and social studies, but there were limited studies on the effects of technology during literacy instruction.

I used the following databases to obtain research: Education Source, SAGE Journals, ScienceDirect, Academic Search Complete, and ProQuest. The following search terms were used to find recent and relevant literature: *iPad integration, iPads in schools, teacher self-efficacy, technology integration, one-to-one technology, teacher barriers, TPACK, student impact, self-efficacy, elementary school, education standards, literacy, national standards, impact on students,* and *education*.

**Conceptual Framework**

The phenomenon of interest was elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. The TPACK framework provided a better understanding of how teachers interacted with technology and integrated it into content and pedagogy. The self-efficacy concept offered a better understanding of the reasons why teachers chose to use their iPads in specific ways. Both TPACK and self-efficacy indicated areas of weakness for teachers and highlighted potential professional development opportunities.

**Technological pedagogical content knowledge framework.** Three broad categories are used to describe the knowledge that teachers possess: content, pedagogy, and technological. Koehler and Mishra (2009) built their TPACK framework upon Shulman's (1986) construct of pedagogical content knowledge (PCK). The TPACK framework describes how teachers' understanding of educational technologies and PCK interact and intersect to produce the effective integration of technology and instruction to ensure student success. The framework requires purposeful and skilled teaching that does not occur within each component individually. Machado and Laverick (2015) described TPACK as a form of knowledge that enables teachers to adapt their beliefs toward using technology in the classroom. Adapting one's beliefs can depend on an individual's level of self-efficacy and their access to learning resources that support this shift in thinking (Machado & Laverick, 2015). The understanding of pedagogical techniques that use technology in useful ways to teach content helps teachers recognize how technology can support the learning of difficult concepts and grasp how technology can be used to build

upon students' background knowledge or to strengthen current knowledge. TPACK requires teachers to understand how to blend technology into current teaching practices.

Research related to TPACK has primarily focused on preservice teachers, and there has been a lack of studies examining in-service teachers' evolving TPACK skills (Machado & Laverick, 2015). Roig-Vila, Mengual-Andrés, and Quinto-Medrano (2015) studied the TPACK needed for primary teachers to integrate technology into teaching. They came to three conclusions based on the findings of their research. First, technology integration is more than using devices as an added tool for instruction; instead, the focus is on connections among technology, content, and pedagogy that naturally play out in classroom contexts. There is value and importance to blending technology into what teachers are already doing to ensure seamless integration. Second, Roig-Vila et al. found that primary teachers had more content and pedagogical knowledge than technological knowledge. These results confirmed that teachers' knowledge of technology is lower than their content and pedagogical knowledge. Finally, the findings showed a negative correlation between the number of years of teaching and the amount of technological expertise. Teachers with more experience generally did not have as much knowledge of technology as teachers with fewer years of experience. Administrators' and school districts' understanding of teachers' level of technology knowledge is important so that proper supports are put into place during the school year to enhance teachers' learning.

Teachers successfully engage TPACK any time that they integrate technology, pedagogy, and content knowledge. A unique feature of TPACK is the understanding that there is no single combination of these components that acts as a solution for its use in a

teacher's practice. Instead, it depends on teachers' ability to flexibly navigate and blend each component in a way that fits with their instruction, ability level, access to technology, and students' needs. Hence, the TPACK of a ninth-grade science teacher will look different from that of a third-grade classroom teacher. However, a lack of skill or knowledge in any one area can negatively affect the overall integration of technology (Saudelli & Ciampa, 2016). The working dynamic between each domain is what supports teachers and ensures the best possible learning environment for students.

The TPACK framework is relevant to this study because TPACK offers a foundation for teachers to combine teaching and technology to improve student learning. TPACK becomes genuinely operationalized when teachers efficiently connect content, an educational approach, and the use of a technological tool or resource to support student learning (Minshew & Anderson, 2015). With TPACK, teachers can move beyond seeing technology as an added item on their long list of things to do and can begin to see it as a seamlessly embedded pedagogical tool (Saudelli & Ciampa, 2016). Teachers' increased comfort level with technology knowledge can support their pedagogical and content knowledge to make the best possible use of their access to one-to-one devices. Self-efficacy can be a significant deterrent or incentive for teachers to engage TPACK and integrate technology into their teaching practice.

The school that was the focus of this study adopted one-to-one technology as a vehicle to change the way in which teachers and students utilized technology for teaching and learning. The research indicated that there was a need for further understanding of how in-service teachers' level of TPACK affected the way that they can align their

understanding of content with effective technology practices to positively influence student learning. TPACK guided the data collection because the interview protocol was constructed so that each of the key elements of TPACK (i.e., knowledge of content, pedagogy, and technology) was explored. Data analysis was informed by TPACK using a priori codes based on the most essential elements of the model.

**Teacher self-efficacy.** One reason that teachers may not use technology in their classroom is their lack of self-efficacy when using the equipment or applications. Self-efficacy, a construct of Bandura's (1977) social learning theory, was relevant to this study because it is the reflection of individuals' confidence and ability to exert control over their motivations and behaviors. Even though teachers may believe in the value of technology, low and even high self-efficacy can make it impossible for teachers to reach full integration (Heath, 2017). Kabatas and Gizem (2018) explained that self-efficacy could help describe behaviors related to technology use. Teachers with high self-efficacy may respond well to contemporary teaching practices involving the use of technology, while teachers with low self-efficacy may hesitate to embrace new methods of teaching that require technology integration. The research above indicated that teachers with higher levels of self-efficacy might respond to and perform better with technology than teachers with lower self-efficacy. Through teacher interviews, I gathered more information about teachers' perceptions of their self-efficacy and how it affected their use of technology.

Self-efficacy is linked to teacher TPACK. There is a positive correlation between positive feelings toward using technology and TPACK scores; specifically, higher self-

efficacy correlates to higher TPACK (Yerdelen-Damar, Boz, & Aydin-Gunbatar, 2017). Saudelli and Ciampa (2016) reported that teachers' self-efficacy could grow if TPACK knowledge increased. However, Salleh (2015) argued that the complex relationship between the pedagogical change to integrate technology and teachers' beliefs might be the reason for limited buy-in from some teachers. Heath (2017) suggested that a true change in teachers' beliefs is possible when one increases their knowledge and skills. The author continued to say that merely eliminating initial barriers to technology use would not increase the use of technology by teachers (Heath, 2017). Without proper guidance, giving teachers technology does not guarantee its appropriate and beneficial use or an increase in their self-efficacy.

Joo, Park, and Lim (2018) identified a lack of empirical research on the connection between TPACK and self-efficacy. Their research findings indicated a direct correlation between teacher TPACK and self-efficacy; specifically, that higher TPACK makes it more likely for teachers to increase their self-efficacy (Joo et al., 2018). López-Vargas, Duarte-Suárez, and Ibáñez-Ibáñez (2017) argued that the study of TPACK and its connection to self-efficacy would allow for an understanding of teachers' behavior regarding their inclusion of technology in the learning process. Further, the authors said that this understanding would lead to the design of differentiated teacher training courses to support teachers (López-Vargas et al., 2017). The use of TPACK and self-efficacy to guide this study was supported through literature and added to the findings of this study to support how teachers are using technology.

**Teachers' Experiences With Technology**

The expansion of digital devices represents an exciting opportunity for teachers because they have the chance to become catalysts for change as they design innovative ways to teach and learn with technology. Continuous exposure and the development of technology integration have revealed promising results for teachers to create engaging and meaningful learning experiences for students. The practices of teachers vary due to the many factors that can influence the role of an educator. To better understand the collective experiences of teachers in using technology in the classroom, researchers have followed, interviewed, and observed classrooms and teachers. However, the factors that lead preservice teachers and veteran teachers toward using technology are different. Beliefs, knowledge, and exposure to technology affect teachers' approach to developing technology-infused lessons for students.

As technology-related skills become essential for teachers to possess, an increased understanding of the daily experiences of teachers will assist in providing them with necessary support as they develop these skills. Many researchers have examined in-service teachers' experiences as they adapt to developing technology (Bahng & Lee, 2017; Çoklar & Kabakçı, 2017; Howard & Gigliotti, 2016). The literature has shown that teachers have a willingness to take risks and show a genuine interest in enhancing learning experiences for their students. Other researchers have explored the ways that teacher preparation programs affect preservice teachers' approaches and experience with technology integration (Anderson et al., 2017; Coyne, Lane, Nickson, Hollas, & Potter, 2017; Han et al., 2017; Lewis, 2015). The collective findings indicate that preservice

teachers have required time and exposure to develop their skills with technology integration, but teacher preparation programs have provided a suitable environment for this practice to occur. Preservice and veteran teachers undoubtedly garner technology knowledge in different ways, and their classroom experience shows that they approach technology integration differently.

**Preservice teachers.** Professional standards for teachers exist to create consistency among K-12 classrooms across the United States. The Common Core State Standards, launched in 2009 in 49 states and the District of Columbia, include digital literacy categories intertwined within both the math and reading curriculum standards. Additionally, state departments and national organizations, such as the International Society for Technology in Education (ISTE, 2018), have established technology standards over the last decade and a half. Most recently, the Council for Accreditation of Educator Programs (2018) has written standards for technology integration in education, which its members believe should be an integral part of teaching rather than a separate competency. While both organizations agreed that teachers have a fundamental responsibility to prepare students to become digital citizens in the 21st century, there is a discrepancy between the identified importance of students' digital literacy skills and the integration of digital literacy development in teacher preparation programs (Lewis, 2015). Educator preparation programs can monitor the progress of preservice teachers' technology knowledge and skills to guarantee that they are prepared to integrate technology into professional standards.

Young generations of learners are entering classrooms with a wealth of knowledge and personal experiences surrounding recent technologies. Teacher education programs have acknowledged the importance of technology in education; however, recent research has suggested that teachers are not leaving their education preparation programs equipped to use technology in the classroom (Han et al., 2017). Inadequate teacher preparation inhibits a teacher's ability to promote students' learning through technology. A suggested solution is for teacher preparation programs to provide prospective teachers with appropriate experiences that allow them to develop their skills and ability to use technology effectively (Anderson et al., 2017; Courduff, Szapkiw, & Wendt, 2016). Because students enrolled in school since 2010 have been well versed in the use of technology, future teachers will work to acquire the skills to skillfully meet the needs of this generation.

Research has identified that preservice teachers lack technology skills beyond productivity and presentation. However, there is an expectation that teachers provide students with opportunities to become active agents of technology. School districts and teacher preparation program leaders can work together to build a more direct, consistent, and open relationship to communicate the skills that should be taught during education coursework. Coyne et al. (2017) suggested that teacher preparation programs should collaborate with school districts to create and offer workshops about technology that will benefit preservice and in-service teachers. Another recommended approach is to have preservice teachers model technology integration during their student teaching, potentially making technology less intimidating and more accessible for in-service

teachers (2017). While Han et al. (2017) agreed that modeling technology integration during the student teaching experience is a beneficial practice to increase the self-efficacy of new teachers, the authors also stated that preservice teachers should have access to exemplary cases and models of technology integration for an optimal learning experience.

Colleges and universities can consciously restructure teacher preparation programs to include direct instruction, modeling, and hands-on experiences for preservice teachers. School districts can design appropriate professional development for new teachers that will support their development of technology skills and enable them to move beyond using technology at its most basic level.

**In-service teachers.** Teachers regularly adjust to changes in curriculum, emerging strategies for teaching literacy and math, new approaches to behavior management, and recently, developments in technology. It is no surprise that some teachers may struggle to find the time to learn innovative ways to integrate technology. Even though research has identified that using technology in the classroom has led to positive student learning outcomes (Lu et al., 2017), it also continues to recognize that teachers still have uncertainties about integrating digital technologies (Howard & Gigliotti, 2016). In many instances, teachers' approach to technology integration is a teacher-centered manner, rather than student-centered. Çoklar and Kabakçı (2017) conducted a study in which teachers reported having positive experiences with technology integration, but when the authors compiled the study's results, they concluded that teachers were not yet planning technology integration with the student in mind.

Hu and Garimella (2017) indicated a change in teachers' approach, noting that they gradually saw teachers moving toward more student-centered teaching practices. There was evidence in the recent literature to show that teachers were capable of adopting technology-enhanced teaching practices. This was relevant to the study because similar to leaders at School A, the research presented an understanding that teachers have adjusted to using technology in the classroom, but further information was needed to fully understand how they have chosen to use the technology in ways that benefited student learning.

Comfort and confidence with technology use is a leading factor that determines whether a teacher integrates technology practices in the classroom. Many studies have acknowledged that confidence was the difference between a teacher who uses technology and a teacher who does not (Howard & Gigliotti, 2016; Liu, Ritzhaupt, Dawson, & Barron, 2017; Williams, 2017; Young, 2016). Initially, Sahin, Top, and Delen (2016) believed that younger teachers, who had more exposure to technology than senior educators, would have more technology knowledge that would aid in higher instances of technology integration in the classroom. However, their findings indicated that the teachers' experiences and years spent teaching did not correlate with their comfort of using technology (Sahin et al., 2016). The authors posited that negative attitudes were a higher contributor to determine the likelihood that a teacher will incorporate technology. Arguing this point, Liu et al., (2017) discovered that experience with technology and the number of years spent teaching strongly influenced teacher confidence and comfort using technology. They believed their findings reinforce the importance of teachers'

dispositions toward technology and having the confidence to use it appropriately in the classroom (2017). Having a positive attitude toward the use of technology will assist all teachers as they explore technology integration, but comfort, confidence, and experience are just as important.

Many teachers may agree that they have used technology for non-teaching tasks, such as grading, planning, or locating resources or curriculum materials. Unsuccessful teaching experiences with technology adoption can hinder a teacher's motivation to continue using technology. Liu et al. (2015) suggested that in-service teacher training experiences lack hands-on activities and fail to provide teachers with the information needed so they feel prepared to integrate technology adequately. They reported that when teachers observed other successful teachers during professional development, it enhanced their learning experience and increased the likelihood that they would adopt new technology practices in their classrooms (2015). Another way to improve teachers' technology learning experiences is through collaborative planning. Deciding where to begin when planning for technology integration can be overwhelming, but Thoma, Hutchison, Johnson, Johnson, and Stromer (2017) found that when teams of teachers used the Technology Integration Planning Cycle (TIPC), they overcame barriers to incorporating technology. Teachers from this study reported that the TIPC changed their way of thinking about technology, encouraged them to look for new ways to use technology, prepared them for challenges that may arise while teaching, and allowed them to celebrate the meaningful projects they were doing with their students. Providing meaningful professional development followed by a collaborative team-planning meeting

are two strategies that catapult teachers from using technology to complete administrative tasks toward purposeful and intentional integration experiences for students.

**Barriers to Teachers' use of Technology**

There are numerous reasons why teachers may love using technology in their classrooms. Digital access for all students, possibilities for differentiation, collaborative learning experiences, and personalized learning are just a few examples of the positive benefits teachers experience when using technology in the classroom. School districts across the country are spending millions of dollars on newer devices for students in K-12 classrooms (Blackwell et al., 2014), yet the excitement around this technology may not be enough to change the teaching and learning practices of the many teachers who now find themselves with a class set of iPads provided by their school district. Walsh and Farren (2018) argued that teachers are an essential element of integrating technology in the classroom, but changes to their teaching pedagogy have not been able to maintain pace with the rapid adoption of iPads and other technologies. Without sound pedagogy and technology knowledge, the iPads are no more than an expensive e-reader, gadget, or source of entertainment.

From the literature emerge three overarching themes related to the barriers teachers face when asked to implement the technology. First, cost and availability refer to schools' ability to purchase enough devices for all students, the costs associated with new hardware, Internet connectivity, and repair and replacement costs. The second theme, access to professional development, was related to the lack of training provided to teachers who were unfamiliar with new technologies. The fear of the unknown is enough

to keep some teachers from exploring available technology. Finally, the third theme was teacher confidence. Many teachers lack the self-confidence and self-efficacy needed to experiment with the challenges associated with technology integration. Overall, there are numerous barriers that teachers face, and many researchers have looked for solutions that allow teachers to overcome their fears more easily.

**Cost and availability.** Supplying classrooms with a sufficient number of devices can be costly for school districts. Even with the help of Apple's education financing program, which allows schools to lease and finance their devices to avoid an initial payout, schools are still responsible for shouldering the cost of the network, maintenance, software, and applications. Currently, district leaders are trying to decide whether they will continue to financially support the one-to-one device initiative currently in place at School A and other elementary schools in the county (Airey, 2019). Many educational applications offer free versions of their programs, but typically these versions only allow basic access for students. In many cases, students are not able to take full advantage of the skills and activities that the paid version of an application contains, so schools need to purchase a license that enables students to benefit from the paid educational applications.

Walsh and Farren (2018) discussed the cost factor of a school's need for wireless Internet connectivity. The authors argued that for the iPads potential to be fully utilized, it is necessary that it be connected wirelessly, yet some schools have not installed wireless capability. Additionally, costs can accrue from replacing and repairing damaged hardware. For school districts with a high number of devices, the replacement and repair costs can amount to hundreds of thousands of dollars each year. Although many schools

have recently been able to budget for new technology, teachers have historically seen a lack of hardware and software as barriers (Ruggiero & Mong, 2015). Overcoming these barriers has been made easier for teachers but is still associated with challenges that require more than school districts fronting the cost of new devices.

Cost and availability are considered first-order extrinsic barriers for teachers. Blackwell et al. (2014) described first-order extrinsic barriers as challenges beyond the immediate control of an individual. Other examples included time to learn technology, training, and support, and professional development. Vongkulluksn, Xie and Bowman (2018) reported that first-order barriers had been known to have adverse effects on how teachers integrate technology. For example, teachers with a high perception of external obstacles have classrooms that are less student-centered and have less technology use. First-order barriers can be seen as the first line of challenges that schools should work to overcome (Vongkulluksn, Xie, & Bowman, 2018). Collaboration among school districts, school administrators, and teachers allow for the creation of a yearlong plan that address the first-order extrinsic barriers specific to each school.

Now that teachers no longer need to cover the cost of expensive hardware, they can shift their attention and focus on integration. According to Ruggiero and Mong (2015), Internet usage in schools rose from 34% in 1994 to 100% in 2005. Additionally, 99% of teachers reported having access to one or more computers (Pittman & Gaines, 2015), use of videos and podcasts in the classroom has increased by more than 50% since 2008, and nearly 100% of teachers are using Internet-based communication tools to connect with students and parents outside of the classroom (Ruggiero & Mong, 2015).

Even though the cost of technology is decreasing for teachers, accessibility is increasing, and more teachers are exploring the very elementary functions of technology, there was still not enough evidence to show that teachers are effectively using technology in the classroom.

   **Professional development.** Teachers participate in a variety of professional development activities throughout the school year. However, professional development must have certain features to be effective (Uslu, 2017), such as collaborative learning (Liu et al., 2015), differentiation (Jones & Dexter, 2018), and teacher input (Uslu, 2017). The overall goal of professional development is to help teachers increase student learning by making changes to in-class activities. As mentioned earlier, several teachers at School A still believed that there was a lack of differentiated professional development available within the school district to meet the needs of all teachers. Vaughn and Beers (2017) described the purpose of professional development as a way to create pedagogical changes for teachers. Therefore, professional development considers teachers' needs and requires teachers to take an active role in planning and presenting (Uslu, 2017). Following professional development, the monitoring of teachers' classroom practices and ongoing support of teachers' learning is meant to encourage student achievement. Because teachers participate in professional development throughout the year, each learning experience can be made relatable to the needs of teachers since a one-size fits all approach is not effective.

   Professional development offers opportunities for teachers to expand their knowledge, enhance their skills, and learn new and innovative teaching strategies.

Christensen and Knezek (2018) reported that technology integration was significantly more problematic for older teachers than younger teachers, and since technology has developed rapidly in recent years some teachers have not had professional development to meet their needs. Teachers need appropriate training regarding the pedagogy of integrating technology, as well as classroom management strategies that encourage teachers to build the confidence to lead in a new instructional setting (Christensen & Knezek, 2018). Schools can determine the most effective way to implement professional development to meet the varying needs of teachers.

Learning a new skill requires an individual to spend time practicing and applying new knowledge to existing knowledge. For teachers who are discovering new ways to integrate technology, there are several requirements to consider. According to Thiel (2018), teachers wanted professional development to be grade level or subject relevant so that there were opportunities to work collaboratively through hands-on activities. Additionally, teachers wished for clear leadership from both School A and district leaders to provide ongoing support. Vaughn and Beers (2017) agreed that learning to teach with technology requires collaboration and support through personalized learning experiences. When given the time make connections between content and technology, to share ideas with colleagues, and to hear from School A and district-level experts, teachers had the opportunity to build on their craft of integrating technology and curriculum.

Enhancing learning using technology is an increasingly popular approach in K-12 classrooms. Literature has shown that teachers benefit from professional development as they explore the benefits and constraints of mobile technology (Liu, Ko, Willmann, &

Fickert, 2018). Professional development builds off of the limitations identified by teachers to ensure a more meaningful learning experience. The learning that takes place during professional development is linkable to what teachers are doing in the classroom (Longhurst et al., 2016). However, Jones and Dexter (2018) reported that schools often find it challenging to differentiate professional development regularly. Professional learning experiences provide teachers with strategies, skills, and knowledge that they can immediately transfer to their classrooms to enhance student learning.

**Teachers' confidence with technology.** Since the early 2000s, educators have been tasked with implementing technology-infused lessons using devices that were not yet in existence at the time when they were learners. For many teachers, their experience with technology is as old as the learners in their classroom. Therefore, it is no secret that teachers' confidence and comfort level may be lower than is required to integrate technology successfully. The identification of low self-efficacy related to technology and its use in the classroom helps to decide on a course of action, such as targeted teacher training and ongoing technology support (Nikolopoulou & Gialamas, 2015). All teachers will develop their self-efficacy over time and at different speeds. Many consider young people born into the world of technology to be digital natives; however, the younger generation of preservice teachers does not naturally transfer their technology knowledge into their educational practices (Vasinda, Ryter, Hathcock, & Wang 2017).

Teachers hold many beliefs about their practice, their knowledge, and their ability to lead a classroom. Hsu (2016) stated that a teacher's views are the best predictor of their classroom practice and their approach to technology integration. One's self-efficacy

and personal beliefs can strongly dictate their technology practices. Typically, educators take one of two paths toward teaching: teacher-centered or student-centered (Tondeur, Braak, Ertmer, & Ottenbreit-Leftwich (2017). Teacher-centered individuals place a strong emphasis on discipline and subject matter, while student-centered individuals focus on students' needs and interests. Tondeur et al. (2017) explained that a teacher's beliefs act as a filter, through which new knowledge and information is screened for relevance and importance, and this includes the acquirement of technology knowledge. The authors argued that teachers' pedagogical beliefs change over time using technology and they end up developing a more student-centered approach to teaching.

Self-efficacy guides the choices that teachers make every day. Many researchers have reported the direct link between self-efficacy and the intention to use technology (Joo et al., 2018; Song, 2018; Valtonen et al., 2015). Increasing self-efficacy for teachers can begin during teacher preparation programs. Song (2018) argued that authentic learning experiences influence preservice teachers' technology integration self-efficacy. A top predictor of influence for preservice teachers was observing their mentor teacher use and model technology integration. Joo et al. (2018) also agreed that preservice teachers could increase their self-efficacy. In their study, the authors found that preservice teachers with high TPACK were more likely to increase their self-efficacy in teaching. Also, higher TPACK had a positive influence on preservice teachers' ease of use and perceived usefulness of technology (Joo et al., 2018). While professional learning can support veteran teachers' development of technology self-efficacy, teacher preparation programs can prepare preservice teachers to enter the classroom with high

levels of TPACK, self-efficacy, and technology knowledge to make choices that will benefit students' learning. With more information about elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices in the classroom to support student learning, district leaders could make appropriate decisions about professional development, levels of school support, and the financial cost of continuing the device initiative.

**Impact on Student Achievement**

Schools across the United States have invested in new devices, like the iPad, as a way to build a one-to-one ratio between students and technology. Many schools seek to immerse students and teachers in technology-rich learning environments that they hope will increase the reading and writing achievement of K-12 students (Milman et al., 2014). However, many researchers have been interested in learning more about the effect that individual devices have on student learning and academic performance (Harper & Milman, 2016; Hutchison & Beschorner, 2016; McDermott & Gormley, 2016; McKnight et al., 2016; Sung et al., 2016). Proponents of technology in classrooms argued that it develops collaboration, increases student engagement, allows access to resources from anywhere, and enhances personalized learning experiences. Opponents contend that there is not enough empirical evidence to support the use of technology in the class and suggested that it is only useful when placed in the hands of a skilled teacher. Despite the opposing views, many schools are still encouraging the use of technology in the classroom and are continuously working to build their one-to-one ratio.

Technology use in schools is a widely researched topic. Crompton, Burke, and Gregory (2017) reported that elementary science is the most commonly investigated area related to technology, but more researchers are looking into the effect that technology has on literacy and writing. Some researchers have found positive correlations between reading achievement and technology use (Andresen, 2017; Husband & Schendel, 2017), while others found no significant difference between the reading achievement of students who used technology-based materials and students who used printed texts (Singer & Alexander, 2017). Other researchers have chosen to examine the effects of technology on subgroups such as minorities, girls, and low-income students (Falloon 2015; Kirkpatrick et al., 2017; Schechter, Macaruso, Kazakoff, & Brooke, 2015; Thieman & Cevallos, 2017; Varier et al., 2017). Findings from these studies indicated that technology had a positive effect on student achievement and increased student success. Researchers continue to examine the ways that schools use technology, which allows school districts, administrators, and teachers to become more informed on appropriate technology practices in the classroom.

**Positive and negative.** There were positive and negative findings related to the integration of technology in elementary classrooms. In a review of an empirical case study on one-to-one devices in elementary and early middle school classes, Andresen (2017) found evidence to suggest that technology had a positive impact on students' reading and their ability to share and create learning material. Additional findings indicated that one-to-one technology increases time on task, facilitates the acquisition of reading skills, and increases students' desire to read and learn (2017). Similar to the

finding above, Husband and Schendel (2017) reported the visible engagement of students during a guided reading lesson where the teacher used technology during instruction. The authors described the iPad as a tool that teachers can use with students who have varying reading abilities, making it a valuable teaching resource. Having a device that supports all students is essential and saves time when planning and preparing lessons, as everything can be set up on the iPad and shared with multiple students at a time. Although Husband and Schendel (2017) believed that the use of iPads had a positive influenced students' reading development, Mangen and van der Weel (2016) identified the urgent need to investigate the effects that digital literacies have had on reading different types of texts for various purposes. Some students use devices as they learn how to read, while older students are beginning to explore technology as a tool they can use while they read to learn. Digital tools allow students to develop research and note-taking skills. Building off of this argument, McKnight et al., (2016) discovered that teachers believed that the iPad enabled them to present richer content that may not have otherwise been available. Teachers can provide virtual field trips, relevant and current information, and authentic resources that bring the curriculum alive in the classroom.

Using digital tools as a replacement to traditional texts is a new strategy for teachers and one that is under-researched. Sackstein, Spark, and Jenkins (2015) advised that an evaluation of the effectiveness of reading on a tablet screen should occur. They argued that reading rate and comprehension were two essential factors for academic growth (2015). To test their hypothesis, the authors explored the difference between reading and comprehending what one group of students read on an iPad and what another

group read in print (Sackstein et al., 2015). Sackstein et al. noted no significant

differences between the two groups of students and they advised that teachers could use

digital reading material without concern. Despite the positive and neutral findings related

to the use of technology in the classroom, some researchers have made a note of their

opposing views. McDermott and Gormley (2016) discovered a regression in the use of

technology from the primary to intermediate grades. In the primary grades, teachers used

technology in an interactive, participatory manner where students were actively engaged

in the use of digital devices. For example, teachers used strategies such as sharing the pen

and choral reading activities. With older students, teachers used technology to quiz

students and to provide access to online reading programs that emphasize individual skill

development (2016). Replacing print-based literacies with technology requires some

consistency from teachers as students' progress through each grade level so that there is

more fluidity in their development of technology skills.

     Some authors have reported less significant issues related to technology use in the

classroom. These authors primarily discussed the positive impact that iPads and other

digital tools had on student achievement, specifically reading acquisition. Hutchison and

Beschorner (2016) stated that a potential limitation for teachers was selecting appropriate

educational applications that supported the concepts they were teaching in class. Not only

does this require time, but also often the only applications worth using have to be

purchased to take advantage of all of the features. Another challenge associated with the

use of technology was monitoring student engagement and activity. There was a learning

curve for many students as they learned how to interact and engage with digital learning

tasks (Colwell & Hutchison, 2015). Additionally, access to unapproved websites and social media caused unnecessary distractions for students. Identifying the challenges and issues that came along with technology use was necessary so that teachers are prepared to overcome these barriers to ensure meaningful and successful interactions for everyone.

**Effects on subgroups.** Research has shown the potential benefits of using technology with all students in the classroom. Falloon (2015) called the iPad a "stand out performer" for collaborative learning when compared to other digital devices (p. 62). However, Falloon's (2015) research included a homogeneous group of school-aged children, so other researchers have explicitly looked into how technology can support the subgroups of students. Schechter et al. (2015) recognized that reading comprehension is a reliable indicator of academic success, yet many young students fall short on reading assessments. The authors acknowledged the benefit that computer-assisted instruction had on struggling readers, due to the self-paced, individualized instruction that it provided. In their study, they examined the potential advantage of a blended learning approach for students labeled as low socioeconomic status (SES) or English Language Learners (ELL), which involved teacher-led and technology-based language arts instruction. Their findings indicated that low SES and ELL students made higher gains in reading comprehension with the blended learning approach than students who only received teacher-led instruction (Schechter et al., 2015). Using technology to enhance instruction in the classroom can drastically increase the success of low SES and ELL students who may not have made academic gains without it.

Considering the impact of technology on low-income, racially, and linguistically diverse students was essential so that schools and teachers can look for ways to reduce the disparity to high-quality instruction. Thieman and Cevallos (2017) studied the degree to which one-to-one access could improve student learning and increase attendance. The study looked closely at how equitably the iPads were distributed across demographic and academic needs. They found that even through a district-led one-to-one initiative, students of colors were less likely to have an individual iPad than their white peers. The authors followed up by explaining that some students who participated in the study did not feel safe taking their iPad home, so they were not included in the results as having an individual iPad (Thieman & Cevallos, 2017).

In a similar study, Kirkpatrick et al. (2017) examined the effect that iPads had on equity and inclusion of minority students. In their research, teachers and administrators reported increased equity, curriculum access outside of school, perceptions of sameness, and communication and collaboration among peers. While there were many positive outcomes, it was reported that the use of iPads also exacerbated social exclusion as they explained instances of bullying and its potential to create challenges for students and teachers alike (Kirkpatrick et al., 2017). Teachers should carefully monitor the use of iPads to ensure that all students have a positive interaction with the technology in class.

## Implications

This study had implications for district leaders at School A in Northern Virginia and the administrators at the study's participating school, who had a personal interest in the results of the study (C. Bowen, personal communication, July 2018). Researchers

indicated a need to better understand the effectiveness of iPad use in the classroom (Harper & Milman, 2016; Hutchison & Beschorner, 2016; Mangen & van der Weel, 2016) and how teachers' personal beliefs and attitudes affected the ways they used iPads and other devices in school (Howard & Gigliotti, 2016; Lu et al., 2017; Sahin et al., 2016). This study contributed to existing research on technology integration and may fill the gap on how iPads can effectively enhance student achievement.

Classroom observations provided an inside look at a teacher's day-to-day use of iPads with students. Technology integration in education is a multifaceted movement that contains different working components, all of which require teachers to adapt themselves to rapidly developing technology and make it applicable in the classroom (Çoklar & Kabakçı, 2017). This study offered an opportunity to obtain first-hand information from teachers about the perceived benefits of having one-to-one devices, as well as the accompanying barriers that make implementation challenging.

Individual, semistructured interviews with teachers yielded information about pedagogy and self-efficacy after nearly 4 years of one-to-one access to iPads. Christensen and Knezek (2018) stated that teachers face numerous challenges and barriers when asked to integrate technology into the classroom. Low self-efficacy and negative attitudes make the shift to full technology integration difficult for some teachers. It was impossible to predict the information that the interviews will produce, but given that researchers have identified barriers faced by teachers, it is necessary to determine whether low self-efficacy and negative attitudes influence teachers' ability to integrate technology at School A effectively.

Although there was interest in the study's findings on a small scale, the results from this study wielded influence beyond a small school district in Northern Virginia. For School A's district leaders, the chance to gain insight into how teachers used the provided technology with students was invaluable. The results of this study informed the school district on how classroom teachers have found ways to integrate technology, how students respond to technology-enhanced lessons, and what teachers felt was missing to support their technology needs. Based on the study's findings, the project deliverable for this study was a differentiated professional development curriculum for school and district leaders that could be used districtwide so that teachers could continue to grow in their practice and from which students continued to benefit from technology-enhanced learning experiences.

**Summary**

The purpose of this study was to understand elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. The nature of the problem and the study's purpose were explained in section 1. Additionally, a list of terms was identified and defined and were necessary for understanding the nature of the study. The literature review described the use of the TPACK framework and self-efficacy theory that guided this study. The review examined current and relevant literature related to the problem in this study, which was represented across three themes. Emergent themes from the literature included teachers' experiences with technology, common barriers teachers face when using technology, and how technology integration affected student

achievement. Section 1 closed with an explanation of the implications that this study had in the academic community, as well as in a local school district in Northern Virginia.

In the next section, I will explain the methodology of this study and include a discussion of the benefits of conducting a qualitative case study, participants, the data collection process, interview procedures, data analysis systems, and the study's limitations.

Section 2: The Methodology

**Introduction**

This study was qualitative in nature. Qualitative research methods involve the analysis of data in the form of natural language and expressions of experiences, such as social interactions (Levitt et al., 2018). A qualitative methodology allows the researcher to pursue an understanding of the ways that people see, view, approach, and experience the world (Ravitch & Carl, 2016). The research questions stemmed from TPACK and focused on teachers' perspectives, perceived self-efficacy, and practices regarding one-to-one devices in the classroom to improve student learning.

This was a case study, which was defined by Merriam (2017) as an investigation of a case over time through detailed, in-depth data collection. The participants in this study included elementary teachers of Grades 2-5. Data collection consisted of classroom observations and semistructured interviews with teachers. I analyzed the data through in vivo codes, a priori codes, axial coding, and thematic analysis. The process of member checking was used to verify the trustworthiness of the results. Results from this study provide information related to the integration of technology based on teachers' perceptions of self-efficacy.

**Qualitative Research Design and Approach**

The case in this study was particularistic, as it focused on a group of teachers at one school who shared their perceptions as they navigated the use of technology for literacy instruction. The case study methodology is commonly listed as one of the primary strategies used to conduct qualitative research (Marshall & Rossman, 2016). I

selected this research method due to the focus on teachers' perceptions of their ability to utilize the provided technology resources. A qualitative approach allowed for a more in-depth understanding guided by open-ended discussions throughout the data collection process. While undeniably defined as qualitative, this study did not fit well with several other types of qualitative designs. The following is a brief description of why this project fits poorly with other common methodologies.

**Consideration of Alternative Designs**

   **Narrative research.** Narrative inquiry generally highlights people's lived experiences, which are used to make sense of how and why people's stories are shaped and reshaped. Ravitch and Carl (2016) explained that narratives are not strictly personal, but rather highlight the intricate relationship between the individual and society. Narrative research has a keen focus on an individual or a set of events. Rather than looking for themes in the data, there is a focus on the sequential unfolding of events in a story that emphasizes the main character (Mohajan, 2018). Unlike this study, much of the data collection for narrative research comes from diaries, letters, artifacts, and photographs (Lenberg, Feldt, Tengberg, Tidefors, & Graziotin, 2017). This study did not focus on the personal stories of participants, which is why it was not a good fit for narrative research.

   **Phenomenology.** This method emphasizes subjectivity and personal knowledge from the perspective of the research participant (Qutoshi, 2018). Researchers using phenomenology aim to understand and analyze the meaning of the lived experience of an individual through several in-depth interviews (Marshall & Rossman, 2016). In this

study, I avoided attempting to understand what it is like to be a classroom teacher using technology in the classroom. Instead, I focused on the implementation of technology and the challenges and successes that came along with it. There was no in-depth investigation into what it means to be a classroom teacher; instead, I looked closely at the pedagogical decisions made by participant educators.

**Ethnography.** Ethnography is considered to be the earliest tradition of qualitative research. This method enables the researcher to become immersed in a setting where she or he can observe groups, communities, organizations, or social movements from within over time (Marshall & Rossman, 2016). Ethnography describes the analyzed patterns of interactions, roles, ceremonies, and rituals of a group. This study did not fit the criteria for ethnography because it did not emphasize long-term observation and data collection, nor did it focus on an individual classroom culture, which is a "central concept for ethnographies" (Marshall & Rossman, 2016, p. 23). For this study, I did not seek to understand how individuals collectively form and maintain the culture in individual classrooms or throughout the school. Consequently, this study also did not meet the requirements for narrative research, which is often associated with ethnography, as I did not intend to present the results in a narrative format.

**Grounded theory.** Glaser and Strauss first articulated grounded theory in 1967, describing an approach to inquiry that generates theories to explain interactions or settings of interest (Marshall & Rossman, 2016). Typically, this method requires researchers to arrive at a theory backward. After many critiques from other researchers in the field, further development of this method occurred through the work of Strauss and

Corbin (1990), who developed more constructivist approaches to grounded theory. They stated that researchers construct theories and data through interactions with and interpretations of social phenomenon and that theories are not discovered, as was initially suggested (Marshall & Rossman, 2016). This study did not constitute grounded theory because I did not intend to establish a new theory from the ground up. Instead, this study was firmly rooted in teachers' technological pedagogical content knowledge and the concept of self-efficacy.

**Quantitative methods.** Additionally, I did not use quantitative data for this study. A quantitative approach focuses mainly on numerical data and would not have provided the comprehensive data needed to understand this issue. Whereas quantitative data typically come from a large group of people, qualitative information is collected from fewer respondents and allows for more careful consideration of ideas (Ravitch & Carl, 2016). The selection of sample size is dependent on the purpose of the inquiry. With a small sample size, a researcher is more likely to obtain information that will help in rigorously and thoroughly answering the research questions (Ravitch & Carl, 2016). The number of participants needed to achieve information saturation also determines sample size. Boddy (2016) stated that information saturation occurs when the addition of a new participant does not yield a unique or meaningful discovery.

**Program evaluation.** Because technology integration was not required of teachers and had not been consistently implemented, program evaluation was not the right choice for this study. In general, the purpose of a research study is to generate new knowledge and support theory construction. However, a program evaluation's goal is to

support decision making (Mertens & Wilson, 2019). I did not seek to evaluate technology integration directly; rather, I sought to evaluate the overall self-efficacy of teachers that enabled them to integrate one-to-one devices successfully. It would have been inappropriate to evaluate the district and School A on their level of technology integration based on a few interviews and observations. Despite the lack of quantitative data, necessary demographic information was collected from teacher participants, which provided context on similarities and differences related to varying years of experience.

**Selection of Case Study Design**

The case study method is rooted in sociology and has been found especially valuable in practice-oriented fields such as education (Mohajan, 2018). The case study approach may help prevent the researcher from spanning beyond the original scope of the study because the research lies within the confines of a particular time and space (Burkholder, Cox, & Crawford, 2016). Case study is typically conducted in bounded settings within real-life contexts. This study was limited to one school setting with participants who had regular access to one-to-one devices during their scheduled instructional time. In this qualitative case study, the use of observations provided insight into how teachers had adapted to the use of technology. Further, the use of semistructured interviews allowed me to collect data on participants' pedagogical practices and enabled them to express themselves in meaningful ways. The interview questions prompted participants to discuss issues directly related to the research questions. This study should provide useful information about teachers' technology integration that can be used by the local school.

A small, purposive sample of participants was appropriate for this study. Ravitch and Carl (2016) argued that interviews allow for a deeper, more individualized understanding of a phenomenon; in this case, the phenomenon of interest was teachers' perceptions related to technology integration. Although it may be challenging to transfer participants' experiences to a larger population, the shared experiences of the teachers at School A were essential. They were used to build an argument for future changes. The selection of a small sample size for this study is typical of case study research, often due to the uniqueness of the person or organization (Burkholder et al., 2016). Because the scope of the study involved understanding teachers' perceptions, few data points were necessary for gathering a full understanding of the research problem. Therefore, interviews made up the bulk of the data, although classroom observations also served as a source of data.

## Participants

I selected teacher participants through purposive sampling due to their unique ability to provide answers to the research questions. Burkholder et al. (2016) stated that purposeful sampling allows a researcher to focus on a particular phenomenon through the intense exploration of information-rich cases. Approximately 20 teachers met the inclusion criteria for this study. These teachers had regular access to iPads for use during instruction. They were Grade 2-5 elementary classroom teachers with 1 to 15+ years of experience. I intended to recruit an equal number of teachers from each grade level. Of the 20 classroom teachers who fit the criteria explained above, I hoped to interview between eight and 12 participants (40% of teachers) and no more than 16 participants.

In qualitative research, sample size depends on what the researcher wants to know rather than the aim of forming generalizable results (Ravitch & Carl, 2016). I used purposive sampling as opposed to probability sampling because I wanted to choose participants who would help illuminate the questions of the study. This study was principally concerned with gaining a thorough understanding of the phenomenon. If more than 16 teachers had agreed to participate, I would have given preference to the first 16 who responded. I kept the remaining teachers in a pool of alternates in case someone dropped out in the middle of the study. In qualitative studies, the minimum size of a purposive sample needed to reach saturation is difficult to estimate (van Rijnsoever, 2017). The coding process in qualitative research can be difficult and time consuming. Vasileiou, Barnett, Thorpe, and Young (2018) contended that sample sizes should be large enough to allow for a new and rich understanding of the phenomenon to unfold but remain small enough to obtain an in-depth analysis of the data. Additionally, they argued that as more data are collected from each participant, fewer participants are needed.

**Procedure for Gaining Access to Participants**

In 2017, I met with the administrator at School A to explain this research study. I asked for permission to gain access to potential participants when data collection was approved. The administrator was supportive of this endeavor and interested in what the findings would yield regarding staff perceptions and the use of technology. The administrator contacted the supervisor of English Language Arts and a member of the planning and evaluation committee to obtain their approval for my study. They were supportive of my approach and enabled me to move forward with data collection at

School A. I got written permission from the administrator. I submitted the letter to Walden University's Institutional Review Board (IRB). Once I had IRB approval (0667832), I was able to begin gathering participant information.

I gained access to participant information through the school's administrative assistant only after teachers had given their permission to have their information passed along. I interviewed participants in this study on a voluntary basis. They were free to remove themselves from this study at any point in time without repercussions. All participants received an emailed consent form that detailed the terms of their participation. I explicitly stated that all of their personal information would be kept confidential, and all findings would be cleared of any identifying information to ensure the concealment of their identities.

Potential participants were asked to respond to the email confirming their participation with the words "I consent" to avoid the collection of personal information. Kirilova and Karcher (2017) suggested that researchers should not collect any identifying information from participants unless it is deemed necessary for the study; however, the nature of qualitative research involves a paper or email trail as individuals volunteer for the study and schedule interviews. Because of my connection with potential participants in this study, no identifying information was requested or asked for in writing to eliminate concerns that identifying information would be shared. Additionally, it was necessary to obtain official permission from the administration to ensure that there was no conflict regarding teachers' participation.

**Establishing a Researcher-Participant Relationship**

To establish a research-participant working relationship, I reached out to participants through email to gauge their interest in participating in the study. The email contained a brief description of the study, which mimicked the description used on the consent letter, as well as my contact information. I attached a copy of the consent form in the email to ensure that all participants had access to it. Appendix B includes a sample email that I sent to each possible participant. Additionally, I called participants because email can often be unreliable due to the overwhelming number of emails that teachers receive daily. I did not rely solely on email as a means of contact and communication with potential participants.

As a current staff member of the participating school, I had built relationships with the teachers and staff. I intended to maintain a level of objectivity and did not allow my personal views or experiences to interfere with the study. Sa, Ezenwaka, Singh, Vuma, and Majumder (2019) discussed the importance of ensuring objectivity and maintaining reliability as necessary conditions, as they are directly linked to the validity of and form of assessment or inquiry. The relationships that I built with teacher participants had the potential to prevent them from answering with honesty and transparency. To encourage openness, I reminded participants that all measures were taken to protect their identity by assigning numbers to each person and redacting all identifying markers, such as name, age, or grade level. Additionally, I shared with teachers that the Council for the Accreditation of Educator Preparation encourages teachers to practice ongoing reflection of their practice, mainly concerning how their

choices and actions affect others (Bergman, 2018). The interview questions asked in this study were designed to elicit reflective responses from participants. They were written to allow participants a maximum degree of freedom to express their perceptions and experiences related to integrating technology into classroom instruction.

**Protection of Participants**

Necessary measures were taken to ensure the privacy and protection of participants throughout the study. Protecting participants' confidentiality and safety is a significant concern for all researchers, but it is especially pronounced in qualitative research (Kirilova & Karcher, 2017). I kept reporting of participants and their location of work confidential using an assigned number system. Allen and Wiles (2016) explained that researchers could assign numbers to individuals and typically state in the consent form that all identifying information will be kept confidential. Participants' names and grade levels were not reported on the observation or interview documents. The school district in this study was the only school district in the county. While it contains a high number of elementary schools, it was still in the best interest of the participants and the school to use the assigned number system to ensure confidentiality for everyone involved. I ensured that all participants had read the consent form and provided their consent via email before beginning the working relationship. I kept consent emails in a password-protected folder on my personal computer for the duration of the study to maintain confidentiality.

**Data Collection**

The first source of data collection for this study consisted of classroom observations of teacher participants during their language arts instruction. Observations allow for a first-hand account of the activities in which participants are engaged. The second source of data collection for this study involved semistructured interviews with each participant. The use of open-ended questions allowed the participants to elaborate on the practices they used in their classroom, as well as their perceived triumphs and struggles related to technology integration. The teachers had a great deal of flexibility in what they decided to self-report. Triangulation improved the trustworthiness of the study results and enabled the saturation of data (Fusch, Fusch, & Ness, 2018). Triangulation is an approach that involves multiple external data collection methods, which in this study included observations and interviews. This approach helps to mitigate bias and controls the influence that a researchers' cultural and experiential background can have on the interpretation of the study's results (Fusch et al., 2018).

The first data collection instrument used was an observation protocol, included in Appendix C, which was adapted from the Illinois Classroom Technology Integration Observation Protocol. Observation notes did not include the participant's name or grade level to ensure anonymity due to the minimal sample size. The protocol looked at seven different categories. Next to each group on the protocol is a space to record field notes. The first category, technology complexity, refers to the level of integration and how well the technology serves as a vehicle for deep learning and productivity. The second category, student technology integration, refers to the level of independence students

were given while engaging with their device. The third category, topic integration, was concerned with how well the technology was integrated into the content and whether or not the technology was supportive of student learning. Fourth, student engagement looked at student focus during the learning activity. The final three categories were concerned with the TPACK elements, specifically how the teacher made connections between the technology and their knowledge of the content. Finally, the observation protocol included a space to record a description of the classroom activities, ways in which the teacher and students used technology. Classroom observations are a common way for researchers to collect data on teachers' TPACK as a way to evaluate and understand their knowledge about planning for technology-rich lessons (Bilici, Guzey, & Yamak, 2016). The observation protocol assisted in answering both research questions.

The second data collection instrument was a researcher created interview protocol. All interview documents were labeled with a number to indicate in which order the interview took place among the others. This number also served as the identifier for each participant. A specific grade level was omitted; instead, it stated primary for teachers in Grades 2-3 and intermediate for Grades 4-5. For each interview, I created a digital audio recording of participants' responses so that transcription of each meeting would be available afterward through word processing software. Turning spoken words into written form is a vital part of qualitative data collection (Ravitch & Carl, 2016). Purposeful and meticulous transcription helped create a system that allowed for easy location of themes, passages, and quotes (Ravitch & Carl, 2016). When necessary, I made notations to describe when a participant may have used body language, voice inflection,

or other means to emphasize their talking point (Belotto, 2018). The use of a semistructured interview protocol allowed for a "systematic approach to data collection while allowing the flexibility necessary to follow-up with key topics and emergent ideas expressed throughout the data collection" (Varier et al., 2017, p. 973). The interview data helped to answer research question two, which asked teachers to describe their level of self-efficacy regarding classroom use of one-to-one devices to increase student learning.

No historical data or legal documents were used as a source of data for this study. The observation and interview data was sufficient for data collection, as they allowed participants to engage in their technology integration practices, discuss how they chose to use the technology throughout their instruction, and share possible concerns about potential barriers to integrating technology. As explained above, these two data collection instruments led to finding answers to the research questions posed in this study.

Observations took place during the school day while the teacher engaged in language arts instruction. This block of time included reading (whole and small group), writing, and word study. The observation was not an evaluation of teaching, but rather an inquiry into how technology has been incorporated into the lesson or the language arts routine. During the observation, I looked for ways in which students used technology throughout their literacy block.

The interviews for this study were held outside of school hours to eliminate distractions, responsibilities, and duties of teachers during the day. Interviews took place in quiet spaces in the school, such as the library or participant's classroom, to eliminate the need for additional travel. Given that all participants were located in the same school

building, I had no further burden. I adhered to all procedures set forth by Walden University before engaging with participants. No data collection occurred without IRB approval. Those who chose to participate in the study received a copy of the transcript, coded and un-coded via email. I informed participants about where they could view a full copy of the research project if they were interested in reading more. I provided a full PDF copy of the research project at each participant's request. To gain access to all participants to schedule observations and interviews, I sent an email once their consent form was signed. All data collection was done at a time that was most convenient for the participant.

A research log was kept throughout data collection to keep track of observation dates, interviews, all communication with participants, and a personal reflection. All forms were held in a sealed manila envelope when they were not being used for analysis. The sealed folder was kept inside of a filing cabinet inside of my home where no one else would have access to the documents. If confidentiality were breached at any point during the study, I would have contacted IRB for guidance, as well as all participants to allow them to option to continue with the research or to have their information removed entirely. The study would only proceed with written permission from participants and expressed permission from IRB. If a participant had immediate concerns with data collection or involvement in the study, contacting IRB for guidance would be the first step and data collection would cease until the issue had been resolved. Participants were given the option to remove themselves from the study at any time and have all of their responses pulled from the study.

My role as the researcher was a classroom teacher in the participating school. I have not held other positions at the School A and have taught third grade. My colleagues in third-grade had remained the same, except for a new special education teacher. I was not involved with any evaluation or decision-making process in the school or district. I did not lead or have any say in the professional development offered by the school district or by the school. I did have various relationships with potential participants. These ranged from teammates that I interacted with every day to individuals with whom I have never held a conversation or only passed in the hallway from time to time. Except for the other third grade teachers, I had little to no regular contact with the other teachers in the school who were study participants.

Although a relationship existed with many of the potential participants, it was unlikely that this would influence the reported experiences of these participants or their responses to the research questions. I had worked at School A for nearly 2 years, but the size of the building prevented regular interaction with many other teachers during the day. With most of the potential participants, I did not have a relationship at all. With some of the participants, there was a formal working relationship that only involved interaction in structured school settings, such as staff meetings, staff events, or school events. With a small percentage of potential participants, there was a combination of a working and personal relationship, specifically with the other third-grade teachers.

Pinnegar and Quiles-Fernández (2018) examined the role that the researcher and participant relationships can have on the nature of a study. The authors concluded that these relationships were fundamental to research methodologies and allow for a deeper

understanding of the data because of the established trust and respect (2018). They

encouraged the cultivation of researcher and participant relationships with an emphasis

on self-reflection and attention (2018). At the beginning of the study, participants were

encouraged to speak openly about their experiences. They were informed that my interest

in this topic is strictly academic and not in any way evaluative of their teaching. As for

members of the third-grade team, I only solicited their participation when the number of

participant volunteers fell below my threshold of eight or if a participant left in the

middle of the study, and no other participants remained in the pool. I did not have reason

to believe that the existing relationship would influence their responses in any way or that

they would not speak candidly about their experiences with technology integration.

**Data Analysis**

I used a qualitative approach to collect, transcribe, and analyze the data from

classroom observations and interviews. Qualitative research aims to generate knowledge

grounded through human experience. Nowell, Norris, White, and Moules (2017)

explained that qualitative researchers often omit a detailed description of their data

analysis methods within published research reports. However, they argued that

researchers must be clear about what they are doing, why they are doing it, and clearly

describe research methods. For this study, I used thematic analysis and two cycles of

coding: in vivo and a priori coding for the first cycle and axial coding for the second. The

data were transcribed and reviewed immediately following each interview.

The thematic analysis allowed me to represent essential concepts and generalize

the data. The themes provided support and a broader understanding of the research

questions. Nowell et al. (2017) defined thematic analysis as a method for identifying, analyzing, organizing, describing, and reporting themes that emerge from the data. Thematic analysis was appropriate for this study because it highlighted different perspectives and generated unanticipated insights and themes within the data that I eventually turned into codes (Guest, Namey, & Chen, 2020). This study meant coding interviews and identifying themes or categories based on participants' interview responses and classroom observations. Nowell et al. (2017) explained that thematic analysis has both advantages and disadvantages. An advantage of thematic analysis is the accessibility it offers for researchers early in their research journey.

I completed two rounds of coding for this study. Because the coding process is not a one-time, linear event, first I used in vivo and a priori coding and then axial coding to analyze the data (Rogers, 2018). Coding the data from participant interviews allowed me to evaluate the outcomes based on what each teacher chose to self-report regarding their perceptions of technology integration in their classrooms. Coding also provided for the interpretation of large segments of text in new ways (Belotto, 2018). Thematic coding enabled me to highlight commonalities, as well as contrasts, between participants' responses. It also allowed me to feature statements about teachers' self-efficacy regarding their use of technology in the classroom. Themes emerged as the data evolved throughout the data collection process. As such, coding began at the end of the first interview and continued until all interviews were complete and themes developed across all participant interviews (Belotto, 2018). I designed a method for coding data using hard copies of each

transcript. I manually coded the data using text highlighting and comments in the margins.

During the first cycle, I used in vivo and a priori coding so that I could use participants' exact words and a set of predetermined codes, which resulted in rich data. In vivo coding is an indicative approach to the coding process because the codes come from the data rather than from theory or prior research (Ravitch & Carl, 2016). It is a commonly used method for the first round of qualitative coding because it emphasizes the participants' voices in the data (Saldaña, 2016). Therefore, the first step was to use in vivo coding, which consisted of reading each transcript and recording exact words or phrases to label data segments (Ravitch & Carl, 2016). Next, I read through each transcript a second time, carefully analyzing each line, and writing additional words or phrases in the margin. The original words and phrases that emerged from the data served as a starting point for the rest of the coding process. When in vivo coding was finished on all transcripts, I examined the data as a whole. Several codes that I found in common across all transcripts included: *differentiated professional development, student engagement, teacher community support, personalized experiences, coplanning/coteaching,* and *collaboration*.

The second part of phase one coding consisted of a priori coding (Rogers, 2018). Before in vivo coding, I developed a list of preset codes that I would use during a priori coding. For part two, I used the following predetermined codes: *professional learning, integration support, ongoing training and support, student achievement, student engagement, self-efficacy, content and technology knowledge, self-perceptions,*

*difficulties/challenges, successes, student/teacher interaction, ease of use, needs and wants,* and *content integration.* The a priori codes originated from the conceptual framework and research questions to serve as predetermined codes from which to begin (Stuckey, 2018). Using a clean copy of each transcript, I used the preset codes to reanalyze the data. I assigned each preset code to a number from 1-14. I marked it with the associated number when a word or phrase in the transcript matched one of the predetermined codes. Following the completion of a priori coding, I was able to compare each set of codes from both steps of phase one, and I began to see themes emerge from both sets of codes.

Finally, during the third cycle, I analyzed each response and used axial coding to look for larger patterns and themes that emerged from the codes. Johansson (2019) described axial coding as a method used to find associations between open codes. Axial coding allowed me to transition from coding chunks of data to coding categories from which arguments and findings developed (Ravitch & Carl, 2016). To begin axial coding, I compiled the open codes from the first round of coding into a table. Axial coding explores relationships between data categories developed during open coding (Kaiser & Presmeg, 2019). During this process, I began to take the smaller, specific pieces of data and join them in a new way through categories and subcategories, which led me to identify the overall themes.

**Establishing Credibility**

As a method of evidence of quality to assure accuracy and credibility, I used member checking to reduce researcher bias by involving the participants and asking them

to check and confirm the results. The use of member checking helps verify the trustworthiness of the qualitative results (Birt, Scott, Cavers, Campbell, & Walter, 2016); however, its use as a method of assuring accuracy and credibility has conflicting views in the literature (Thomas, 2017). Proponents such as Lincoln and Guba (1985) stated, "The member check…is the most crucial technique for establishing credibility" (p. 314).

Conversely, there is literature that does not support the use of member checking for qualitative research. Thomas (2017) found evidence from sources that caution against member checking to ensure reliability or studies that do not mention the use of this method entirely. Despite the conflicting reviews, I engaged in member checking during the interviews by restating or summarizing the participant's responses. I asked each participant to confirm the accuracy and interpretation of the data (Candela, 2019). This method made it possible for participants to ensure their statements' accuracy and allowed them to provide additional comments (Candela, 2019; Creswell, 2005). Through member checking, I intended to mitigate bias that I may have unintentionally included through the analysis process and ascertain whether I understood their responses (Ravitch & Carl, 2016). Due to my close relationship with the participating school, unintentional bias could lead to a skewed interpretation of the data. Member checking helped to eliminate this possibility and ensure I was collecting the most accurate data.

Another step toward reducing bias was using reflexivity. Reflexivity in qualitative research refers to the researcher's attention during the investigation (Palaganas, Sanchez, Molintas, & Caricativo, 2017). As I reviewed the information, I took into consideration how my overall conduct during the interviews and classroom observations could have

influenced my data collection methods. I had to consider how my experiences and beliefs could have affected the data analysis and how I interpreted the participant's responses. Identifying and examining my biases upfront helped to avoid unknowingly integrating them into my data analysis and reporting. Combined with member checking, reflexivity helped to pinpoint instances where my bias became intertwined with the findings.

**Procedures for Discrepant Cases**

I put procedures in place to deal with discrepant data. Ravitch and Carl (2016) stated the importance of checking and rechecking interpretations against data and looking for alternative explanations and misinterpretations. Researchers must not force data to conform to preconceived notions. To combat this, I searched for discrepant cases in the data where a person, instance, or idea did not fit with a particular pattern or current understanding of the data. After analyzing all the data, I looked for any discrepant cases that stood out against the themes that I had identified.

## Limitations

This study was limited in scope and narrowly focused on the perceptions of a small sample of teachers who had access to one-to-one technology in their elementary classrooms. Through this study I aimed to understand elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. A significant amount of time had passed between the rollout of one-to-one devices in the county and this study. Grade by grade adoption of the one-to-one devices began in 2014, so some teachers had presumably had access to technology for nearly 5 years. Teachers may have since left the district or novice teachers had recently started teaching in the county, so the level of

experience and the number of years with access to devices varied. The extended period

that had passed since the initial adoption of technology influenced the data that was

collected. Another limitation during the interview process was the participants' inability

to remember information accurately or the misrepresentation of information. Given that

participants sat through one interview and several years had passed since their initial

experience with technology integration, individual perceptions could be somewhat

inaccurate.

I intended to collect information from teachers who did not know me well or with

whom I had limited interactions. However, there was always a chance that teachers

would adjust their responses due to my status as a colleague. As a teacher myself,

participants may have felt a comradery that would influence what they chose to share

during the interview. There was also the possibility that participants had a hidden fear of

evaluation and judgment based on classroom observations and my perception of their

ability to perform their job. These feelings may have altered the way teachers delivered

their classroom instruction as they prepared for my visit. For example, there was a

possibility that some teachers did not use technology regularly and precisely planned a

technology-integrated lesson for the observation. Finally, teachers may have chosen not

to accurately report their self-efficacy related to their classroom behaviors and

experiences.

**Data Analysis Results**

Once the consent forms were received, data collection was able to begin, and I

scheduled classroom observations and interviews at the earliest convenience for each

participant. Participants in this study were part of a purposeful sample, as I chose each interviewee based on their availability to one-to-one technology and their grade level. I sent emails to all potential participants; however, only eight participants returned a consent form, and all consent forms were received via email. Of the 20 potential candidates contacted, eight agreed to participate, six did not respond at all, and six responded, but declined to be interviewed or to participate in the classroom observation. A copy of the consent form was provided to participants in a sealed unmarked envelope and placed in their school mailbox.

Observations of the participants were completed during their language arts instruction before I interviewed them. Using observations allowed me to triangulate the data and increase understanding of much of the information provided in the interviews. Triangulation is important for the accuracy of the data (Flick, 2018). All interviews took place in person at a time and private location convenient for each participant. Six of the interviews took place in the participants' classroom, and two of the interviews took place in my classroom within School A at the request of those two participants. I transcribed the audio-recorded interviews verbatim using Google voice typing. I was careful to "maintain the fidelity of participants' experiences, words, and genuine articulation of their experiences" (Ravitch & Carl, 2016, p. 241). I reviewed the data as I transcribed, looking for patterns, trends, and themes.

During the interviews, I asked each participant questions from the interview protocol. I tailored the observation protocol and interview questions to elicit responses relevant to the research questions for this study. The research questions for this study are:

RQ1:   How do the teachers in Grades 2-5 describe their classroom practices

regarding one-to-one devices to increase student learning?

RQ2:   How do the teachers describe their self-efficacy beliefs regarding

classroom use of one-to-one devices to increase student learning?

After I transcribed the interviews, I printed copies of each transcript for a first round of in vivo coding. This type of coding allowed me to use the participant's exact words to label data segments instead of using researcher-created codes and phrases (Ravitch & Carl, 2016). I began to label parts of the interview data in the margins with a word or short phrase that I found in the transcript. During this process, keywords and phrases naturally began to stand out and form potential codes. I read through each transcript a second time to add any additional words or phrases that I may have missed during the first read. The codes placed in the margins used exact wording from the transcript, and I put them in quotation marks to accentuate the participants' voices (Saldaña, 2016). Afterward, I reviewed the codes that were generated from each transcript and started to compile codes similar in nature on a separate, blank document.

Next, I used a priori coding, in which I reread the data using the predetermined codes that I established before the coding process began. Ravitch and Carl (2016) explained that in vivo and a priori coding are not mutually exclusive, and often a combination of the two occurs through multiple readings of each type of coding. The predetermined codes included *professional learning, integration support, ongoing training and support, student achievement, student engagement, self-efficacy, content and technology knowledge, self-perceptions, difficulties/challenges, successes,*

*student/teacher interaction, ease of use, needs and wants,* and *content integration*. As recommended by Elliot (2018), I used a priori codes formed from concepts that I read in research literature in preparation for research. I generated the predetermined codes based on common terms presented in the literature and through personal experience. I printed a clean copy of each transcript before I began a priori coding to eliminate confusion with the codes generated during in vivo coding. Each predetermined code was assigned a number 1-14. As I read through each transcript, I placed an assigned number above a matching word or phrase in the data. I read through each transcript a second time to assign numbers and ensure no data was left unmarked. Once a priori coding was complete, I reviewed the codes from both of my first-round reviews and began to see connections between the words, phrases, and predetermined codes. Some patterns and themes were emerging and starting to align. First-round codes aligned for both in vivo and a priori codes included: *differentiated professional development, professional learning opportunities, teacher collaboration, coplanning, coteaching, usefulness, online community support network, student engagement, growth mindset,* and *self-efficacy*.

Once I had an established set of codes from the first round of coding, I continued with the second round of axial coding. Manning (2017) explained that once in vivo codes are developed, more complex categories could be acquired through axial coding. During axial coding, I went through the chunks of coded data and placed commonalities together into coding categories. The categories helped in identifying overall themes for the development of my findings. As the transcripts were reread, statements within the data were color-coded based on their similarity to available codes. Once the second round of

coding was complete, the codes were organized into collective groups that revealed four distinct axial codes. Red, yellow, green, and blue were used as highlights for potential themes. Red was used for references to differentiated professional development, professional learning opportunities, or support. Yellow was used to identify words and phrases related to the usefulness of technology in language arts instruction, specifically for student engagement and achievement. Green was used to reference comments about collaboration, coplanning, or coteaching. Finally, blue was used to identify references to a growth mindset or self-efficacy. The axial codes acted as general markers under which the information from open coding could be reviewed and interpreted. The axial codes included: *differentiated professional learning, the use of technology integration in language arts, collaboration, coplanning, and coteaching,* and *developing and maintaining self-efficacy and a growth mindset*.

Several commonalities emerged from the transcripts across all interview data. After transcription and coding, the transcriptions were shared with participants through Google to confirm the accuracy of interpretation for member checking purposes. Also known as participant validation, I used this strategy to allow participants to speak about the study and challenge my interpretations and accuracy of the data (Ravitch & Carl, 2016). I gave participants ten days to review their transcription and get back to me with any changes, clarifying information, or any additional information they wanted to add. Creswell (2009) felt that a researcher should share a refined version of the transcript with participants, rather than the actual transcript. Therefore, I also included a quick reference point at the bottom of each transcript with a bulleted list of valuable takeaways, potential

themes, and summarized points from the data. None of the participants responded to my request for changes, clarification, or additional information.

**Discussion of Findings**

Two research questions guided this study that focused on understanding elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. I designed the classroom observation and interview protocols (Appendices C and D) to collect detailed descriptions of data that would assist in answering the two research questions. The first part of the section will describe the findings related to the study's two research questions. Two rounds of coding the interview transcripts gave way to several common topics from teacher participants, and there were many similarities and differences in their reported experiences with technology. In vivo and a priori coding led to axial coding, in which several categories began to emerge. I sorted those categories into the following overarching themes: *differentiated professional learning, the use of technology integration in language arts, collaboration, coplanning, and coteaching,* and *developing and maintaining self-efficacy and a growth mindset*. The second part of this section will describe the overall themes that emerged during the coding process.

**Research Question 1.** The first research question sought to capture how teachers described their teaching practices regarding the use of one-to-one devices to increase student learning. Classroom observations and the interview protocol were used to generate data for teachers' classroom practices.

*Finding 1.* The first finding was the difference in the level of engagement that students had with technology. The level of engagement for students ranged from early

finisher work to long-term cross-curricular projects that were student-centered. In general, older students were exposed to more long-term projects that included technology integration, while younger students took advantage of word, spelling, and math applications. However, one discrepancy for this observation pertained to two of the teacher participant observations and interviews due to the different levels of technology experience. Teacher 2, a primary teacher, is highly confident in her ability to integrate technology. Her students regularly participated in long-term projects that go beyond memorization and force students to problem solve and use creativity. She reported that "technology is 100% engrained in what we do every single day." On the other hand, Teacher 5, an intermediate teacher, was not as confident in her technology use, stating, "...if left to my own devices I might not use it (technology) so much," so her students engaged on a simpler level.

  ***Finding 2.*** The second finding was the similar software used by participants. There are many ways to use technology in the classroom, but there were several common applications that most or all of the participants used. These included SmartBoard, Google Suite, Kahoot!, Nearpod, and Reflex Math. Teacher 6 described her use of the Nearpod app and shared, "I create the Nearpod lessons because it keeps my students engaged and provides quick information about what kids know." Teacher 8 was a proponent of Google Suite and discussed the various ways she uses it in her classroom. She said, "Google is the easiest way for me to share information with my students, track their assignments, and provide quick feedback..." One explanation for this similarity is the list of approved applications made available by the school district. Teachers and students

only have access to applications preapproved by the school district and made available in a specific "app catalog" on student iPads. Teacher 5 presented as a discrepancy for this finding because she reported using fewer of the technology mentioned above than the other participants. Table 1 lists some of the common applications cited by participants' during the interviews or observed in use during classroom observations.

Table 1

*Application Usage by Type*

| Number of participants | Application or software | Classroom usage |
|---|---|---|
| 8 | Google Suite | Writing projects, Google Classroom assignments, research hyperdocs, classroom assessments |
| 7 | PowerSchools | Unit assessments and quick checks |
| 6 | Reflex Math | Math fact fluency |
| 6 | Dreambox | Math concept review and fact fluency |
| 6 | Kahoot! | Whole-group review |
| 4 | Nearpod | Flipped classroom learning, content introduction, content review |
| 5 | iMovie | Book reviews, book reports, group projects, and creating movies from student written stories |

*Finding 3.* The third finding was that most teachers built time in their schedule every day for technology integration. Teacher 1 and Teacher 2 explained that technology integration is so engrained in their teaching. Teacher 3 shared, "I love having one-to-one devices because of the many advantages it has within the classroom. The students love the iPads and don't always realize we are doing work during the day when they are engaged." With the school district considering changing one of the primary grade levels to two-to-one with iPads, Teacher 2 stated, "Two-to-one would change everything because it eradicates (student) choice." It is also worth noting that Teacher 1 and Teacher 2 consistently discussed their confidence with technology, their desire to seek

professional development outside of the county, and the positive impact technology has had with their students. These two participants described more instances throughout their day, including technology integration, compared with all other participants. At the same time, Teacher 4 and Teacher 5 reported the fewest cases of student engagement in technology every day.

**Research Question 2.** The second research question was used to understand how teachers described their self-efficacy regarding their use of one-to-one devices. The interview protocol was the data collection method used to generate data on teacher self-efficacy. I found that all participants fell into one of three self-efficacy categories: very confident, moderately confident, and somewhat confident. Teachers 1 and 2 were very confident, Teachers 3, 5, 6, and 8 were moderately confident, and Teachers 4 and 7 were somewhat confident. Teacher 1 rated her self-efficacy a nine out of ten and discussed her confidence helping others with technology questions and concerns. When discussing self-efficacy, Teacher 5 explained, "I took on technology because it was challenging and discovered that I was better at it than I originally thought." While Teacher 5 reported a moderate self-efficacy, she also discussed the lack of support available and her struggle to integrate technology into her teaching daily. Teacher 7 expressed that she was not "tech-savvy," but that coworkers and an ITC are helpful when it comes to troubleshooting issues. Similarly, Teacher 4 reported that she is "becoming more and more confident," and continues to learn from her peers, but is not currently seeking professional development for more technology training.

**Overview of Themes**

Data from the classroom observations and interview transcripts were analyzed to identifying emerging themes. I created a summary table to display the findings and support the final analysis. A summary table includes three columns: theme, the definition of theme, and evidence (Clark & Veale, 2018). Table 2 breaks the four themes into *differentiated professional learning, the use of technology integration in language arts, collaboration, coplanning, and coteaching,* and *developing and maintaining self-efficacy and a growth mindset*. The theme's definition will clarify its meaning, and the evidence will depict the number of participants for each theme.

Table 2

*Evidence of Themes*

| *Theme* | *Definition of theme* | *Evidence (number of participants)* |
|---|---|---|
| Differentiated professional learning | Professional development | Current offerings are not optimal or are lacking (6) |
| | | Differentiated PD for teachers (4) |
| | Online support network | Teacher forum to share ideas (5) |
| | | Sought outside PD (4) |
| | | PD directed to first year teachers (1) |
| | | Want more PD (4) |
| | | More time for PD (2) |
| Usefulness in language arts | Literacy teaching and learning | Publishing writing (3) |
| | | Research databases (3) |
| | | Personalized learning (1) |
| | | $21^{st}$ century skills (1) |
| | | Organizes data (2) |
| | | Direct and immediate feedback (2) |
| | | Cross-curricular benefits (2) |
| | | Adjusted instruction with more access to application and Google Suite (4) |
| | | Student accountability (1) |
| | Student engagement | Supports ESOL instruction (1) |
| | | Engagement is huge (5) |
| | | Increases positivity (3) |
| | | High motivation for reluctant readers |
| | | Student collaboration (2) |
| | Student achievement | Student choice (1) |
| | | Student are problem solvers (1) |
| | | Can track student achievement (2) |
| | | Tracks reading (2) |
| | | Testing exposure (2) |
| Collaboration, coplanning, and coteaching | Collaborative experiences | Sharing ideas with others (3) |
| | | Team-based learning (2) |
| | | Human interaction (2) |
| | | Online collaboration (3) |
| | Coplanning | More time to work with colleagues (3) |
| | | No time available (4) |
| | | Would like school time provided by admin (2) |
| | | Would explore coteaching (1) |
| | Coteaching | Have tried coteaching (2) |
| | | Not enough time to learn more (1) |
| Developing and maintaining self-efficacy and a growth mindset | Developing growth mindset | Model growth mindset for students (3) |
| | | Use growth mindset as a teaching tool (2) |
| | | Need to work on individual mindset (1) |
| | Self-efficacy | Have high self-efficacy (3) |
| | | Moderate or low self-efficacy (5) |
| | Self-management | Use team or peers to troubleshoot (4) |
| | | Google questions (2) |
| | | Independent problem-solving (4) |
| | | Seek ITC support (2) |
| | | Troubleshoot with students (2) |

**Theme 1: Differentiated professional learning**. The most recurring theme throughout all participants' interviews fell in response to interview questions related to professional development and support. Most participants mentioned their desire to seek learning opportunities that support their growth with technology integration in the classroom. However, the type of professional learning sought out by each teacher was different. Some required advanced sessions to enhance integration, while others needed foundational support to navigate applications and Google suite. All participants identified a lack of professional learning opportunities provided within the school district, specifically differentiated experiences for teachers with varying levels of technology skills. Differentiating learning opportunities and developing the current technology integration offerings within the school district were requested by participants to support and challenge them. Three participants stated that they do not rely on the county's professional development to help their knowledge and expertise. Two others shared that they choose technology-focused professional development, but do not find it particularly helpful or meaningful. For example, Teacher 5 said she is still willing to attend the ongoing professional learning opportunities offered in the county because she wasn't sure where else to turn. Similarly, Teacher 3 reported that she has attended most of the technology training in the county and wished that there were new choices that would enable her to continue learning. All other teachers do not participate in formal professional development for technology or reported seeking opportunities outside of the county.

Five participants wished for a more collaborative professional development experience. The use of an online forum for teachers to share new ideas and resources and to ask questions about technology integration was preferential. Several of these participants wanted a less structured alternative to professional development through the creation of a collaborative online space. Teacher 1 discussed her preference for an online space where teachers can share technology-enhanced lessons is a more effective way of disseminating information to a larger group. Typically, professional development sessions lack the necessary time to dive deep into new learning or only focus on one topic. With an online forum, teachers can search for and share new ideas daily.

**Theme 2: Technology integration in language arts**. The usefulness of technology integration in language arts instruction was one of the most interesting and informative themes that emerged from the data. It became apparent through classroom observations and interviews that several teachers had many creative and functional ways to integrate technology into the classroom to boost student engagement and support learning. All of the participants were able to discuss the useful ways they have integrated technology into language arts instruction. The interviews and classroom observations revealed the different levels of comfort that each teacher had when using the technology to enhance or support instruction. Four participants stood out from the others as they discussed how they used technology during teaching. Each of these participants focused on a student-centered approach to iPad use for student learning. In contrast, the other four participants primarily discussed how they use technology in a teacher-centered manner.

Table 3 depicts the ways that technology use was observed in the classroom for each of the eight participants.

Teacher 1, who had a variety of successful integration strategies, explained how she uses technology to support her students in different ways. She said that the most common use of iPads in her classroom is sharing lesson presentations with students so they can view them while she teaches. The connection allows students to share ideas to the board, participate in interactive games, answer questions privately, and take short quizzes. This strategy for iPad use in the classroom was mentioned in other interviews as well. Another approach mentioned by Teacher 1 was the recording of tests, directions for centers, and word study quizzes, which she then pushes out to her ESOL students through Google Classroom. These students can open the recording and listen at their own pace while the teacher is working with another group of students. She discussed how this has increased autonomy for these students and decreased the number of disruptions from students while she is teaching other small groups. This strategy also mimics the read-aloud feature that these students receive on district and state-mandated assessments throughout the year.

Table 3

*Observations of Technology Use in the Classroom*

| Participant | Observation findings |
|---|---|
| 1 | Most students were working in small groups on their iPad, using iMovie.<br>4 students were out filming book trailer commercials in the library with a green screen.<br>4 students working in small group with teacher for instruction.<br>Students were working all around the classroom. |
| 2 | Teacher circulating the classroom, checking in with students.<br>Students working in pairs to bring their stories to life with illustrations and small props.<br>Some students recording videos and reading their stories on the iPad.<br>Some students' watching/replaying videos on their iPad.<br>2 students seek teacher support while working, most working independently.<br>Students were working all around the classroom. |
| 3 | About half of the class was writing in notebooks.<br>The other half of the class was publishing or typing a story from their notebooks.<br>Some students were taking pictures of illustrations and adding them to their slideshow story.<br>Three students sought out the teacher with questions.<br>The teacher called several students to the back table to talk about their writing projects.<br>All students were able to navigate the writing template independently.<br>Most students were working at their desks. |
| 4 | The teacher was leading a Kahoot! activity with the class.<br>Students were seated at their desk with their iPads.<br>The teacher read each question and answer choice before giving students a chance to respond on their iPad.<br>After each question, the teacher would review the feedback from the question.<br>Students were able to navigate the activity independently without technology support. |
| 5 | The teacher was sharing a lesson on plants that was displayed on the SmartBoard.<br>Students were seated at their desks, but the iPads were not in use during the lesson. |
| 6 | All students working independently on iPads.<br>Students exploring the Apollo Mission through Nearpod application<br>Teacher is virtually checking in with students' through the app.<br>When finished working, some students pulled out science notebooks and worked independently.<br>Students were working at their desks. |
| 7 | Students were working on a word study choice board. The activities on the choice board had students working with their word study words in different ways.<br>The teacher had four students at a small table supporting their work on the iPad.<br>The rest of the class was working independently.<br>1 student asked a question while the teacher was working at the back table.<br>Most students were working at their desks. |
| 8 | The teacher had just finished giving directions for a podcast activity.<br>The students grabbed their iPads and each opened Google Classroom and the podcast activity without support.<br>Students got headphones and found somewhere to sit in the classroom and began listening to the podcasts.<br>When finished listening, students worked on a document on the iPad that asked 4 or 5 comprehension questions.<br>Three students asked questions about the document while the rest of the class worked independently. |

*Note*. There were eight observations, each lasting 15-20 minutes to observe how students were using technology in the classroom, how much support they required, and the level of comfort from the teacher when supporting students in their technology use.

Teacher 2 shared that taking risks with technology integration is something that she often does. She experiments with different ideas, materials, and resources to make learning through technology fun and interesting for her students. During the classroom observation, students were using technology to bring their self-authored stories to life, which required a deep understanding of their storyline and the software to complete the project. Teacher 2 also discussed several iPad applications that have supported students during language arts. For example, Reading A-Z has leveled books that teachers can assign to students on their iPad. It also has a read-aloud function, which allows students to listen to a fluent reader while they follow along. Teacher 2 stated, "The use of reading applications like this one has had a positive impact on student achievement and has increased students' motivation to read and interact with books."

Teacher 6 discussed her use of Nearpod to design cross-curricular lessons. She explained how she has created science and reading infused lessons to review current science standards and reading content during language arts. She said that cross-curricular activities in language arts are important for students to see the connection between literacy and other subject areas. Another interesting use of technology was Teacher 3s use of podcasts in the classroom to support students' writing. Students practice skills such as using graphic organizers, writing conclusions or reflections, and synthesizing or summarizing information. She has seen some students improve their writing skills through this activity.

Unlike the high level of integration of some teachers, others discussed their technology integration more simply. For example, two participants talked about using

math fact applications and Google suite as primary integration strategies. Teacher 5 stated that Google documents have made her delivery of materials much more manageable. She can streamline big projects and eliminate the amount of paper she distributes. Teacher 4 also preferred Google suite and explained that it has increased parent access to the resources and materials students use in school. She shared that the use of the Google suite had increased collaboration in the classroom.

 **Theme 3: Collaboration, coplanning, and coteaching.** Collaboration, coplanning, and coteaching were the third theme to emerge from the data. Six participants discussed the need for more time to collaborate and plan with other teachers. Participants 1 and 3 both suggested a countywide forum so that teachers can share resources with others in the county. At the same time, Teacher 7 talked about the need for better county offered professional development that focused on collaboration. She mentioned the limited amount of time that teachers have to sit down and work with other teachers, and working with teachers at different schools is nearly impossible. She suggested creating professional development that emphasized grade-level learning experiences in person so that teachers could share ideas for technology integration, plan lessons, and have time to work through activities on iPads before sharing with the students.

 Similarly, Teacher 2 believed that human interaction is necessary when teachers are learning new strategies and techniques using technology. Her biggest concern was the lack of support for grade-level and crossed grade-level discussions and felt it was important to communicate and reflect with others. These discussions can support one's

self-efficacy and development of knowledge in technology, especially for new teachers. For example, Teacher 2 shared a lot about the support she and her teammates provided to a novice teacher throughout the school year. While they were happy to help, she felt as if there should have been county offered opportunities specifically designed for new teachers.

Teacher 7 and Teacher 1 both felt strongly about team-based learning time that focuses on technology integration. Teacher 7 said that this time could be used to discuss large projects or upcoming units that would benefit from technology integration. Team planning for technology allows everyone to share the strategies that are working or not working for their students and provides opportunities to update or create new lessons with technology components. Teacher 1 believed that teachers could discover new ideas through coplanning. For example, Teacher 1 discussed a lot of ways that she used technology to support ESOL students during language arts instruction. She wanted more time to share these strategies with her teammates, knowing they could use them to help their students.

Teacher 5 stood out in her preference for collaboration and coplanning. While she appreciates others' knowledge, she did not feel confident in contributing advice in a collaborative or coplanning setting. She mentioned that if left to her own devices, she may not use technology as much as she does right now. Much of her collaborative or coplanning experiences have come in the form of quick tutorials or technology fixes from colleagues. She discussed that her colleagues are very supportive as she learns how to use new features or strategies that involve the iPads. They have pushed her to do things with

technology that she may not have done on her own. Another outlier was Teacher 4, who discussed collaboration as a positive aspect of technology integration, but not among colleagues. For her, technology has boosted the collaborative opportunities with students and parents. She has collaborated individually with students during writing projects to provide immediate feedback and shared that parents have easier access to students' online accounts from home, specifically through Google Classroom.

**Theme 4: Maintaining self-efficacy and a growth mindset.** The final theme that presented itself throughout this study was the self-efficacy and growth mindset of teachers. Dweck (2008) argued that there are two ways to view intelligence. An individual with a fixed mindset views intelligence as something that cannot change, while an individual with a growth mindset views intelligence as something that can develop. When discussing self-efficacy, every participant displayed a growth mindset but had varying levels of self-efficacy. Many of the participants' responses about self-efficacy were directly linked to professional development, stating that differentiated learning was necessary to continue developing their technology knowledge.

Teacher 1 and Teacher 2 stated that they had high self-efficacy and were very confident in their ability to integrate technology into their classrooms. They were confident using technology, but both required additional learning through professional development outside of the county. Teacher 1 stated that she often will use Google to find the answer to a technology question and has always tried to troubleshoot issues in the classroom on her own first. Teacher 2 has enjoyed attending conferences for technology

and researching new ideas and answers to her questions. Both teachers described themselves as independent learners of technology.

Teachers 3, 5, 6, and 8 were moderately confident with technology integration. Many of them cited the lack of professional development as a barrier to their continued learning but shared that they seek information independently or from colleagues. Teacher 5 and Teacher 3 both identified that there was room for growth, but that they needed professional development aligned with their individual needs for technology growth. Interestingly, Teacher 5 shared that she only uses Google Suite and most other technology at school, but does not typically use them at home. Her most significant area of growth was troubleshooting issues in the classroom independently. Often, she has the students solve the problem before reaching out to the ITC or a colleague. Teacher 6 is confident with technology integration and is still excited to learn more. She has relied on the county professional development for new learning even though she did not describe them as high interest.

Finally, Teacher 4 and Teacher 7 were the least confident in their technology integration skills. Teacher 4 stated that she is learning a lot from her peers and will continue to learn more each day. She stated that she is more likely to ask for help when encountering an issue with technology rather than trying to solve problems independently. Teacher 7 said she could explore new ideas independently, but she prefers to reach out for help when she is seeking a quick solution. She believed that a school's ITC could make or break the help and support provided to teachers. Technology coaches

that offer high levels of hands-on support and information create learning opportunities for teachers to become problem solvers instead of solution seekers.

**Discrepant Findings**

I identified two discrepant findings related to research question one. First, there was a range of responses to teachers' descriptions of their classroom practices while using one-to-one devices. The data showed that 25% of participants were more than comfortable having iPads in their classroom and heavily depended on the devices for instruction. About 63% of participants were comfortable with technology, but did not use their devices all day, did not seek external or independent professional development, or taught with a combination of technology-based and print-based materials. The smallest group, about 12%, described themselves as being the least confident with technology and would not be tremendously affected if they were removed from the classroom altogether. These differences were mostly related to teachers' years of experience, current pedagogy, or their internal level of self-efficacy and current view on a growth mindset.

The second discrepant finding related to research question one was the range of perceptions related to professional development. The data showed that all participants agreed that more professional development offerings were needed for better technology learning. However, the type of education, the delivery format, and the purpose of the training differed for each participant. Two participants discussed the need for more differentiated professional development because their technology skills were much higher and needed appropriate support. Four of the participants agreed that the county's professional development did not meet their needs, but they were not actively seeking

other opportunities for learning. One participant was more inclined to reach out to a colleague, research questions or new ideas independently, or seek support from the school's ITC. Finally, one participant did not find the current professional development offerings helpful but instead wished for training that was for beginners that were also applicable to her daily instruction.

Research Question 2 elicited one discrepancy in participant responses. A majority of the teachers described their self-efficacy as high or average. Within this group of participants, some were more comfortable than others. The discrepancy was primarily associated with implementation and self-efficacy; more precisely, the teachers' comfort level with troubleshooting problems and seeking learning experiences to support technology integration development. Only one case stood out against the others in terms of willingness to fully adopt technology, problem-solving device issues, and seeking technology-related professional development. The interviewee did not feel comfortable fully transitioning to one-to-one technology, compared to the other participants, and discussed her preference for using print-based materials a majority of the time. She also shared that she is less willing to seek professional development and would instead choose to ask a colleague for immediate support. This participant's approach differed from her colleagues in this respect. As a teacher who does not rely solely on the integration of technology, her level of comfort in one-to-one devices may not have developed in the same way as a teacher who has only taught in schools where technology was adopted.

**Evidence of Quality**

Liao and Hitchcock (2018) synthesized the use of credibility techniques used in qualitative methods. Their synthesis stated that establishing credibility is considered an essential indicator of robust qualitative inquiry. Keeping in line with the goal of qualitative analysis, I strived to maintain the fidelity of participants' ideas, perspectives, and experiences by using member checking. By checking in with participants, I was able to engage in a validity measure to establish credibility.

**Member Checking**

It was essential to ensure that I maintained a high standard of research quality through data collection and analysis. I engaged in member checking with participants to confirm that my representation of their words was accurate and adequately written after the interview. I emailed a copy of individual transcripts to each interviewee as soon as they were finished so that I had time to "engage with and respond to participants' critiques, amendments, interpretations, and suggested additions to the data set (Ravitch & Carl, 2016, p. 199). In addition to the transcripts, Appendix E shows the additional information for participants detailing why I was contacting them, what I was asking them to do, and how they could contact me with questions or information (Jones, 2018). Flick (2018) recommended the use of member checks and triangulation to ensure data validity. I sent each interviewee a copy of the coded observational and interview data so they could see how their experiences impacted the organization and interpretation of the collected data. Triangulation was used by sending the coded data to participants for review to make the findings more credible (Torres, 2020). All interviewees reported back

with confirmation that their transcript was received. However, none of the participants reported any discrepancies in how their responses were recorded or interpreted, and no one chose to provide additional feedback or comment upon receiving the coded data.

**Summary**

I designed this qualitative case study to address a problem within a Northern Virginia elementary school regarding the lack of understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. To gain a better understanding of this problem, I conducted classroom observations and semistructured interviews with teachers who were closely associated with this problem. Once the data were analyzed, four themes emerged from the data, and evidence for those themes was shared in section 2. It became apparent that even though there were various reported experiences with technology, participants required exposure to technology-based learning experiences, professional development, and collaborative, cross-grade level opportunities to bolster self-efficacy.

**Research Question 1**

The first research question explored teachers' practices regarding the use of one-to-one devices. The integration of technology into classroom instruction is not without its share of challenges, but according to many teachers in this study, it has some degree of value and purpose. In general, teachers with fewer years of experience were united in their praise of incorporating technology into day-to-day pedagogy. In comparison, those with more years of experience varied on their opinions but tended to be more rooted in traditional, print-based methods. Their experience is more beneficial when authentic,

hands-on learning is provided, and they are more likely to change their pedagogical practices in the long run (Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017). Overall, the teachers at School A use the one-to-one devices with their students in a myriad of ways. However, they are still developing their skills for regular and effective technology integration.

**Research Question 2 and Maintaining Self-Efficacy and a Growth Mindset**

The second research question aimed to understand how teachers described their self-efficacy regarding their use of one-to-one devices. Maintaining self-efficacy and a growth mindset was a theme that emerged from the data during analysis. The data indicated that most teachers would describe their self-efficacy has high or moderate, while only two participants reported a lower level of self-efficacy. Participants collectively shared that a growth mindset is something they are building with their students and themselves. It is suggested that employees with a growth mindset are characterized by an eagerness to continuously develop themselves (Center for Community College Student Engagement, 2019). Moreover, employees with a growth mindset are highly engaged because of the opportunities available for personal growth (2019).

Similarly, self-efficacy has been linked to teachers' intentions to integrate technology. The most significant factors between teachers who do and do not incorporate technology are the attitudes and beliefs of individuals (Hall & Trespalacios, 2019). Long-term and ongoing exposure to new concepts makes it possible for teachers to increase their self-efficacy when provided the opportunity to learn and use technology within a

relevant setting (Liao et al., 2017). Teachers with more extensive exposure to technology are more likely to demonstrate a high level of self-efficacy.

**Differentiated Professional Development**

The teachers interviewed for this study engaged with technology in various ways, with some seeking external support, independent learning, and self-teaching. In contrast, others remain stagnant or discouraged with professional learning opportunities. Most teachers maintained regular or semi-regular use of technology during classroom instruction, indicating that the teachers felt the initial device roll out of the program was relevant and beneficial, despite the lack of support and resources provided to teachers from the beginning. Considering the need for teachers to have access to quality professional development, it is worth noting that the right professional development instills the skills and dispositions needed for teachers to respond to the challenges of 21st century contexts (Sprott, 2019). Several of the teachers interviewed for this study described the lack of professional development available to meet their needs, even though the school district promised it at the beginning of the one-to-one device rollout. Fenton (2017) argued that school districts fail to recognize and plan for regular, relevant, and ongoing professional development and are unlikely to see the long-term benefit.

**Technology Integration in Language Arts**

In this context, two participants discussed and displayed their comfort with technology, and their desire to learn and do more to support their students during literacy instruction illustrated this. Technology integration can support student knowledge construction, knowledge exploration, learning by doing, and cooperative learning (Xu &

Chen, 2016). Seen in action in the classroom, Teacher 1 has found ways to engage her whole class during instruction and leads her ESOL students towards independence with the help of one-on-one devices. Teacher 6 develops technology lessons that involve cross-curricular standards and is "always looking for new things to try." Sofkova Hashemi and Cederlund (2017) emphasized that students find assignments, such as writing, more engaging, and motivating through virtual experiences. Engaging with technology allows teachers to differentiate assignments based on students' needs and develop lessons that combine multiple subject areas. The teachers' experiences are a clear indicator that teachers can find ways of using technology to support students while also engaging them in meaningful learning.

**Collaboration, Coplanning, and Coteaching**

Coplanning and collaboration were two areas mentioned by several of the participants as learning options that they wish were made available more often. Both were seen as valuable ways to learn about technology integration. Battaglia and Brooks (2019) found that effective coplanning required training in collaboration, coteaching, and differentiation. However, limited time and demanding workloads have been cited as obstacles to coplanning (Bettini et al., 2017; Battaglia & Brooks, 2019). A suggestion to help overcome traditional coplanning is collaborative teaching. In this scenario, two teachers may communicate through email to share instructional plans, resources, lessons, or assessments (Battaglia & Brooks, 2019). Adjustments, suggestions, and feedback would occur electronically or in person, depending on each teacher's schedules. Despite

the interest in coplanning and collaboration mentioned by some participants, no one discussed experiences with either strategy.

**Project Deliverable**

I analyzed the results of this research study to determine how best to solve the identified problem of the lack of understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices in a Northern Virginia school. An analysis of the classroom observations and interview data led to the emergence of four themes: *differentiated professional learning, the use of technology integration in language arts, collaboration, coplanning, and coteaching,* and *developing and maintaining self-efficacy and a growth mindset.* Findings from this study have indicated that professional development is a sufficient course of action to promote teachers' feelings of self-efficacy and their ability to confidently deliver technology integrated lessons, as well as enhancing the knowledge of best practices for technology-integrated instruction. The deliverable portion of this project is a three-day professional development, split into 6 half-day sessions, that builds upon teachers' need for differentiated learning experiences. It also focuses on supporting the development of self-efficacy through collaboration, communication, and peer planning with support from current literature. Based on the findings of my research, the one-to-one device initiative was successful in some ways, specifically by providing new technology experiences for students and teachers. However, based on the feedback given by teachers in this study, some improvements can be made.

The professional development materials created for this project aim to tackle more problematic areas of the one-to-one device initiative. It was developed to provide a sense of relevance for the teachers at School A. Professional development tailored to the specific needs of individuals encourages teachers to play an active role in their learning and decide what they will take away from experience. Providing individual learning experiences can be difficult in a school or district, but when the learning is differentiated, teachers can take new knowledge and apply it to their immediate needs in the classroom. The use of this professional development plan can alleviate a significant obstacle identified in this study, which was the lack of time to collaborate with other educators to plan and discuss technology integration. By giving the teachers tools for effective communication and collaboration practices, they will be able to actively participate in professional development, rather than accept what the presenters are sharing.

Overall, the professional development deliverable designed for this study plans to acknowledge the strengths that the one-to-one devices have developed in teachers. It also identifies the weaknesses of the initiative. The project deliverable will provide teachers with opportunities to participate in these activities during the professional development time, rather than continue with the hurdle of accessing professional development outside of contract hours, which was mentioned by several participants during the interviews. Additionally, it aims to enhance collaboration and communication among teachers so that coplanning, coteaching, and individual self-efficacy can emerge as consistent practices for technology integration at School A.

Section 3: The Project

**Introduction**

The project is a 3-day professional development plan, split up across 6 previously scheduled half-day early release learning days, based on the needs identified in the data analysis. I created a PowerPoint presentation with presenter notes that provide appropriate information for teachers with varying levels of experience with technology integration. The PowerPoint will specifically address technology integration techniques that can support students' literacy learning, but these skills are easily transferable to other subject areas.

In Section 3, I describe the project and overall goals for the comprehensive professional development, the rationale for the selected plan, implications for social change, and the chosen evaluation plan for measuring the project's effectiveness. Further, I include the literature review that guided the project's development. I designed the project within the confines of current literature on professional learning opportunities, the use of technology integration in language arts instruction, collaboration and coplanning, and growth mindset. I have included an implementation timeline for the project, a timetable, potential resources and barriers, existing supports, and the roles and responsibilities associated with the project. The project deliverable with all of these items is in Appendix A.

**Project Description and Goals**

The purpose of this 6 half-day professional development program is to provide the equivalent of 3 full days' worth of content to teachers that involves collaboration,

communication, and coplanning techniques, as well as technology-focused topics that are differentiated to meet the needs of teachers. The outcomes of my study indicated that teachers lack differentiated professional development experiences related to technology integration, as well as opportunities to collaborate, communicate, and plan with other grade-level teachers within the school or school district. This plan is intended to advise that the benefits of coplanning, coteaching, and collaborating can aid in creating an open community of educators who seek to develop their knowledge surrounding technology integration. This workshop will describe the benefits of collaboration and coplanning, as well as how they can be incorporated into teachers' everyday interactions with others. Additionally, teachers will have the chance to develop technology-integrated lessons for literacy standards that they feel are in the most need of an update or enhancement.

I began planning for this project began by developing improvement goals and specific student learning outcomes. The goals and outcomes came from the data analysis at School A. Because the data that I collected and analyzed came from teachers at this site, the targeted audience of this professional development program was elementary teachers who had access to technology in their classroom and who currently worked at School A.

The goals of the project will be as follows:

1. Provide differentiated professional development to all teachers who use or want to use more technology in their classroom and have not been provided with learning that meets their individual needs. Five of the participants mentioned a lack of

professional development targeting their specific needs; this project will address those interviewees.

2. Promote the development of positive self-efficacy, growth mindset, and TPACK that encourages teachers to challenge themselves concerning technology integration. A positive professional development outcome would be for participants to see an increase in self-efficacy at the close of the school year.

3. To encourage coteaching, coplanning, and collaboration among elementary teachers to effectively promote both language arts and technology standards.

4. To demonstrate that technology can be used to enhance grade-level language arts standards. The literature indicates that technology integration is not as commonly studied in language arts as compared to other subject areas, so this goal is to add to the knowledge base on this topic.

### Rationale

A professional development program was the most logical choice for this study due to the consistent responses from teachers related to a lack of differentiated and targeted professional development for technology integration. The research questions for this study were designed to understand teachers' experiences with one-to-one technology, as well as teachers' self-efficacy related to technology integration. It became evident during the data analysis that many teachers had taken advantage of the current professional development offerings. However, certain deficiencies remained in terms of self-efficacy and new, differentiated learning experiences for teachers with various levels

of technology knowledge. At least one teacher expressed feelings of unease about her ability to adopt one-to-one practices in her classroom fully.

An in-depth review of the current literature demonstrated that this study's findings could act as a platform for designing a professional development experience to meet the needs of current and future teachers. An evaluation of what teachers need from a program was based both on literature and the study's findings, which highlighted the need to overcome barriers such as lack of time to collaborate and plan with colleagues, as well as a heightened need to provide differentiated, relevant content to teachers. Additionally, the findings indicated that participants would benefit from an internal and external support system that would encourage self-efficacy and a growth mindset. The suggested training will be spread out over the school year to allow teachers the opportunity to put into practice the strategies and skills that they are learning during the training and to provide ongoing support.

The professional development program created for this study emphasizes tools for effective and meaningful communication, builds a relationship between technology integration and language arts instruction, and provides teachers with a sense of agency in how they choose to approach technology integration in the classroom. Considerations were made to avoid obstacles such as time for coplanning and collaboration by allotting time during each session for teachers to interact, plan, and reflect on their current practices. Collaborative opportunities allow teachers to work with like-minded individuals and may increase the amount of support for participants within the local school community.

**Review of the Literature**

At the beginning of this study, I identified several variables that had an impact on teachers' ability to integrate technology into their teaching practice. Among these variables was the need to identify and support teachers' self-efficacy. Fostering self-efficacy correlates with teacher TPACK, in that a high self-efficacy concept is related to a higher TPACK (Yerdelen-Damar et al., 2017). TPACK served as the primary framework for this study. Professional development is supported through the TPACK framework to bolster teachers' technology knowledge, pedagogy, and content knowledge to serve students' needs (Saudelli & Ciampa, 2016).

TPACK contains two principles that guided the current study and influenced the literature review. First, it establishes the connection to professional development to improve teacher knowledge and performance. Second, it identifies a link between the importance of teacher confidence and meaningful technology integration in the classroom. Teacher confidence is regularly referenced through Bandura's (1977) concept of self-efficacy. More recent literature connects self-efficacy and content knowledge with better teacher performance and student achievement (López-Vargas et al., 2017).

Teacher participants in this study reported varying levels of self-efficacy in their ability to integrate technology into the classroom. Still, most participants categorized themselves as individuals with high self-efficacy and the determination to seek learning experiences independently. Also frequently reported was the desire for collaborative learning and coplanning opportunities that would allow teachers to share how they use technology. Even though coplanning and regular collaboration are not necessarily

sustainable or currently provided as options for teachers, many of the participants felt as though these were essential elements to promote improved teacher pedagogy and increased student achievement.

For these reasons, I have separated the literature review into the four major themes that emerged. The first theme is professional learning to support technology integration. In this section, I discuss the general nature of professional learning and how it can contribute to technology integration. The second theme is the usefulness of technology in language arts instruction. In this section, I discuss how technology integration has changed and shaped language arts instruction, as well as its benefits for students. The third theme that emerged was collaboration and coplanning. Here, I discuss what makes collaboration and coplanning successful tools that lead to the effective use of technology for students. The final theme that emerged from the data was growth mindset. I discuss the importance of self-efficacy and a growth mindset, which allows teachers to adjust their pedagogy and instructional practices as technology evolves.

Research for this literature review was primarily collected using the Education Source database offered through the Walden University Library. A variety of search terms were used, including (but not limited to) *self-efficacy*, *teacher self-efficacy*, *growth mindset*, *coplanning*, *coteaching*, *personalized learning*, *teacher collaboration*, *technology in language arts*, *content area technology integration*, *digital literacy*, *collaborative learning experiences*, *professional development*, *flipped professional development*, *professional learning*, *collaborative professional development*, *sustained professional development*, *embedded professional development*, and various

combinations of those terms. I filtered the search results based on peer-reviewed status and timeframe to ensure that all literature fell within the past 5 years.

**Differentiated Professional Learning**

There has been a clear need for research on effective professional development programs that support iPad use in the classroom (de Jong, Meirink, & Admiraal, 2019; Psiropoulos et al., 2016; Trust, Krutka, & Carpenter, 2016). Earlier in this work, I identified that the use of iPads in schools has risen exponentially since 2010. With this growth has come the need for initial professional learning experiences that introduce basic learning management systems and content-specific applications and websites, as well as ongoing training to sustain knowledge and use of devices in the classroom (Fenton, 2017). Fenton (2017) explained that teachers, similar to those in this study, long for professional development to take them to a higher level. Additionally, teachers want to learn from other teachers who have been using one-to-one devices successfully (Fenton, 2017). The premise of professional development should align with the needs of teacher participants and the growth of available technology.

Participants in this study shared that their criticism of professional development came from the feeling that the information was not relevant or did not support what they were doing on a daily basis. The establishment of relevance was, therefore, the goal of the professional development project created for this research study. Trust et al. (2016) reported that professional development should be "long-term, ongoing, social, constructivist, and situated in classroom practice" (p. 16). Similarly, de Jong et al. (2019) shared the following three qualities that all professional development for educators

should have: intense and sustained, embedded in teaching practice, and collaborative and collective. With proper planning, feedback, and goals, these three qualities can be at the forefront of a professional development program.

First, intense and sustained professional learning enables teachers to hone in on their skills and continue professional growth. Goodyear (2017) found positive results for both teachers and students when teachers participated in long-term, sustainable professional development. A sustained professional development approach offers facilitators the ability to move beyond teachers' foundational knowledge and skills toward a focus on teachers' capacity to take ownership of their learning. Second, embedding professional development into teaching practice allows for real-time collaboration to take place. Unlike regular professional development, embedded teacher learning starts by identifying teachers' individual needs and then entails demonstrating, observing, and coaching for frequent short periods (Cavazos, Linan-Thompson, & Ortiz, 2018). When professional development takes place in the classroom, teachers can immediately use new strategies, quickly address students' instructional needs, and identify areas for future growth. Third, teacher participants often requested collaboration through professional learning experiences during the interviews. Collaborative approaches to professional development promote changes that extend beyond the walls of a classroom (Darling-Hammond, Hyler, & Gardner, 2017). The possible outcome of collaborative professional development is a collective force of teachers who serve to support one another for the betterment of the staff and students. The collective environment created through collaborative learning opens a safe space for teachers to

reflect, share, and take risks that influence change for all. Overall, sustained, embedded, and collaborative professional development supports teachers' practice by meeting each teacher's individual needs while promoting systemic, long-term change.

Another crucial aspect of professional development mentioned earlier in this work is the increase in self-efficacy that can occur when teachers participate in meaningful and worthwhile professional development training. Improving teachers' self-efficacy is a fundamental step toward improving teachers' preparedness to integrate technology into language arts instruction (Slutsky, 2016). Providing professional learning to teachers that meet their individual needs can have a positive correlation with technology integration. Fenton (2017) found that teachers were more likely to integrate technology when they had access to relevant, content-specific professional development. A professional development program can promote teacher self-efficacy and enhance student learning outcomes when the following ideas are considered: cultural relevance, teachers' existing knowledge, tailored strategies to meet teachers' needs, and opportunities for collaboration, reflection, and experimentation (Powell & Bodur, 2019). Lindvall, Helenius, and Wiberg (2018) reported that professional development focused solely on content knowledge may not be the most effective way to support teachers and, ultimately, their students. Taking into consideration a combination of the components mentioned above can help develop a well-rounded professional development program designed to meet the individual needs of teachers. The project component of this research study includes 6 half-days of professional development activities and experiences, all aimed to meet the varying needs of teachers at School A. Decisions regarding which elements to

include in the project were based on current literature in the field of professional

development.

Cultural relevance is another component to consider when creating a professional

development program for teachers. Promoting culturally relevant professional

development is beneficial when there is an existing divide between teachers and students

(Bradshaw, Feinberg, & Bohan, 2016). It is not enough to assume that teachers'

backgrounds, learning styles, and experiences are all similar enough that the information

will be received equally. When creating the project for this study, I looked into the

demographics at School A. I found that a majority of the students identified as White,

while all other races each made up the remaining population. Additionally, there was not

a drastic cultural divide between teachers and students. Although the data showed a lack

of diversity at School A, the data did not indicate a lack of uniqueness; all teachers would

benefit from culturally relevant professional development. Students from minority groups

show increased levels of achievement, motivation, and self-efficacy when teachers are

equipped with the tools to foster an inclusive and equitable classroom (Parkhouse, Lu, &

Massaro, 2019). Culturally relevant professional development can address teachers'

needs and concerns related to their ability to work in diverse classrooms. While there is

research to support the inclusion of cultural relevance in teacher professional

development programs, there is not enough recent literature surrounding this topic

(Miled, 2019; Parkhouse et al., 2019). Further research is needed to determine what

culturally relevant professional development should look like so that school leaders can

make research-based decisions.

Finally, with TPACK at the forefront of this professional development, the combination of sustained support, content-specific learning, and collaborative opportunities for planning all provide avenues toward changing teachers' technology practices, beliefs, and content knowledge. Each of these outcomes is then related to improving teachers' self-efficacy. The power of sharing experiences and specific pedagogical knowledge and skills can be especially beneficial for teachers that have little experience with professional collaborative experiences (de Jong, et al., 2019). My professional development can serve as a vehicle for teacher participants to develop their TPACK skills, engage in productive, collaborative experiences, and build potential coplanning and coteaching relationships that ultimately deliver effective and meaningful technology instruction to students.

**Technology Integration in Language Arts**

Technology integration can occur in all subject areas for students of all ages. However, there is a lack of research on digital technology in literacy education (Kirkpatrick et al., 2018; Sofkova Hashemi & Cederlund, 2017). Traditionally, literacy instruction occurs with print-based materials and texts, but in recent years digital libraries, websites, and iPad applications have appeared with digital versions of books and literacy materials. Although this evolution has been quick, teachers do not need to choose one or the other. For example, Piotrowski and Witte (2016) explained that teaching in today's world must involve instruction of many texts and teaching strategies that include both modalities. Though, combining these two methods of literacy teaching does not come without its challenges. The authors recognized that schools and teachers

receive pressure to integrate technology to increase student literacy achievement but argued that teachers of language arts need more experience with new literacies and technology to teach effectively (Piotrowski & Witte, 2016). Ciampa (2016) similarly reported that it is increasingly necessary to integrate technology and content area literacy instruction, but also acknowledged that little is done to prepare teachers. Further research on this topic may elicit information about how to adequately prepare teachers to provide literacy instruction for students of all ages using both traditional and technology-based resources.

Several participants mentioned increased student achievement as a result of using one-to-one devices in the classroom. While the study's participants reported noticeable increases in student achievement through the use of one-to-one devices, some studies have found mixed outcomes when looking at technology use in different content areas. Kirkpatrick et al. (2018) summarized the findings from two studies. In the first study, Grade 7 and 8 student achievement increased slightly for students who used technology in mathematics than those who did not, but no difference in student achievement between the two groups in language arts. In the same study, their finding for high school students was the exact opposite. In the second study, Kirkpatrick et al. (2018) reported that one-to-devices had no impact on student achievement in any subject area. Robinson (2016) agreed that technology integration on student achievement is a hotly debated topic and requires further research. The definition of student achievement may need to be clarified for future research to understand better how technology integration plays a role in students' literacy achievement.

Despite the unclear or negative findings on technology influencing student achievement, Andrei (2017) reported that technology-based reading programs have a positive impact on the reading achievement of English Language Learners (ELLs). Technology offers many tools and access to resources that make language and literacy learning more accessible to ELLs. For example, access to glossaries, online dictionaries, and read-aloud functions support reading comprehension for this group of students (Andrei, 2017). Leko, Alzahrani, and Handy (2019) studied literacy instruction with technology integration for students with disabilities and found that a majority of special education teachers successfully used technology for vocabulary and comprehension instruction. Technology inherently offers tools and resources that allow teachers to differentiate instruction for specific groups of students. This strategy was true for Teacher 2, who consistently used technology to bridge the language and literacy gap for her ESOL students.

**Collaboration, Coplanning, and Coteaching**

During coplanning, all teachers contribute different years of experience, background knowledge, and teaching strategies. An ideal teaching scenario would consist of teachers sharing instruction and assessing students equally while using advanced coteaching and coplanning strategies to provide remediation, enrichment, and differentiation through flexible grouping (Battaglia & Brooks, 2019). Traditionally, coplanning and coteaching are widely recognized through the partnerships between special education and general education teachers (Keeley, Brown, & Knapp, 2017). However, a more current view pinpoints collaboration and coplanning as a means to

bridge disciplinary divides between classroom teachers (Hurd & Weilbacher, 2017).

Through professional development, teachers will be able to connect with colleagues from

other grade levels to create technology-enhanced lessons for similar content standards, or

to share new ideas related to technology integration that may benefit students in multiple

grade levels. In this form of collaboration, teachers benefit from their interactions and

walk away with new strategies, ideas, and resources to support instruction.

Collaboration has many benefits for teachers. The first benefit is the potential for

teachers to overcome personal isolation that can hinder professional learning and practice

(Goddard & Kim, 2018). The authors explained that the shift from isolated to

collaborative learning could require a cultural or pedagogical change from teachers

(2018). For example, an isolated teacher who primarily learns independently may prefer a

teacher-centered classroom. After a collaborative professional development, they may see

the benefits of shifting to a student-centered classroom. A new mindset would require the

teacher to make significant changes to their current pedagogy to implement their new

learning. The second benefit of collaboration is exposure to other areas of expertise. This

benefit is extended when classroom teachers have opportunities to work with other staff

members in the building, such as librarians, reading teachers, literacy coaches, and

technology coordinators. Rinio (2019) conducted a study to determine whether the use of

social network analysis for school librarians would support the identification of

collaborative networks within a school. Rinio (2019) defined social network analysis as a

social organization with trust, norms, and networks that act as a framework to share

resources and facilitate collective action. The author found that social network analysis

enabled school librarians to generate information and insight that ultimately led to an increased collaborative environment Rinio (2019). The final benefit of collaboration and coplanning includes increased self-efficacy. Goddard and Kim (2018) examined the link between teacher interactions and collaboration with teacher self-efficacy. They stated that if teachers felt disconnected from their peers or that their work was unimportant then their overall morale may be negatively affected. Thus, when teachers collaborate, they are more likely to experience positive outcomes that lead to improved self-efficacy (2018). Influential leaders who place teacher collaboration at the center of instructional improvement are more likely to help teachers achieve students learning goals (Goddard et al., 2015). Confidence, success in the classroom, and collaboration all come together to influence teachers' self-efficacy positively.

Time was often cited as the most significant deterrent throughout my interviews due to the numerous daily responsibilities and requirements placed upon teachers. It is difficult for teachers to find common planning time with other grade levels throughout the day, making cross-grade level planning nearly impossible. Another challenge teachers at School A face is finding time to meet with coaches, specialists, and other staff members. Participating in this study's professional development can help teachers overcome the time barrier presented by coplanning and coteaching because of the common, collaboration time it offers throughout the school year. Therefore, having a supportive space with time to interact with colleagues is one of the benefits of this training.

**Maintaining Self-Efficacy and a Growth Mindset**

Earlier in this work, I discussed the relationship between teacher self-efficacy and technology use in the classroom. The teachers who reported higher self-efficacy were more likely to have more confidence when implementing technology. Positive self-efficacy has been linked to individuals with a growth mindset. For example, Rhew, Piro, Goolkasian, and Cosentino (2018) reported that individuals with a growth mindset tend to persevere through challenges and believe that they can find solutions to problems. Conversely, individuals with a fixed mindset put forth less effort or do not attempt challenging tasks. In another example, several authors have recognized that individuals with a growth mindset tend to exhibit higher motivation and self-esteem (Brock & Hundley, 2016; Dweck, 2008; Patrick & Joshi, 2019). The research mentioned above indicates that a growth mindset correlates with the confidence to problem solve, explore solutions independently, and the motivation to become proficient in areas of weakness. In education, workplace problems, curriculum changes, and classroom management are all challenges that teachers face. A growth mindset can enable educators to embrace these uncontrollable situations with persistence and composure.

Identifying a mindset could be the first step toward making positive changes in one's self-efficacy. While self-identifying one's growth mindset is a positive attribute in education, many authors warn against an over-reporting growth mindset, otherwise known as having a false growth mindset (Brock & Hundley, 2016; Clark & Sousa, 2018; Patrick & Joshi, 2019). A false growth mindset is when an individual may self-proclaim or believe that they have a growth mindset, but they do not and may be unaware of what

growth mindset means or what it looks like in a professional setting (Patrick & Joshi,

2019). Dweck (2016) argued that educators often report having a growth mindset because

it has become a frequent topic of discussion in education; so many teachers believe they

have to self-report a growth mindset. The following are common characteristics of a false

growth mindset: feeling and self-reporting that growth mindset is the only mindset in all

scenarios, having a strong focus on positive affirmations or positive praise, and blaming

students' failure to learn on their mindset (Patrick & Joshi, 2019). However, it should be

noted that one mindset is not entirely dominant in all situations. For example, a teacher

may have a growth mindset when learning from a difficult conversation with a colleague

but remain fixed when asked to make a dramatic shift in their teaching practice that

brings into question their capability to perform their job.

Adopting and developing a growth mindset could be a continuous loop of learning

for educators. Technology integration is a relatively new practice that teachers have

incorporated into their daily teaching, and for some, this transition has been easier than

for others. For teachers with a growth mindset, the perceived challenges of integrating

technology are seen as learning opportunities and personal growth. However, for teachers

with a fixed mindset, the challenge of adjusting their instructional practice may be

viewed as a task that is not worth the risk or that they are unable to learn the new skills

necessary to be successful. Several teachers at School A indicated that they work to

support their students' mindset while simultaneously developing their mindset about

technology integration. In the literature, there is a growing interest in how teachers' non-

cognitive skills, such as growth mindset, influence students' academic success (Patrick &

Joshi, 2019). With evidence that a teacher mindset can directly affect students' mindset and academic performance, it may be beneficial to support teachers to develop mindset practices in their teaching (Seaton, 2018). Providing teachers with evidence of growth mindset impacting students learning and including it as a focus in professional development could create a starting point for more extensive conversations on individual mindset.

Professional development programs geared toward technology integration within all content areas that aim to improve teacher self-efficacy must also consider teachers' level of TPACK. Since higher TPACK tends to be related to more self-efficacy, it is essential to recognize teachers' knowledge and skills when delivering training for both technology integration and content knowledge (Yerdelen-Damar et al., 2017). In addition to having benefits that support technology integration, a growth mindset has other benefits to increase workplace engagement. Caniëls, Semeijn, and Renders (2018) discussed that mindset could induce employee engagement in five different areas: enthusiasm for work, perception of effort, focus and attention to detail, interpretation of setbacks, and interpersonal relationships. Ultimately, they believed that employees with a growth mindset enjoyed their work more because they welcomed the challenges and learning experiences. Luckily, mindset is not definitive; therefore, teachers can grow and improve their current mindset. Addressing ones' mindset may be the first step toward improving low self-efficacy and a lack of drive or confidence that prevents one from fully committing to technology integration.

**Conclusion**

The establishment of a professional development program that provides collaboration, coplanning, and introduces a variety of technology skills proves to be a difficult task. However, it is necessary to give access to resources, content expertise, and an on-going support system. There are numerous benefits to professional development and collaboration, even in the short-term, where teachers can spend allocated time engaging in meaningful working relationships. Professional development must center on all teachers' needs and take into account their various levels of TPACK and self-efficacy to maintain a level of relevance with all participants. The challenging task of delivering a comprehensive technology-focused professional development can is achievable, but only if it is a well-designed program that includes the criteria discussed in this literature review.

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**Project Description**

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**Resources and Support**

Implementing this professional development requires few resources. Teachers will need to be given copies of schedules and activity directions so that the presenter will need access to a printer, paper, and ink before the start of the training. A laptop computer, USB cord, and access to a SmartBoard will be necessary to project presentations, keep track of participant activities, and for staying in contact with individuals throughout the training. Handouts of self-assessment inventories will be needed, as well as all task challenge directions. These will be printed and prepared before each session.

These resources are available for use within School A at no additional cost to the presenter. School supports for this training include the use of early release for teachers to choose this training and remain at School A for the duration of the school year during each training session, rather than seek other trainings. Additionally, the use of space, materials, technology, and ITC support is also beneficial backing from the administration.

**Potential Barriers and Solutions**

There are a few barriers that exist for the implementation of this professional development program. The school district allows several days at the beginning of the year and several throughout the school year for school-based professional development. Schools are left to decide how they will administer professional learning and what topics will be covered. The biggest obstacle associated with implementation is not knowing how the administration at School A will choose to schedule school-based professional development days throughout the school year. It is possible that immediate training will take precedence over this professional development program, potentially eliminating one or more sessions from the overall schedule.

Losing a session would not be ideal, but it would be possible to share the information from a missed session via email and create an online dialogue. This way, the program could remain mostly on schedule with the remaining sessions. An online review of an entire training would not reach as many participants, but those who are genuinely invested would be drawn to view the presentation and complete tasks on their own time. Planning and scheduling this professional development with the administration before the beginning of the school year will be one way to alleviate any missed training.

**Implementation and Timetable**

Implementation of the professional development program will take place over 6 half-day teacher workdays offered throughout the school year. Training will occur during scheduled times set forth by the school district during the following months: August, October, December, January, February, and March. Teachers will engage in training sessions from 12:30-4:00, with a short break at the discretion of the presenter. The training will take place within School A at the discretion of the administration. Before the beginning of the school year, presentation needs, the number of participants, and classroom availability will be taken into account when choosing a learning space. The next step in planning professional development was to establish a timetable and overall plan to outline the steps and resources needed.

Table 4 shows the first day of professional development, which begins with a presentation on the background of the research. This professional development will start with an introduction of the literature, data collection, analysis, and overall findings of this project. Next, the focus of day one is to provide background information on teacher self-efficacy and the norms of collaboration. Both topics will be reassessed at the end of the training to determine if participants showed any personal growth over time. Each training session will also include a task challenge. The goal is to introduce participants to a new iPad app that could be used with students in the classroom to support learning.

Table 4

*Professional Development Timetable for Session 1*

| Time | Topic | Resources |
|---|---|---|
| 12:15 | Snack & welcome | |
| 12:30 | Part 1: Introduction and Background of Research (presentation) | Laptop, SmartBoard |
| 1:00 | Questions related to research | |
| 1:15 | Part 2: Technology & Self-Efficacy (presentation) | Laptop, SmartBoard, and self-efficacy inventory |
| 1:50 | Questions, comments, or follow up related to presentation or findings from inventory | |
| 2:00 | Activity 1: Labelbox App Task Challenge | Teacher computers or iPads, task directions, grade level LA standards |
| 2:30 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 3: Self-Efficacy and Norms of Collaboration | Laptop, SmartBoard, and personal seven norms inventory |
| 3:30 | Part 4: Preplanning With a Partner or Group | Laptop or iPad, grade-level LA standards, larger poster paper, markers |

Table 5 shows the professional development plan for the second early release, typically scheduled in October or November. Day two focuses on online collaboration, following the discussion about collaborative norms in the first session. Also, this session addresses participants' request for a collaborative platform for teachers to share ideas and resources through the creation of a Slack account.

Table 5

*Professional Development Timetable for Session 2*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Other Opportunities for Teacher Collaboration (presentation)<br>• Creating a Slack account | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Slack account | |
| 1:30 | Identifying language arts standards for online collaboration among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 2: Big Huge Labs Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Teacher Collaboration (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table 6 shows the schedule for another early release dedicated to professional development in December. For this presentation, some participants may be familiar with the concept of digital mind mapping. Because this training was created to meet the differentiated needs of all participants, any participant who is already comfortable with today's topic may elect to join the session at 1:30 and begin with the portion of the identifying standards.

Table 6

*Professional Development Timetable for Session 3*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Digital Mind Mapping to Spark Knowledge (presentation)<br>• Digital Mind Mapping With Sketchboard | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Sketchboard account | |
| 1:30 | Identifying language arts standards for digital mind mapping among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 3: Skitch Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: What Is TPACK? (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table 7 displays the timetable for session four, which will be held in February.

During this session, participants will learn how to create independent learners using a

flipped classroom. Nearpod will be the platform of choice, where teachers can choose

from a wide range of created lessons, or they can create their lessons for students to view.

Additionally, this session highlights the benefits of coplanning for both teachers and

students.

Table 7

*Professional Development Timetable for Session 4*

| Time | Topic | Resources |
|------|-------|-----------|
| 12:30 | Part 1: Creating Independent Learners (presentation)<br>&bull; Using Nearpod | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Nearpod account | |
| 1:30 | Identifying language arts standards for flipped learning experiences among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 4: Show Me the App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Coplanning (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table 8 shows the schedule for session 5, which would be held around March

during an early release for professional development. This training focuses on creating

digital assessments. Before this training, participants will be asked to bring a copy of an

assessment they typically use as a paper resource. For participants who are comfortable

navigating Google, they can begin creating a digital version of their assessment while the

rest of the participants move through a step-by-step tutorial.

Table 8

*Professional Development Timetable for Session 5*

| Time | Topic | Resources |
|------|-------|-----------|
| 12:30 | Part 1: Navigating the Possibilities of Digital Assessments (presentation) Using Google to create assessments | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Google | |
| 1:30 | Identifying language arts standards for digital assessments among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 5: My Story App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Can Coteaching Work For You? (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table 9 outlines the schedule for the final professional development session to be held in May. This session will begin with a tutorial on creating podcasts through the Garage Band app. It will end with a follow up of the self-efficacy inventory and the seven norms of collaboration inventory. Directions for completing the course evaluation will also be provided during this session.

Table 9

*Professional Development Timetable for Session 6*

| Time | Topic | Resources |
|------|-------|-----------|
| 12:30 | Part 1: Podcasts in language arts (presentation) <br> • Using GarageBand | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or GarangeBand | |
| 1:30 | Identifying language arts standards for podcasting among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 5: Shadow Puppet App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |
| 3:35 | Part 3: Conclusion <br> • Post self-efficacy inventory <br> • Post personal seven norms inventory <br> • Course evaluation | Copies of self-efficacy survey and personal norms survey |

**Role of the Researcher**

This professional development program was designed with the intent that I would deliver the training. However, it is entirely possible that someone with a high level of technology knowledge, such as another teacher or ITC, would be able to deliver the information. This decision was made by design so that this training can be repeated in

subsequent years to new teachers. Because not all teachers may be current on their understanding of appropriate and practical uses of technology in language arts instruction, both of which are important in the context of this study, it is necessary to have a technology coach and reading specialist involved. Their involvement ensures that both areas are represented accurately and that their expertise is incorporated throughout the training. The support of the reading specialist and ITC could also be beneficial during the collaborative planning opportunities so that teachers can use them as a resource.

**Role of the Participants**

Teachers in Grades 2-5 will have priority to sign up for this professional development, due to the limited amount of space available to host the training. Once those teachers have signed up, and if there is still space open, then K-1 teachers will be able to sign up. The activities from each session will encourage teachers to discuss their current pedagogy, content standards that benefit from technology integration, strengths, and weaknesses related to technology integration, and present levels of self-efficacy. Teachers will also be asked to complete a self-assessment on the seven norms of collaborative work at the beginning and end of the training program. This professional development was designed with relevance and differentiation in mind, so teachers will be asked to come with personal knowledge and experiences to share with others, as well as an open mind for new learning opportunities.

<div align="center">

**Project Evaluation Plan**

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The chosen project was a professional development program. Typically, professional development evaluations in the school district for School A use one of two

standard questionnaires. The first form asks respondents to answer six questions that consist of several types of scales. For example, the first question uses a Likert-scale. In contrast, the second question is a rating question with a range from 1-10 to determine the likelihood of recommending the training to a colleague. The next two questions use a descriptive rating scale. Finally, there is an open-ended question for the respondent to offer additional feedback. The second form also consists of six questions. The first four questions require a yes or no response, followed by an opened-ended question. Next, a descriptive rating scale determines any changes in the respondent's practice after the training. Similar to the first form, the last question provides an opportunity for the respondent to share comments. The questions pertain to the quality of the content delivered, the level of engagement during the training, reasons for attending the training, and potential changes to teacher practice. The open-ended questions allow respondents to share comments, feedback, or further information about one of the scaled questions. The evaluation is sent at the end of the training, regardless of its overall duration.

The current evaluation system set in place by this school district is helpful but does not go in-depth enough to meet the needs of this study. The use of survey-like questions is not enough to evaluate professional development (Gaumer Erickson, Noonan, Brussow, & Supon Carter, 2017). Therefore, in addition to the school district's evaluation, the evaluation planned for this training will include reflections from participants at the end of the training sessions. I will administer the reflection form at the end of the last meeting. In a study by Nicolaidou, Karagiorgi, and Petridou (2018), the authors examined the need to incorporate participant reflection as a form of evaluation

for professional development. They found that this feedback is a critical component of professional development. School leaders and facilitators benefit from receiving the feedback, deriving meaning from it, and enhancing training and support in the future. Adding on to this finding, Gaumer Erickson et al. (2017), stated that reflections and feedback could enhance participants' learning and potentially demonstrate skills learned through the training. This type of evaluation is logical because it will provide information about how well this training met the needs of staff members. A participant reflection combined with the traditional school district evaluation will identify if the training met teachers' basic needs, their desire for differentiation, and provided ample time for planning with peers. The use of both evaluations will offer various perspectives to adapt the training sessions for future cohorts.

**Overall Goals of the Project**

This project's goals were separated into four parts. The project should provide differentiated technology instruction for teachers who have exhausted all other options through the school district. Another goal is to promote the development of positive self-efficacy, growth mindset, and TPACK that encourages teachers to challenge themselves concerning technology integration. A third goal is to encourage coteaching, coplanning, and collaboration among elementary teachers to effectively promote both language arts and technology standards. The final goal is to demonstrate that technology can be used to enhance grade-level language arts standards.

The evaluation goals should identify whether the professional development was well designed to meet the needs of participants. The first goal should be to determine how

many participants attended each session and whether that number remained consistent through the training's duration. A second goal would be to understand whether the training met the needs of all teachers. Third, there should be a goal to determine if participants reported an increase in self-efficacy or growth mindset, as well as an improvement on the personal seven norms inventory.

The county's evaluation procedure does not explicitly address these goals, so I will offer an opportunity for reflection to allow participants to address these four goals specifically. Each goal will be reflected as an open-ended question that allows respondents to voice their opinions and suggestions. Qualitative feedback is valuable to understand how much respondents liked the training or its relevance to their practice. However, open-ended responses add more depth and clarification so that there is a better understanding of whether the training met the overall goals of the project. Reflection questions will ask participants how the training impacted their opinions on coteaching and coplanning, their willingness to integrate technology into the language arts curriculum, and to reflect on their self-efficacy, growth mindset, and their perceived level of TPACK. Sufficient time will be provided for participants to respond to the open-ended questions. Teachers will have the opportunity to voice their opinions and thoughts about professional development freely and without fear of negative recourse. All forms and inventories will ask for teachers to identify their grade level as primary or intermediate, and no other identifying information will be collected.

**Stakeholders**

The school district for School A did not have input on the creation of this professional development program. Still, they are identified as stakeholders in this project due to their ongoing efforts to provide technology and training to educators within the county. They would be interested in the results of this professional development and its potential for use in other schools. The findings of this study have indicated the lack of professional development, specifically those that are differentiated for experienced technology teachers. Therefore, the school district may see this study and professional development as a starting point to redevelop the current offerings to meet the diverse needs of teachers throughout the county.

Another stakeholder for this professional development is School A, who will have hosted the training for its teachers. School A has made some changes in the current school year in redefining the roles of the ITC and Gifted Resource Teacher (GRT). They have promoted these roles as coaches, which means there has been an emphasis on collaboration and coplanning. The individuals in these roles have encouraged the increased use of technology and have made themselves available to work with teachers in creating lessons and resources. Their interest in my study has also been promoted through conversations with the GRT, who is invested in how teachers use technology and how he can best be available to support in and out of the classroom (J. Manor, personal communication, 2019). School A is invested in the outcomes of this study and the professional development because it enables them to understand the staff, technology use, and what supports should be in place to ensure the success of teachers and students alike.

Finally, the most important stakeholders are the teachers of School A. Professional development provides the skills and dispositions necessary for teachers to improve their practice (Sprott, 2019). Teachers who choose to participate in this professional development are taking the first step toward growing as learners and as professionals. Their participation and feedback can only prompt the improvement of technology training for teachers in the future.

## Project Implications

Providing teachers with a professional development opportunity that is geared toward their individual needs and offers dedicated time to work with technology and expand their knowledge can help transfer technology skills to students. These students, although not the first generation to have access to technology, will be the next generation to influence technology development and growth. It would be a disservice for teachers to allow their personal beliefs or opinions to hinder students' access to technology and their opportunities to take part in their learning. This professional development program may not lead to a more significant change in the world or even within the local setting. Still, it can create social change and serve as a means to hopefully create a better resource for teachers at School A and give them the confidence to integrate technology in all areas of the classroom for their students. This vision fits along nicely with the school district's student success plan to challenge and engage all students through multiple pathways.

When teachers are only equipped with technology skills without the knowledge of how to integrate it into classroom practice best, they may underuse of overuse the potential that technology can have in the classroom (Dewi, Lengkanawati, &

Purnawarman, 2019). Teachers' ability to integrate pedagogical and content knowledge alongside technology use is a clear indicator of success and vital to their overall professional development (2019). Offering professional development that focuses on each component of TPACK ensures that teachers develop and grow in all areas, not just in their technology knowledge. Currently, several teachers at School A feel inadequately supported through professional development to continue growing and learning.

In the school district for School A, teachers are not required to take any technology-focused training. Yet, students begin using one-to-one devices as early as second grade. This disconnect creates a pause for teachers in the district because of the emphasis and expansion of technology use. However, there are still several obstacles that lie in the way of teachers' having the support and resources needed to use the county-provided devices successfully. There are currently two technology offerings available in the professional development library, one explicitly geared toward middle school teachers and the other an introduction to a popular digital student portfolio application. These offerings provide little hope that significant changes will be made without a more substantive push from teachers and the development of a training that has been built to grow alongside teachers.

Many teachers would agree that their students need extended learning opportunities in the classroom to be creative thinkers and learn how to use technology to collaborate and extend their learning. Gillespy (2019) stated that educators can identify the level of support that must be offered for the students, but "we tend to forget that adult educators also need opportunities to become empowered professionals in their practice to

support their students" (para. 3). Teachers who work with students benefit from knowing

the best ways to use technology as a vehicle for collaboration, evaluation, and

communication and should spend the time needed to grow professionally. Ultimately,

that teacher knowledge creates a school culture and learning environment that fosters the

ISTE student standards for technology use.

Section 4: Reflections and Conclusions

**Introduction**

The project in Appendix A was based on the findings of the study looking at elementary school teachers' perspectives on utilizing one-to-one iPads to improve literacy instruction. The outcomes from this study indicated that the project should target the concerns of participants, such as lack of differentiated professional development and access to collaborative work time with peers. The targeted professional development includes a range of technology-based activities, from basic training to activities for specific learning needs, with ongoing support provided throughout the year and beyond. The basic training consists of an introduction to data that supports the need for this training, a discussion of the norms of collaboration and teacher self-efficacy, and all aspects of group planning. Other more specific parts of the training will include the following: the creation of various accounts through which teachers will work and develop lessons on each platform, individual app task challenges to introduce teachers to a variety of tools, discussions about which standards link well with specific resources, and the creation of lessons using resources that may be unfamiliar.

As previously discussed, several barriers hinder teachers' ability to integrate technology into their teaching practice effectively. These problems range from low self-efficacy and the reality that many teachers are ill prepared to create technology-enhanced lessons to lack of the time and collaboration needed to discuss and plan for ways to use technology in the classroom. The project component of this study is meant to assist teachers in enhancing their literacy instruction using technology, and consequently

improving their self-efficacy and TPACK by allowing opportunities for collaboration, coplanning, and trial and error. The professional development has been created to allow time for teachers to learn about new technology at a basic and a more advanced level, collaborate with grade-level peers and colleagues from other grade levels, develop self-efficacy in technology with scaffolding and ongoing support provided throughout the training, and engage in discussions about technology, literacy, and personal development. The follow-up time after the training will allow teachers to seek additional support, discuss the strengths and weaknesses of the training, and report current issues. There is the potential for this training to be adjusted and used at the district level for schools with individuals who are seeking an alternative to current technology professional development offerings.

## Project Strengths and Limitations

This project's strengths begin with its roots in recent literature, with feedback from participants in the research section of this work. The plan emphasizes relevance and usefulness for teachers at all grade levels and with varying years of teaching experience. Currently, there are no mandated trainings or sets of skills required by the school district to implement the one-to-one devices. Given that teachers approach technology differently, this project allows teachers to explore how their content standards may benefit from technology enhancements. Participants stated during the interview that relevance and usefulness to their practice were important considerations when seeking or participating in a professional development program.

Additionally, differentiation was a crucial component for several of the participants, particularly those who were very comfortable using technology in their classrooms and who regularly sought out independent learning opportunities. One of the key strengths of this project is that it allows participants to choose specific content standards at their grade level, and then apply the new skill in a way that is appropriate for their students. It also enables them to access the technology in a way that meets their level of comfort while encouraging them to take risks and expand their knowledge of technology. Ultimately, teachers will walk away with several new strategies for technology integration and a higher sense of self-efficacy related to their ability to implement new technology strategies. By emphasizing new and different ways to use technology rather than focusing on specific grade-level content standards, the program creates a sense of relevance and usefulness that can be adapted to individual needs.

Another strength of this professional development program is that it allows teachers to identify current literacy standards in relation to which technology integration has been successful, and others that they feel could benefit from incorporating technology components. By combining content, technology, and built-in planning time, teacher participants are allowed to build technology into their curriculum within the confines of a supportive, collaborative, and risk-free environment that may not be provided outside of this training. Teachers are able to implement technology into their curriculum standards in a way that bolsters instruction in areas of individual weakness, as identified by teachers.

As previously mentioned, this professional development program includes time for coplanning, which is often lacking in the day-to-day schedule of many teachers. Interviews yielded that teachers do seek out opportunities to learn from and plan with colleagues, but often the time needed to do so is lacking. Because coplanning is a rare yet valuable opportunity, the conversations need to be streamlined and focused on the end goal (Pratt et al., 2017). Activities within this professional development allow specific time for teachers to come together in a way that is beneficial to them, with same-grade-level colleagues or cross-grade-level colleagues, to help them better understand the connections between technology and content standards.

A limitation of this professional development program stems from its strengths in bringing teachers together for coplanning. The intent to bring teachers together for coplanning and collaborative experiences for a short period throughout a school year can be seen as a fundamental weakness. The likelihood that these collaborative opportunities will continue outside of this professional development is small due to the many time constraints discussed by several teachers during the interview process. A program limited to 6 half-days over several months may serve as a beginning for highly interested teachers but does not create a model for sustainability and ongoing structured time to work together. Without built-in time beyond the professional development program for teachers to gather and continue their discussions and planning, there is no way to ensure the continuation of technology-based coplanning among teachers.

Professional development days are predetermined and built into the school calendar by the school district. District leaders and administrators often plan the content

before the start of the school year. Even if this professional development were to be implemented, there is no guarantee that additional time would be provided to offer follow-up opportunities to teacher participants at the close of the training. While it is essential to recognize each teacher's individual technology needs, a central part of the training is enhancing teachers' self-efficacy and their level of TPACK. Without proper channels in place after professional development, there is no certainty that teachers will maintain or continue to expand their self-efficacy regarding technology integration. It would be beneficial to establish a system for providing ongoing time and support for teachers after the conclusion of the professional development. It would be incredibly challenging to organize the logistics of continuing support without backing from the school district and school administration.

Finally, another limitation of this professional development is the general design, which emphasizes freedom, choice, and unstructured planning time to meet the needs of individual participants. Unlike many other programs that focus on guided, highly specific instruction, this professional development allows for a flipped learning experience where teachers can choose how they use the technology topic introduced so that it will best meet the needs of their learners. Inevitably, some teachers would prefer that the information come in the form of ready-made strategies, linked directly to their grade-level content standards. However, with the variability of teacher participants, this professional development relies on individuals to recognize their level of comfort with technology and the depth to which they are willing to incorporate new skills into their content. While there are opportunities for group sharing, planning, and learning, the individualized

nature of this program means that even the technology topics introduced or the great ideas of other participants may not align with the individual needs of each participant. The freedom provided in professional development does not necessarily mean that all participants will use that freedom to bring about significant changes to their self-efficacy or overall technology integration in the classroom.

### Recommendations for Alternative Approaches

The major problem identified in this work was the lack of appropriate professional development and specific training to support teachers as they integrate iPads into their curriculum. Alternative approaches to this problem may include a continuous online support model and text manual for support, or access to a virtual technology coach. The goal of the alternative approaches would be to mitigate the current problem of appropriate and specific training and support for teachers.

The first approach would require the creation an online professional development portal that is accessible to all teachers. A website or online class in Canvas or Blackboard would have to be set up to include material for various aspects of technology development. Teacher input should be used to determine what materials are made available and what resources should be included within each section. Suggestions for online material include using research databases, personalized learning, supported student subgroups, collaboration platform, application basics, and exploring Google Suite. Within each section, there would be step-by-step video tutorials, links to related materials, and a space for questions and support. The online portal would be accessible to teachers at any time for individual pacing and convenience. The problem with this

approach is that it would eliminate the ability to collaborate, discuss, and have face-to-face interactions with others.

Another approach to this problem would be to provide schools with a text manual that mimics the online portal option. This approach would require extreme attention to detail and organization. The manual would require a detailed table of contents, tabs to divide the contents, and visual examples throughout. This approach would also require research, writing, and manpower to put together, to create copies for schools, and to distribute. This method would not be as efficient or user friendly as the project. It would completely eliminate the need for peer interaction, collaboration, or immediate support.

Finally, the school district ITC could fulfill a virtual support role in addition to the school-based ITC. The virtual coach would act as an immediate point of contact for teachers who have questions or need support with technology integration in the classroom. The coach could keep a communication log of the problems and issues being reported and develop an overall suggested fix or solution that could then be shared with all teachers. The coach would be available by virtual appointment to meet with individuals or groups to provide answers to immediate questions. Similarly, appointments could be booked for mini training sessions for individuals or teachers seeking to support their technology integration.

The local problem that I aimed to resolve through this project was the need for greater understanding of elementary teachers' instructional practices and perceived self-efficacy in using one-to-one devices. While it is beyond my control to fix problems on a national level, a professional development program aimed at teachers on a local level

could help to address this problem. If the local problem is narrowed down to teachers' low self-efficacy in technology, the focus, as mentioned earlier, can help alleviate this problem. Teachers' use of technology in their instructional practice could be influenced by an expansion of current professional development offerings that focus on differentiation and the variability of teachers' needs across the school district, taking into account the level of experience that teachers bring with them. Aside from professional development in technology, the creation of a well-organized online platform for lesson sharing, technology, curriculum links, and virtual collaboration could go a long way toward building an ongoing learning environment for teachers.

Additionally, there are various state and community colleges that have teacher preparation and master's programs, as well as individual course offerings for teachers. Looking carefully at the current preparation programs and their requirements for teaching preservice teachers critical technology skills would likely have a positive effect on the self-efficacy and willingness to integrate technology for novice teachers. A significant factor expressed in the literature is the universal issue that preservice teachers are not adequately prepared to use technology in the classroom but are often required or strongly encouraged to do so (Han et al., 2017). Teacher preparation programs at the college level may have the ability to improve the quality of technology education by working more closely with school districts and their subsequent technology leaders. This reform would be a massive undertaking that would have to merge the ideas of various local school districts, which do not necessarily align.

**Scholarship, Project Development and Evaluation, and Leadership and Change**

I began this project unsure about how teachers perceived their level of self-efficacy and how they would respond to their use of technology in the classroom. Feedback from teachers, combined with an in-depth look at current literature, made it apparent that there are various needs, barriers, and strategies when it comes to preparing and providing ongoing technology support for educators. As I began to explore the possibilities of this project, I felt that I had a good background of knowledge in technology use in language arts, as well as what teachers are looking for in a useful professional development course. My background knowledge was supported through years of attending various professional development courses, several years of personal experience with one-to-one technology in the classroom, and the completion of a master's program in reading, literacy, and instruction. As I worked through the early phases of this study, I was able to build upon my existing knowledge to help identify critical factors that are hindering the growth of teachers' technology use in the classroom. Because I continue to work at the school, I went into this study with a basic understanding of what I would encounter throughout my research. I knew that there were opportunities for building upon my foundation of knowledge.

I recognized that I started this journey with only a limited understanding of technology integration and the core components of a competent professional development program. Ravitch and Carl (2016) explained the concept of research often being built on an "expert-learner binary," which is the assumption that the researcher is more knowledgeable than the participant(s) (p. 371). This assumption is problematic because it

should be acknowledged that all individuals bring valuable information and experiences to the research process. During data collection, I learned a lot about how other teachers are using technology in their classrooms, and I was able to take that information back to my classroom and use it.

Professional development became a vital component of this study. My work focused on the outcomes of providing teachers with a professional learning experience that will help them increase their self-efficacy and plan new ways to integrate technology into their literacy teaching. As the results of my research began to unfold and I explored them further through current literature, I was able to gain a deeper understanding of the critical components of professional development, as well as the supports needed for teachers to maintain successful levels of technology integration. In creating a professional development program, I called on all levels of existing knowledge, as well as the breadth of knowledge acquired through an in-depth review of relevant literature.

During project development, I demonstrated tremendous growth as a scholar, an educator, and a leader within my current job. Axelrod and Axelrod (2017) identified that the combination of text and experience influences researchers as organizational change practitioners. The authors described three types of knowledge that individuals bring to their research: what the author knows from research, from experience, and what they need to know more about (Axelrod & Axelrod, 2017). My experience included this knowledge as I developed a professional development program with the potential to reach other teachers within the school district to create lasting change. My confidence in designing professional development courses has increased and helped me become more

qualified to develop other trainings in the future. Many people are experts in technology, literacy, or professional development. However, I can say that I am qualified in all three areas and feel empowered to continue my work after the conclusion of this doctoral project.

## Reflection on Importance of the Work

As previously mentioned, one of the most critical aspects of learning that occurred for me was the identification of the essential components of a competent professional development program to support the diverse needs of teachers. Relevance and differentiation are two pillars of the organizational structure that I have incorporated into this project. As a current educator, I have created a bridge between my personal needs and the higher interest in more diverse professional development offerings.

Throughout this study, there was evidence to show not only the barriers that teachers face when they are asked to integrate technology into their daily practice but the lack of consensus around how to achieve ongoing, differentiated professional development to help eliminate predetermined barriers. This realization is especially pronounced at the elementary level, where often, both teachers and students are learning how to use technology for the first time in an educational setting. The current academic literature on this subject points to an overall need to reform the way teachers are supported in their technology use. This need is where my professional development project and the importance of this work are best highlighted. There is a general interest, both at the local and national level to improve technology integration in schools. Teachers are currently struggling with the many demands placed upon them, as well as

the lack of technology preparation necessary to integrate one-to-one devices into their literacy teaching effectively. The solution for this problem is to target teachers with new and relevant professional development opportunities that will assist in improving their self-efficacy, raising their level of TPACK, and helping them overcome the barriers to technology integration.

Building this professional development program has not only contributed to my personal growth as a scholar but has also created a situation where I have allowed teachers to voice their concerns and describe their needs and then subsequently created a resource to meet their immediate needs. I will not have had the opportunity to present this program by the conclusion of this doctoral study. However, interested parties will be offered a copy of this work, including the professional development to use as they see fit.

From the beginning of this study, the underlying theme has been the concerns about teacher self-efficacy concerning one-to-one technology integration, influenced by the lack of relevant professional development in the elementary setting. This project deliverable represents an opportunity to address those concerns, at least at the local level. It represents a positive step forward for educators and other researchers who are interested in helping support technology integration in ways that benefit student-learning outcomes.

### Implications, Applications, and Directions for Future Research

Teachers who participated in this study all indicated that they had some level of self-efficacy when it came to technology integration. However, many were still left wanting new learning experiences beyond what was offered through the school district.

The obstacles that teachers faced, whether it was time for collaboration or differentiated learning, were similar to those reported in the literature. Although my findings intersected with those that have appeared in recent research, cited in this work's literature review, it did not represent a comprehensive understanding of how these issues impacted professional development, specifically related to technology integration.

Expanding the knowledge base about technology-focused professional development and its relationship to teacher self-efficacy is a necessary component of building a comprehensive understanding of teachers' needs. Additionally, the targeted assessments of existing programs help to understand how to combat the issues associated with teachers' one-to-one technology integration. This is especially true when trying to gauge teacher self-efficacy and willingness to engage with new technologies. A more informed understanding may support current theoretical frameworks, such as TPACK. Furthermore, it may likely encourage the consideration of teacher self-efficacy when creating professional development and dissuade against the one-size fits all approach to learning.

Future research should continue to explore the relationship between teacher self-efficacy, technology integration, and professional development. Further knowledge is needed to determine how teacher self-efficacy and teachers' use of technology in the classroom can impact or impede student learning. Teachers interviewed for this study provided unique examples of how they use technology during language arts instruction. Still, more information is needed to determine the role that professional development can

play in fostering more positive teacher attitudes, primarily when that professional development is targeted, relevant, and offers a level of on-going support for participants.

**Conclusion**

Teacher self-efficacy and technology integration have recently merged paths now that technology in schools is on the rise. There is reason to believe that professional development is an adequate vehicle to improve teachers' confidence to integrate one-to-one technologies in their daily practice and ultimately create more authentic and personalized learning experiences for students. This study revolved around the desire to learn more about how teachers' perceptions about their ability to integrate technology influenced the technology experiences they were providing to their students. It was discovered that a majority of teachers were confident in their ability to incorporate technology, but were lacking continued learning experiences to expand their knowledge and move beyond technology basics. Some participants resorted to exploring professional development opportunities independently to find something that matched their immediate needs. The lack of desirable and relevant professional development provided through the school district was perhaps one of the most enlightening findings. The idea that teachers have sought outside learning opportunities signals that there is significant merit to the current literature on this subject, which indicates that professional development is useful when it is relevant and targeted to meet teachers' diverse needs.

Another finding that stood out was that teachers desire the time to collaborate and co-plan with their colleagues, however, as indicated in the literature, there is often no time for teachers to engage in such activities for an on-going period. There are often

additional barriers such as schedule conflicts, team meetings, assigned duties, or non-work-related responsibilities that add to the difficulty of collaboration. Two teacher participants suggested the use of an online collaborative platform that is shared among teachers in the school district to alleviate face-to-face collaboration and the associated barriers. These participants saw this suggestion to deliver a collaborative forum where teachers can share technology-enhanced lessons with others.

There is enough evidence to suggest that a similar professional development program can afford teachers with a supportive learning environment. Time to co-plan and collaborate, to explore technology at a level that meets their needs, and ultimately supports their confidence to take their learning back to the classroom are all essential components. By engaging in the design of future professional development that emphasizes freedom of choice, relevance, and a supportive environment, educators at School A can continue to learn and grow. Exposing teachers to strategies and resources that are transferrable to the classroom can promote high self-efficacy and begin to improve students' literacy learning.

As one interviewee stated, the integration of technology is completely embedded in her teaching practice, and the right professional development can open doors to things one could never have imagined. Another interviewee has viewed technology to reach some of her most vulnerable students, especially concerning literacy standards. Technology can provide students with differentiated, personalized learning experiences. When technology is used in the right way, it can promote collaboration, critical thinking, digital citizenship, and ownership of knowledge. When a teacher is unsure of the

effective ways that technology can be used to enhance learning, students may miss out on

developing these critical skills. Using one-to-one devices is a big responsibility for

teachers but having access to the right forms of professional development can increase

teacher confidence, improve technology integration, encourage risk-taking, and provide

students with valuable learning experiences.

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Appendix A: The Project

Technology and Literacy: Developing Self-Efficacy Through Differentiated Technology
Instruction for language arts

Purpose:

The purpose of this 6, half-day professional development program is to provide the
equivalent of three full days worth of content to teachers that involve collaboration,
communication, and coplanning techniques, as well as technology-focused topics that are
differentiated to meet the needs of teachers. The outcomes of my study indicated that
teachers lack differentiated professional development experiences related to technology
integration, as well as opportunities to collaborate, communicate, and plan with other
grade level teachers within the school or school district. This plan intends to advise that
the benefits of coplanning, coteaching, and collaborating can aide in creating an open
community of educators who seek to develop their knowledge surrounding technology
integration. This workshop will describe the benefits of collaboration and coplanning, as
well as how they can be incorporated into teachers' every day interactions with others.
Additionally, teachers will have the chance to develop technology-integrated lessons for
literacy standards they feel are in the most need of an update or enhancement.

Stated Goals:

1. To encourage coteaching, coplanning, and collaboration among elementary teachers
with the purpose of effectively promoting both language arts and technology standards.

2. To demonstrate that technology can be used to enhance grade-level language arts
standards.

3. To promote the development of positive self-efficacy, growth mindset, TPACK, and
cooperation to encourage teachers to challenge themselves with regard to technology
integration.

Implementation Schedule:  Professional Development Half-Days for all employees

Session 1: Developing Self-Efficacy to Promote Technology Integration
Proposed Time: October Professional Learning Day
Duration: 3.5 hours

Session 2: Online Collaboration
Proposed Time: December Professional Learning Day
Duration: 3.5 hours

Session 3: Digital Mind Mapping
Proposed Time: January Professional Learning Day
Duration: 3.5 hours

Session 4: Flipped Learning
Proposed Time: February Professional Learning Day
Duration: 3.5 hours

Session 5: Digital Assessment
Proposed Time: March Professional Learning Day
Duration: 3.5 hours

Session 6: Basic Podcasting
Proposed Time: April Professional Learning Day
Duration: 3.5 hours

The timetables below provide a breakdown for each session of the professional development. The suggested times are based on the early release schedule that is predetermined at School A. These times could be adjusted and the timetables could be combined over the course of three days. A time adjustment would mean that some activities are shortened, lengthened, or removed altogether. The second column of the table explains the activity that allow for differentiation. The final column lists the resources needed for each activity by both the presenter and participants.

**Session 1: Developing Self-Efficacy to Promote Technology Integration Schedule**

Table A1

*Professional Development Timetable for Session 1*

| Time | Topic | Resources |
|------|-------|-----------|
| 12:15 | Snack & welcome | |
| 12:30 | Part 1: Introduction and Background of Research (presentation) | Laptop, SmartBoard |
| 1:00 | Questions related to research | |
| 1:15 | Part 2: Technology & Self-Efficacy (presentation) | Laptop, SmartBoard, and self-efficacy inventory |
| 1:50 | Questions, comments, or follow up related to presentation or findings from inventory | |
| 2:00 | Activity 1: Labelbox App Task Challenge | Teacher computers or iPads, task directions, grade level LA standards |
| 2:30 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 3: Self-Efficacy and Norms of Collaboration | Laptop, SmartBoard, and personal seven norms inventory |
| 3:30 | Part 4: Preplanning With a Partner or Group | Laptop or iPad, grade-level LA standards, larger poster paper, markers |

Table A1 shows the first session timeline. Participants will be welcomed, and

introductions will take place. The session will begin with an outline of the research study,

including demographic information, research questions, and basic findings. Participants

will be introduced to the app task challenges that will take place during each session.
Finally, the session will include a self-efficacy and norms of collaboration inventories to
serve as a baseline.

Table A2

*Professional Development Timetable for Session 2*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Other Opportunities for Teacher Collaboration (presentation)<br>• Creating a Slack account | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Slack account | |
| 1:30 | Identifying language arts standards for online collaboration among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 2: Big Huge Labs Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Teacher Collaboration (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table A2 shows the professional development plan for the second early release, typically scheduled in October or November. Day two focuses on online collaboration, following the discussion about collaborative norms in the first session. Also, this session addresses participants' request for a collaborative platform for teachers to share ideas and resources through the creation of a Slack account.

Table A3

*Professional Development Timetable for Session 3*

| Time | Topic | Resources |
|------|-------|-----------|
| 12:30 | Part 1: Other Opportunities for Teacher Collaboration (presentation)<br>• Creating a Slack account | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Slack account | |
| 1:30 | Identifying language arts standards for online collaboration among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 2: Big Huge Labs Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Teacher Collaboration (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table A3 shows the schedule for another early release dedicated to professional

development in December. For this presentation, some participants may be familiar with

the concept of digital mind mapping. Because this training was created to meet the

differentiated needs of all participants, any participant who is already comfortable with

today's topic may elect to join the session at 1:30 and begin with the portion of the

identifying standards.

Table A4

*Professional Development Timetable for Session 4*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Creating Independent Learners (presentation)<br>• Using Nearpod | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Nearpod account | |
| 1:30 | Identifying language arts standards for flipped learning experiences among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 4: Show Me the App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Coplanning (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table A4 displays the timetable for session four, which will be held in February. During this session, participants will learn how to create independent learners using a flipped classroom. Nearpod will be the platform of choice, where teachers can choose from a wide range of created lessons, or they can create their lessons for students to view. Additionally, this session highlights the benefits of coplanning for both teachers and students.

Table A5

*Professional Development Timetable for Session 5*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Creating Independent Learners (presentation) <br> • Using Nearpod | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Nearpod account | |
| 1:30 | Identifying language arts standards for flipped learning experiences among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 4: Show Me the App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Coplanning (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table A5 shows the schedule for session 5, which would be held around March

during an early release for professional development. This training focuses on creating

digital assessments. Before this training, participants will be asked to bring a copy of an

assessment they typically use as a paper resource. For participants who are comfortable

navigating Google, they can begin creating a digital version of their assessment while the

rest of the participants move through a step-by-step tutorial.

Table A6

*Professional Development Timetable for Session 6*

| Time | Topic | Resources |
|---|---|---|
| 12:30 | Part 1: Creating Independent Learners (presentation)<br>• Using Nearpod | Laptop, SmartBoard |
| 1:20 | Questions related to presentation or Nearpod account | |
| 1:30 | Identifying language arts standards for flipped learning experiences among students | Laptop or iPad and grade-level LA standards |
| 2:00 | Group sharing | |
| 2:10 | Activity 4: Show Me the App Task Challenge | Teacher computers or iPads, task directions, grade-level LA standards |
| 2:35 | Break into mixed-grade-level groups to discuss activity, classroom uses, and potential challenges | |
| 2:45 | Break | |
| 3:00 | Part 2: Benefits of Coplanning (presentation) | Laptop, SmartBoard |
| 3:15 | Part 3: Planning With a Partner or Group | Laptop or iPad, grade-level LA standards |

Table A6 outlines the schedule for the final professional development session to be held in May. This session will begin with a tutorial on creating podcasts through the Garage Band app. It will end with a follow up of the self-efficacy inventory and the seven norms of collaboration inventory. Directions for completing the course evaluation will also be provided during this session.

Below is an explanation of the app task challenges for each professional development. The task challenges were included to a working break, but also to allow them time to explore new iPad applications that are unfamiliar. When teachers have the time to explore the features of a new app, create something on their own, and learn how to share, edit, and manage the tools, they may be more likely to take it back to their classrooms for students to use.

**Activity 1:  LabelBox App Task Challenge** (Badura, n.d.)

Step 1: Download and open LabelBox app and tap on "Add Photo."  Choose a photo from your camera roll that you would like to edit.

Step 2: Tap on the red ribbon in the upper right hand corner to reveal the various tapes. Tap on the tape you would like to use.

Step 3: To place tape on your picture, simply drag your finger left to right where you would like it to appear.

Step 4: When you lift your finger your keyboard will appear. Add text to your tape.

Step 5: Display sharing options by tapping on share button.

Step 6: After exploring the functions of the application, teachers will be asked to find literacy standards that they could pair with the app.

For example: Students could take a picture of an illustration of the main character of a story. Using the LabelBox app, students can identify the characteristics of that character. This would align with the second grade reading standard: 2.7d -Describe characters, setting, and plot events in fiction and poetry.

**Activity 2: Big Huge Labs Task Challenge** (Badura, n.d.)

Step 1: Open bighugelabs.com in any web browser.

Step 2: Scroll down and select "Badge Maker."

Step 3: Exam the various options that are available within this tool.

Step 4: Consider your curriculum and the individual characters or historical figures that students are exposed to.

Step 5: Create a badge for one of the characters or historical figures you chose you're your curriculum that could serve as an example for your students.

Step 6: Use the "Create" button to complete your badge and take a screen shot of the image on your iPad or computer. Edit the photo as needed.

Step 7: After exploring the functions of the website tool, teachers will be asked to find literacy standards that they could pair with the app.

For example: In fourth grade, students are asked to understand features of non-fiction text. This web tool can enable students to demonstrate their knowledge of a main book character or a historical figure from the Virginia Studies curriculum while focusing on non-fiction text features like headings and graphics. This would align with the fourth grade standard: 4.6a - Use text features such as type, headings, and graphics, to predict and categorize information.

**Activity 3: Skitch Task Challenge** (Badura, n.d.)

Step 1: Select an object in the room and take a photo for this activity.

Step 2: In the App Store, download the Skitch app. When it finishes downloading, open the app and choose the photo that you just took.

Step 3: Select the arrow in the bottom right corner. This will add an arrow to your page. Add a total of six arrows surrounding your photo.

Step 4: Next, select the arrow tool. You will see an "a" above the arrow, which will allow you to add text. Think of six adjectives that describe the object you photographed and place one word next to each of the six arrows.

Step 5: Take some time to explore some of the other tool options. Feel free to add additional elements to your photo, such as boxes or stamps.

Step 6: When you are finished, select "Share" in the upper right hand corner. Then click the "Save" button. Your picture will be saved to your devices photos.

Step 7: After exploring the functions of the website tool, teachers will be asked to find literacy standards that they could pair with the app.

For example: Students can use this app for vocabulary development. Using the Skitch app, students can place a root or affix in the center of the page. Then, they can list as

many vocabulary words that contain the root of affix. Once they complete the activity independently, students can find a partner to share vocabulary and add to their list. This would align with third grade standard 3.4b - Use knowledge of roots, affixes, synonyms, and antonyms to determine the meaning of new words.

**Activity 4: Show Me App Task Challenge** (Badura, n.d.)

Step 1: Download and open the Show Me App. Create a free account.

Step 2: Spend 5-10 minutes taking pictures of the following landmarks in the school: main office, principal's office, nurse's office, cafeteria, and library.

Step 3: Return to our room and go back to the Show Me app. Tap on "Create" and make five slides.

Step 4: Add a picture of the school to each of the five slides and label each picture. Use a different color for each slide.

Step 5: Starting on the first slide, tap the record button and begin recording your voice as you describe each picture. Pause the recording at the end of each slide before transitioning to a new one. Then tap done when you are finished recording all slides.

Step 6: Tap on "Save Show Me" and watch the auto replay. Tap on "Save" when you are done previewing.

Step 7: Choose a name for your presentation and then hit "Next."  Choose "Other" and type "Test."  Then select "Done adding topics."

Step 8: When finished, use the gear symbol to share you presentation.

Step 9: After exploring the functions of the application, teachers will be asked to begin creating a presentation that highlights at least one literacy standard and could be shared with their students.

For example: In fifth grade, students are required to develop their research skills, then create and present a project. This app will allow students to create a digital presentation focused on their topic. They can include pictures, text, and voice recordings to teach and highlight their research. The projects can then be shared with the teacher and classmates for a flipped learning experience. Students can watch each other's presentations and learn about a variety of topics. This would align with the fifth grade standard 5.9a-f - The student will find, evaluate, and select appropriate resources to create a research product.

**Activity 5: My Story App Task Challenge** (Badura, n.d.)

Step 1: Download and open the My Story App and choose "add author."

Step 2: Enter your name in the box and take a photo of yourself. Click "Create."

Step 3: Select your icon and click "Add a Book." Decide on a title and choose a color for the cover, if desired. Click "Create."

Step 4: Select the "Stickers & Media" icon. Choose the camera button to take a photo of yourself. Resize your image to fit in the designated space and drag it to the left side of the page.

Step 5: Click the "+" sign to add a new page and explore the tools. After exploring the tools, you can select "Done," which will then enable you to view your book.

Step 6: Your story can now be viewed, edited, shared, or exported as an eBook or movie. Take a moment to explore these options.

Step 7: After exploring the functions of the application, teachers will be asked to find literacy standards that they could pair with the app.

For example: Students in all grade levels are expected to write in a variety of forms, including narrative, descriptive, expository, and persuasive. The My Story app can be used to publish various forms of writing at any grade level. For some students with handwriting challenges or dyslexia, the voice-recording feature could be used as a means of publishing. This would align with grade level standards 5.7, 4.7, 3.8, and 2.10 - The student will write in a variety of forms to include narrative, descriptive, opinion, and expository.

**Activity 6: Shadow Puppet App Task Challenge** (Badura, n.d.)

Step 1: Download and open Shadow Puppet.

Step 2: Tap on the "Create New" button. Tap on the "Flickr Creative Commons" section.

Step 3: You will be prompted to search. Search for "school." Tap on one of the images that appears to best represent what school means to you and add it to your slideshow.

Step 4: Search for five more images that represent School And add them to your slideshow. Be creative!

Step 5: Reorder the images if you wish by clicking the blue square that contains the number six.

Step 6: Click the "Next" button. You can choose to add music from iTunes or the Shadow Puppet library or you can add text by clicking the "T" in the upper right hand corner.

Step 7: Once you have text and music in the places you want, begin recording. Return to your first slide and tap the "Start" button. Narrate each slide. Clicking the "Recording" button after each slide will pause your recording until you move to the next slide.

Step 8: When finished, tap the "Save" button then click "Done."  Shadow Puppet will take you back to the main page where all presentations are stored. View your presentation.

Step 9: After exploring the functions of the application, teachers will be asked to find literacy standards that they could pair with the app.

For example: In fourth grade, students work with media messages and advertisements, such as flyers, commercials, posters, etc. The app Shadow Puppet would offer students an opportunity to take what they have learned about media messages to create their own advertisement or commercial. They would have to incorporate persuasive messages and creative visuals. This would align with standard 4.3 - The student will learn how media messages are constructed and for what purposes.

**PowerPoint Slides for Presentations**

TECHNOLOGY AND LITERACY: DEVELOPING SELF-EFFICACY THROUGH DIFFERENTIATED TECHNOLOGY INSTRUCTION FOR LANGUAGE ARTS

By: Alexis Jacoby

# Session One Part One: Developing Self-Efficacy to Promote Technology Integration

## Background of the Research

- □ How do elementary teachers' instructional practices and perceived self-efficacy influence use of one-to-one devices
- □ Relevant details:
  - ◻ Teachers is grades 2-5 (regular 1:1 access)
    - ◼ 8 teacher (4 primary, 4 intermediate)
    - ◼ 4-15+ years of experience
  - ◻ Emphasis on professional development reform
  - ◻ Limited to teachers at School A
  - ◻ Examined barriers that inhibit integration
  - ◻ Potential impact on student achievement
- □ Research Questions
  - ◻ How do the teachers in Grades 2-5 describe their classroom practices regarding one-to-one devices to increase student learning?
  - ◻ How do the teachers describe their self-efficacy beliefs regarding classroom use of one-to-one devices to increase student learning?

Notes: Provide a brief overview of the research background. Allow time for questions.

## Basic Findings

- Most teachers expressed a desire for more learning experiences that matched their current needs with technology
- Half of the participants reported high levels of self-efficacy when integrating technology
- Several participants described a variety of ways they use technology to support students' literacy instruction
- iPads were most commonly used as a tool for writing, but used less often in conjunction with reading standards
- Collaboration and co-planning were in high demand for most participants as a means of technology learning

Notes: Outline the basic findings from the study to set the purpose and driver for this training.

## Conclusions

- Relevance and diverse professional development programs are highly sought after by teachers
- Collaboration and co-planning are beneficial and require time, but are not necessarily sustainable in the long run
- Teachers across grade levels can serve as supports to one another and may benefit from collaborative experiences
- Teachers' self-efficacy translates to their use of technology in the classroom
- Exposure to new technology skills and resources can have a positive effect on teachers' self-efficacy

Notes: Review the study's conclusions. Highlight how these conclusions led to the creation of the different components of this training.

## Session One Part Two: Technology and Self-Efficacy

## Technology Integration

- Even though technology may be used regularly in the classroom, many teachers are not successful with their integration (Ditzler, Hong, and Strudler, 2016).
- Novice teachers are unprepared for technology demands, while in-service teachers feel inadequate in their ability to integrate technology
- Shifting to digital technologies requires teachers to re-conceptualize instructional delivery
- Technology use has been known to improve learning for students with disabilities and support personalized learning experiences for all students

Notes:  Explain the background of technology integration, with support from the literature. Provide examples of technology use in the classroom that may not be deemed successful with students, how teachers need to reconceptualize instruction, and how technology supports all groups of students.

# Pre-Service Teachers' Experiences

- Teacher education programs have acknowledged the importance of technology in education
- Pre-service teachers lack technology skills beyond productivity and presentation
- Technology integration standards have recently been included in teacher preparation programs (Council for Accreditation of Educator Program, 2018)
- Teacher preparation programs can provide appropriate experiences that allow pre-service teachers to develop their skills and ability to use technology effectively (Anderson et al., 2017; Courduff, Szapkiw, & Wendt, 2016)
- School districts and teacher preparation program leaders can work together

Notes:  Explain how preservice teachers are affected by technology and how School Are or are not equipped to support new teachers with technology integration. Ask for teachers to share personal experiences as novice teachers with technology integration and support.

# In-Service Teachers' Experiences

- Opportunities to become a catalyst for change
- Teachers have a willingness to take risks and show a genuine interest in enhancing learning experiences for their students
- Some teachers may struggle to find the time to learn new and innovative ways to integrate technology
- Technology integration needs to be planned with student learning outcomes in mind (Çoklar and Kabakçı, 2017)
- Many studies have acknowledged that confidence was the difference between a teacher who uses technology and a teacher who does not (Howard & Gigliotti, 2016; Liu, Ritzhaupt, Dawson, & Barron, 2017; Williams, 2017; Young, 2016)

Notes:  Discuss the differences between preservice and in-service teachers' experiences with technology, with support from literature. Ask participants to share their journey with technology with their table groups and open it up to comments.

# Barriers to Technology Use

- Without sound pedagogy and technology knowledge, the iPads are no more than an expensive e-reader, gadget, or source of entertainment
- Cost and availability
- Access to professional development, or the lack of training provided to teachers who were unfamiliar with new technologies
- Many teachers lack the self-confidence and self-efficacy needed to experiment with the challenges associated with technology integration

Notes: Explain the common barriers faced by teachers. These barriers can impact how and if teachers integrate technology. Ask if any of these barriers are present in the school or among individuals, making the use of technology more difficult.

## Impact on Student Achievement

- Technology develops collaboration, increases student engagement, allows access to resources from anywhere, and enhances personalized learning experiences
- Technology has had a positive effect on student achievement and increased student success for minorities, low-income students, and girls
- Technology has had a positive impact on students' reading and their ability to share and create learning material (Andresen, 2017)
- Learning curve for many students as they learned how to interact and engage with digital learning tasks

Notes: Students are impacted by the use or lack of use of technology in the classroom. Refer back to study and participants' comments about how iPads have impacted students. Provide examples of the ways technology is being used at School A. Ask participants for examples of other ways that technology is being used.

## Teacher Self-Efficacy

- Low and even high self-efficacy can make it impossible for teachers to reach full integration (Heath, 2017)
- Teachers with higher levels of self-efficacy might respond and perform better with technology than teachers with lower self-efficacy
- Eliminating initial barriers to technology use would not increase the use of technology from teachers
- Without proper guidance, giving teachers technology does not guarantee its appropriate and beneficial use or an increase in their self-efficacy

Notes: Make a connection between barriers, experience, and support and how those components, along with self-efficacy can determine technology use in the classroom.

# Determine your Self-Efficacy

1. Individually, complete the survey on technology integration self-efficacy.

2. Review your survey and estimate your level of self-efficacy (high, medium, low)

3. Talk with your group members about what you discovered from the survey. What are your areas of strength? Growth?

Notes: Explain the self-efficacy survey and its use to determine the level of self-efficacy at the beginning of this training and repeat the survey at the end. The goal of the training is to help participants' maintain high-self efficacy or increase their self-efficacy. Take any questions from participants. Pass out surveys and allow time for teachers to complete.

Session One Part Three: Self-Efficacy and Norms of Collaboration

# Developing Collaborative Groups

| Why? | How? |
| --- | --- |
| □ Changing form, changing identity | Four focusing questions: |
| □ Develop organizational capacities | 1. Who are we? |
| □ Develop professional capacities | 2. Why are we doing this? |
| □ Promote a spirit of inquiry | 3. Why are we doing it this way? |
| | 4. Whose needs are being met? |

Notes:  Talk about the importance of including collaborative groups within this training, what they look like, and how it can be accomplished in these groups the sessions.

# Promoting a Spirit of Inquiry

| Seven Norms of collaboration | Inviting Thinking |
| --- | --- |
| □ Pausing | □ Full Attention |
| □ Paraphrasing | □ Approachable Voice |
| □ Posing Questions | □ Plural Forms |
| □ Putting Ideas on the Table | □ Exploratory / Tentative Language |
| □ Providing Data | □ Positive Presuppositions |
| □ Paying Attention to Self and Others | □ Non-Dichotomous Questions |
| □ Presuming Positive Intentions | |

Notes:  Part of collaborative groups is promoting a spirit of inquiry. Within that, there are the norms of collaboration and various thought processes. The norms will drive our conversations. We will dive into different components of the norms.

# Structures for Successful Meetings

1. **Decide on Decision Making**
2. **Develop Standards**
   a. One process at a time
   b. One topic at a time
   c. Balance participation
   d. Understand and agree on meeting roles
   e. Engage in Cognitive Conflict
3. **Design**

Notes:  Successful meetings between colleagues or groups require a structure that is understood by all. This structure will be encouraged during collaborative planning because it allows for a group to move through ideas and topics logically in order to complete a task.

# Norms Inventory

### Rating Perceptions of Myself

□ Answer the questions on the norms inventory.

□ Review your answers and make note of strengths and areas of growth.

□ Share in small groups one area of growth you have identified and plan to work on throughout this training

Notes:  Explain the norms inventory to participants. The inventory is used to assess how individuals interact in a group setting, asking them to rate themselves in several different categories. Take questions and pass out the inventory. Allow time for everyone to complete the inventory.

# Partner / Group Planning

- Identify Language Arts standards that may benefit from technology integration or that you would like to work on at some point during this training
- Discuss current uses of technology
- Identify areas of technology you wish to explore further

Notes: Use this first group-planning meeting to practice the group meeting structure. Allow time for groups to begin working. Circulate the room to answer questions and support groups.

## Session Two Part One: Online Collaboration

## Components of Success

- □ Teacher collaboration is vital component for student success
- □ Assumption that teachers innately know how to collaborate without explicit instruction (Weiss, Pellegrino, & Brigham, 2017)
- □ Collaborative experiences begin in teacher preparation programs
- □ If teachers feel disconnected from their peers it may have a negative effect on teacher morale
- □ When teachers' work together they are likely to experience positive outcomes (Goddard & Kim, 2018)

Notes: Collaboration is a key component of teacher success. With support from literature and evidence from this study, explain collaborative experiences, benefits and setbacks, and importance. Ask group to share experiences with collaboration and current challenges.

## Barriers to Collaboration

- □ Overall time constraints prevent regular collaborative opportunities
- □ Scheduling conflicts prevent multi-grade level meetings from occurring
- □ Professional development does not lend itself to ongoing collaboration
- □ Collaborative priorities often do not extend beyond grade level meetings

Notes: There are many barriers that prevent teachers from collaborating on a regular basis. Discuss these barriers and ask the group about other barriers that exist for them and what potential solutions they have come up with to encourage more collaborative experiences.

## Online Collaboration

- □ Teachers at School A suggested the use of an online platform to share technology integration ideas
- □ Slack – online platform with workspaces that allow for communication between team members
- □ Why Slack?
  - ▪ Organized conversations
  - ▪ Easy to stay in the loop and follow new ideas
  - ▪ Choose your focus and silence the rest



Notes:  Introduce Slack to participants as a solution to the suggestions for an online collaboration platform. Discuss why Slack is a useful tool over other platforms.

## Creating an Online Collaborative Platform

1. Open and create a Slack account
2. Set notification preferences for your workspace
3. Invite you tablemates to join your workspace
4. Create channels – organize by grade level, subject, or topic
5. Begin communication on one of your channels
6. Share a file for others to view
7. Send a direct message

Notes:  To provide differentiation, teachers who are comfortable with exploring new platforms and opening new accounts will be set forth to navigate Slack. For teachers who are not as comfortable, we will walk through opening an account and navigating the tools together, offering support throughout and answering questions as they arise.

## Work Time

Now that you have created your Slack workspace, spend time with your group creating channels and adding content.

Share your channels with the group and join channels that interest you.

Notes:  Provide work time for teachers to begin creating content using their Slack account.

## Identifying Standards

□ Examine Language Arts standards for your grade level
□ Choose one or more standards to use with today's topic – online collaboration
□ Discuss
　▫ How could your identified standards benefit from integrating technology to include online collaboration?
　▫ What challenges would your or your students face?
　▫ Are there content standards that could be included?

Notes: Model an effective group discussion, using the structure discussed earlier. Allow teachers to being their conversations, selecting standards that they will work with throughout the training.

Session Two Part Two: Benefits of Teacher Collaboration

## Benefits of Teacher Collaboration

- □ Increased levels of teacher trust in the shift from isolation to public practice (Goddard & Kim, 2018)
- □ Student learning is influence by teaching effectiveness
- □ Collaboration is the basis of teacher professional practice
- □ Developing a collaborative pedagogical culture supports teacher practice
- □ Collaboration can support the link between leadership and achievement in schools

Notes:  Develop a basis for the importance of teacher collaboration, especially beyond team collaborations. Ask teachers to suggest other collaborative partners in the school that would benefit student learning and teacher practice.

## Supporting Subgroups

- Promotes overall positive learning culture for all students
- When teachers work together, students show improved achievement outcomes (Goddard & Kim, 2018)
- Classroom teacher and special education teacher collaboration supports learning for students with disabilities
- Collaboration with ESOL teachers supports adaptation of curriculum materials for second language students
- Collaboration put students' needs at the forefront of planning and addresses students' misconceptions

Notes:  Teachers support subgroups in all classrooms. With support from literature, discuss how collaboration supports subgroups. Discuss as a group other ways in which subgroups can be supported in the class with technology. What experiences have you had where student learning or achievement has been impacted because of teacher collaboration or technology integration?

## Partner / Group Planning

- Link identified standards to today's technology focus (collaboration)
- Write a lesson incorporating new technology skills
- Share ideas in small groups

Session Three Part One: Digital Mind Mapping to Spark Knowledge

## Benefits of Mind Mapping

- Helps students brainstorm ideas and explore concepts or problems
- Facilitates a better understanding of relationships between new ideas and concepts
- Easy way to communicate ideas in multiple ways
- Allows for quick and easy recall of information
- Interesting way to take notes and collect ideas
- Visual organization of ideas and concepts

Notes:  After discussing the benefits of mind mapping for students, ask participants to draw an example of a mind map around the topic "technology integration."  After, groups with share examples with one another, noting similarities and differences in their interpretation of a mind map.

## How to Mind Map

- Begin with a main idea or concept from which information will stem in the form of words or pictures
- Branches relate to the main topic and can connect with one another
- Sub-branches grow and student knowledge increases

Notes: Offer examples of different mind maps (traditional bubble map, outline, brain dump, chronological order). Ask participants to share other examples of mind maps that they have used or seen in their classrooms.

## Why Mind Mapping?

- Strategy for brainstorming
- Alternative task that emphasizes creativity
- Encourages a natural progression of thinking
- Informs the teacher into students' thought processes
- Demonstrates comprehension of a topic

Notes:  After discussing the benefits, share suggestions for when mind mapping would best be used in the classroom. Ask groups to brainstorm a list of examples that show when mind maps would help students in their thinking and allow teachers to see students' thought process. Pose the question – could mind mapping be used as an assessment tool?

## Digital Mind Mapping with Sketchboard

1. Open Sketchboard and create an account
2. Let's learn our way around the workspace
3. Create your first board
   a. As a table decide on a main idea
   b. Using the tools, create individual mind maps
   c. After ten minutes, share ideas with your group and add new ideas to your map
4. Sketchboard presentations

Notes:  After the discussion, lead teachers to Sketchboard. To offer differentiation, teachers who are comfortable creating new accounts and navigating new material may work at their own pace. For everyone else, we will move through account set up and online tools step-by-step. After accounts have been created, initial questions have been answered, and teachers have a starting point from which to work, there will be work time provided.

## Identifying Standards

- Examine Language Arts standards for your grade level
- Choose one or more standards to use with today's topic – digital mind mapping
- Discuss
  - How could your identified standards benefit from integrating technology to include digital mind mapping?
  - What challenges would your or your students face?
  - Are there content standards that could be included?

Notes:  Circulate the room to answer any questions, offer support, and inquire about how teachers will use this in their classrooms. Allow time for teachers to share their projects and ideas for classroom integration.

Session Three Part Two: What is TPACK?

## TPACK Basics

- □ Koehler and Mishra (2009) built their technological pedagogical content knowledge (TPACK) framework upon Shulman's (1986) construct of pedagogical content knowledge (PCK)
- □ Describes how teachers' understanding of educational technologies and PCK interact and intersect to produce the effective integration of technology
- □ TPACK requires teachers to understand how to blend technology into current teaching practices

Notes:  Share background information about TPACK and how it was used as the framework for this study. Explain how it relates to this training and to teachers.
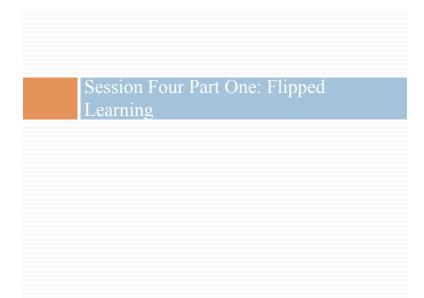
# TPACK in Action

- □ Teachers successfully engage TPACK any time they integrate technology, pedagogy, and content knowledge
- □ Lack of skill or knowledge in any one area can negatively affect the overall integration of technology
- □ Increased comfort level with technology knowledge can support their pedagogical and content knowledge
- □ Self-efficacy can be a significant deterrent or incentive for teachers to engage TPACK and integrate technology
- □ High teacher TPACK can positively influence student learning

Notes:  What does TPACK look like?  Provide examples of integration between technology, pedagogy, and content knowledge. Explain why TPACK is a necessary component to successful technology integration. Ask participants to reflect on their level of TPACK. Discuss in groups what TPACK means to you and how it has influenced your use of technology. Answer questions from the group.

# Partner / Group Planning

- □ Link identified standards to today's technology focus (digital mind mapping)
- □ Write a lesson incorporating new technology skills
- □ Share ideas in small groups

Notes:  Remind teachers about the meeting structure that we are following during group planning and discussions. Allow time for teachers to apply digital mind mapping to their grade level standards, collaborate across grade levels, and lesson plan with today's topic in mind.

Session Four Part One: Flipped Learning

# Inclusive Learning

- □ Inverted teaching methods – delivering content outside of class and problem-solving during class (Altemueller & Lindquist, 2017)
- □ Teacher's role shifts to learning coach and facilitator
- □ Online lectures, presentations, materials made available to students in a digital format for viewing outside of the classroom
- □ Redirection of attention away from the teacher and toward the learner and the learning

Notes:  Online education is used in the United States via different outlets. How does flipped learning make education for inclusive?  Ask the group to consider the ways in which students benefit from a student-centered classrooms versus a teacher-centered classroom.

# History of Flipped Classrooms

- Many consider Jonathan Bergmann and Aaron Sams founders of the flipped classroom
- More recently used as of 2012, but has been around for years, primarily in college courses (Gough, DeJong, Grundmeyer, & Baron, 2017)
- Advances in technology have made flipping classrooms much easier

Notes:  What are flipped classrooms and how are they being used around the country? Explain the premise of a flipped classroom and provide examples of how Bergmann and Sams use flipped classrooms to support student learning. Allow tables to discuss this topic. Then, using a t-chart, groups will outline the benefits and drawbacks of a flipped classroom. Groups will share their ideas with everyone.

# Flipping K-12 Classrooms

- Majority of the research falls on high school classes (Gough et al., 2017)
- Higher classroom engagement, lower student behavior problems
- Lecture-based instruction can be ineffective and making it digital doesn't necessarily make it more interesting
- Digital, flipped learning allows students to revisit material multiple times at their own pace
- Low income and lack of Internet access limits some students
- Incomplete homework at home = unprepared for class

Notes:  Highlight the benefits of a flipped classroom, as well as the disadvantages that could arise. Ask teachers to think about whether flipped classrooms in elementary, specifically upper elementary would be beneficial, or if that is something that should be left to middle and high school. Allow time for discussion and questions.

## The Shift to Flipping

- □ Focuses on student-centered learning
- □ No single model or approach
- □ Common factors (Johnston & Martelli, 2017)
  - ▪ Interaction and contact between students and teacher
  - ▪ Environment that requires students to take responsibility for their own learning
  - ▪ Out of class content is archived for review or remediation
  - ▪ In class time is spent engaged in learning with teacher as facilitator
  - ▪ In class time allows for personalized learning experiences

Notes:  Discuss what it may take to shift toward a flipped classroom, at least part-time. Johnston and Martelli (2017) outline several of the factors that flipped classrooms have in common. Ask participants to brainstorm digital platforms that could be used for flipped classrooms in elementary school.

## Work Time

Create a login or sign in to Nearpod.

Explore grade level lessons that have been created for teacher use in Language Arts.

Choose a topic for any grade level standard that you could turn into your own Nearpod lesson.

Spend some time creating a presentation that you could flip to your students for independent learning.

Notes:  After the discussion, lead teachers to Nearpod. To offer differentiation, teachers who are comfortable creating new accounts and navigating new material may work at their own pace. For everyone else, we will move through account set up and online tools step-by-step. After accounts have been created, initial questions have been answered, and teachers have a starting point from which to work, there will be work time provided.

Session Four Part Two: Benefits of Co-Planning

# Co-Planning for Personal Success

- □ All teachers contribute various years of experience, background knowledge, and teaching strategies
- □ A way to bridge disciplinary divides between classroom teachers (Hurd & Weilbacher, 2017)
- □ Teachers wish for more time to interact and plan with peers, but time is a constraint
- □ Teachers working together = positive outcomes and increased self-efficacy

Notes:  Coplanning was mentioned in the study as something that teachers wished they have more time to do. With support from literature, discuss how coplanning is a beneficial practice for both teachers and students. Ask groups to create a t-chart that shows how they currently engage in coplanning and how they would like to engage in coplanning. Share out ideas with the whole group for discussion.
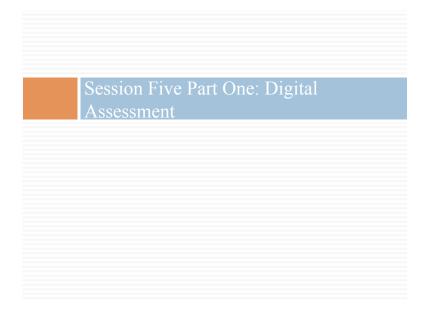
# Co-Planning for Student Success

- Classroom teachers and resource teachers can support students with diverse needs (special education, ESOL, reading support, or math support)
- Models collaborative behavior for students
- Sharing instruction and assessment data can lead to remediation, enrichment, and flexible grouping options that support student success
- Strong leaders who place teacher collaboration at the center of instructional improvement are more likely to help teachers achieve students learning goals (Goddard, Goddard, Kim, & Miller, 2015)

Notes: Coplanning is especially beneficial when teachers are working with staff who support subgroups, such as special education or ESOL. Share the benefits of coplanning and how it could impact student learning and behavior.

# Partner / Group Planning

- Link identified standards to today's technology focus (flipped learning)
- Write a lesson incorporating new technology skills
- Share ideas in small groups

Notes: Remind teachers about the meeting structure that we are following during group planning and discussions. Allow time for teachers to apply flipped classroom ideas to their grade level standards, collaborate across grade levels, and lesson plan with today's topic in mind.

Session Five Part One: Digital Assessment

## Increased Digital Learning

- The use of digital learning tools has increased in recent years (Faber, Luyten, & Visscher, 2017).
- Digital learning tools show positive outcomes on student achievement.
- Digital assessments can be tailored to meet the individual needs of students.
- Immediate feedback for students

Notes:  Discuss the increased used of digital tools in school over the last ten years. These tools have many benefits for students and teachers. Ask participants to think about how technology has evolved since they started teaching and discuss with their table group.

## Digital Formative Assessments (DFAs)

- Effectiveness of their use depends on classroom implementation
- Teacher self-efficacy and level of TPACK may influence the use and quality of DFAs
- Limited research on DFAs makes it difficult to attribute overall effects.
- Novelty effects of DFAs has the potential to become burdensome and eventually wear off – eliminating their use altogether (Faber, Luyten, & Visscher, 2017)

Notes:  Technology can be used in many ways, but one way is through DFAs. What is a DFA and how can it be used to assess student progress. What barriers have participants faced when trying to use DFAs in their classroom?  What information is still needed for participants to feel more comfortable with creating and using DFAs in their classroom?

## Digital Assessments in the Elementary Classroom

- Digital assessments may look different depending on your grade level (Lazonder, Walraven, Gijlers, & Janssen, 2020)
  - Google forms
  - Seesaw post with text or voice recording
  - PowerPoint presentation
- Encourages students to take ownership of their learning
- Teacher feedback is immediate and can drive remediation and enrichment practices

Notes:  There are many ways to use DFAs in the classroom. Aside from the examples given on the slide, ask the group to share other examples of DFAs that they have used or have seen used in the classroom. What skills would students need in order for DFAs to be done effectively?  What happens when access to Internet or tools is suddenly unavailable?

# Creating a Google Assessment

- Outcomes
  - Learn how to create a Google Forms Assessment
  - Create the answer key for easy grading
  - Send the quiz to students
  - View the quiz from a student's perspective
  - Bonus: Download Flubaroo (a free automatic grading tool!)
  - See Flubaroo in action
  - Learn how to email test results

Notes: After the discussion, lead teachers to Google Suite. To offer differentiation, teachers who are already comfortable with Google Suite may work at his or her own pace. For everyone else, we will move through Google Forms step-by-step. After initial questions have been answered and teachers have a starting point from which to work, there will be work time provided.

Session Five Part Two: Can Co-Teaching Work For You?

## Co-Teaching Possibilities

- □ Opens doors to art integration in the classroom
- □ Decreases student-teacher ratio and improves behavior control (Turan & Bayar, 2017)
- □ Support first year teachers by pairing them with a novice mentor teacher in a co-teaching environment
- □ Teachers can simultaneously remediate and enrich small groups of students
- □ Encourages inclusion of students with disabilities when a classroom teacher and special education teacher co-teach (Brendle, Lock, & Piazza, 2017)

Notes: Now that collaboration and coplanning have been discussed, talk about the benefits of coteaching. This was another topic mentioned during teacher interviews in this study. Take a survey of hands to see the number of teachers who have had coteaching experiences. If there are raised hands, ask those teachers to share their experience, mentioned both the benefits and drawbacks.

## Research-Based Co-Teaching Models

1. One teaches, one observes to collect data
2. Station Teaching – two groups meet with the teachers while one group works independently and students rotate
3. Parallel teaching – both teachers teaching at the same time to half of the group, differentiating the material as needed

Brendle, J., Lock, R., & Piazza, K. (2017). A study of co-teaching identifying effective implementation strategies. *International Journal of Special Education*, 32(3), 538–550.

Friend, M. & Bursuck, W. D. (2009). Including students with special needs: A practical guide for classroom teachers (5thEd.). Columbus, OH: Merrill

## Research-Based Co-Teaching Models

4. Alternative teaching – one teacher provides instruction to a majority of the group while the other teacher is meeting with a small group

5. Team teaching – both teachers instruct during the lesson to the whole group

6. Supportive teaching – one teacher instructs while the other circulates the room to support individual students

Brendle, J., Lock, R., & Piazza, K. (2017). A study of co-teaching identifying effective implementation strategies. *International Journal of Special Education*, 32(3), 538–550.

Friend, M. & Bursuck, W. D. (2009). Including students with special needs: A practical guide for classroom teachers (5thEd.). Columbus, OH: Merrill

Notes:  Share these research-based coteaching models. In groups, have teachers discuss the strengths and weaknesses of each model. Then, as a group, choose one model and write how that model may work during a language arts lesson in an elementary classroom. Groups will share their ideas with everyone for discussion and questions.

## Discuss

1. Which co-teaching model, if made available, would be the most beneficial to your teaching practice?

2. Which resource teacher(s) would you most be the most helpful in a co-teaching relationship?

3. What challenges would you face by adopting a co-teaching model?

Notes:  Continue with these discussion questions in small groups and then in the larger group. On poster paper, write down commonalities in participant responses for each question. After discussing number three, brainstorm possible solutions to make coteaching work at School A.

## Partner / Group Planning

- Link identified standards to today's technology focus (digital assessment)
- Write a lesson incorporating new technology skills
- Share ideas in small groups

Notes: Remind teachers about the meeting structure that we are following during group planning and discussions. Allow time for teachers to apply DAFs to their grade level standards, collaborate across grade levels, and lesson plan with today's topic in mind.

## Session Six Part One: Basic Podcasting

## Podcasts – A Technology for All?

- One time lectures are often not enough for all students to conceptualize information
- Few studies have been done on the potential of podcasts as a inclusive technology
- Research shows positive outcomes with podcasts for special education students (Gachago, Livingston, & Ivala, 2016)
- Other studies have explored podcasts as a source of motivation and engagement (Gachago, Livingston, & Ivala, 2016)

Notes:  Introduce the idea of using podcasts in an elementary class, as a way to introduce material but also as a way for students to showcase their learning. With support from literature suggest podcasts as a beneficial tool that everyone could use.

## An Alternative Approach

- Advantages to language learning, specifically speaking and listening, for ESOL students
- A study on podcasts found higher listening comprehension scores for ESOL students who used podcasts as a tool for learning (Yoestara, & Putri, 2019)
- Has the potential to increase knowledge retention (Jalali, & Bialy, 2019)
- Form of personalized learning that can be tailored to students' individual needs (Phillips, 2017)
- Extends learning beyond the classroom

Notes:  Share the advantages to using podcasts in the classroom, specifically with students who have specific learning needs. Additionally, podcasts are a way to challenge more advanced learners because they offer a route to personalized learning that can extend beyond the classroom. Ask groups to discuss the potential benefits of using podcasts in the classroom, as well as the potential challenges.

## Podcast Development

- ☐ Understand your audience and how the podcast will align with your curriculum
- ☐ Prepare a script or outline, but keep it short and simple
- ☐ Gather the appropriate equipment and use a good quality audio recording program
- ☐ Always keep a copy of your podcasts
- ☐ Choose your podcast hosting site carefully
- ☐ Periodically evaluate the effectiveness of your podcasts

(Jalali, & Bialy, 2019)

Notes:  Walk participants through the development of a podcast for an elementary classroom. What is important to have ready beforehand and what elements do you need to have in place before you can begin recording?  Ask the group to discuss whether the time involved to create a podcast is worth the benefits.

## Student-Generated Podcasts

- ☐ Requires skill mastery in research, analyzing information, creating an outline, writing scripts, and rehearsal for a fluent product (Phillips, 2017)
- ☐ Increased motivation and confidence
- ☐ Collaborative learning experiences
- ☐ Development of language production skills
- ☐ Transferrable skills (i.e. creativity, digital literacy)
- ☐ Connections to real-life examples
- ☐ Increased student flexibility for independent learning (Mathany & Dodd, 2018)

Notes:  Students have the capability to create their own podcast. Discuss the various benefits that podcasts have for students in the classroom. Discuss in groups the skills that students would need in order to independently create podcasts in the classroom and whether the time spent teaching those skills is time well spent. On poster paper, groups will list examples of podcast uses in the classroom and share with the larger group.

# Podcasts with GarageBand

- Open GarageBand and choose a template to begin
- As a table group choose a simple topic for your podcast. Generate a short script (one minute or less)
- Record your script (single track recording)
- Edit and trim your recording
- Add music
- Export your podcast

Notes:  After the discussion, lead teachers to GarageBand. To offer differentiation, teachers who are already comfortable with this app may work at their own pace. For everyone else, we will move through GarageBand step-by-step. After initial questions have been answered and teachers have a starting point from which to work, there will be work time provided.

# Identifying Standards

- Examine Language Arts standards for your grade level
- Choose one or more standards to use with today's topic – Podcasts
- Discuss
  - How could your identified standards benefit from integrating technology to include podcasts?
  - What challenges would your or your students face?
  - Are there content standards that could be included?

Notes:  Circulate the room to answer any questions, offer support, and inquire about how teachers will use this in their classrooms. Allow time for teachers to share their projects and ideas for classroom integration.

## Partner / Group Planning

- Link identified standards to today's technology focus (podcasts)
- Write a lesson incorporating new technology skills
- Share ideas in small groups

Notes: Remind teachers about the meeting structure that we are following during group planning and discussions. Allow time for teachers to apply podcasting to their grade level standards, collaborate across grade levels, and lesson plan with today's topic in mind.

## Conclusion

Please complete the following:
- Post self-efficacy inventory
- Post personal seven norms inventory
- Course evaluation

Thank you for attending!  I will be available afterwards for additional questions.

Notes: At the end of the final session, leave time to remind participants about the self-efficacy inventory and the personal norms inventory, both taken during the first session. As a follow up, participants are asked to take both of the inventories again. They will be asked to review their results on the second inventory to their first (which they will be asked to bring prior to the session). As a group, they will discuss their personal victories and challenges along the way. Then, they will create a poster listing their victories and challenges and share with the whole group. Finally, they will be asked to complete the course evaluation. I will remain behind for any lingering questions or comments.

Appendix B: Email to Potential Participants

Greetings,

You are invited to take part in a research study about teachers' perspectives of utilizing one-to-one iPads to improve literacy instruction for students. The study also looks at how self-efficacy plays a role in teachers' technology integration. The researcher is inviting classroom teachers in grade 2-5 who have a class set of iPads in their room to be in the study. I obtained your email through the school's administrative assistant. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

A researcher named Alexis Jacoby, who is a doctoral student at Walden University, is conducting this study. You might already know the researcher as a teacher in the school, but this study is separate from that role.

If you are interested in participating in this study, please review the consent form attached to this email and respond with "I consent." You can contact Alexis Jacoby at the email address or phone number listed below for further details and instructions.

Thank you for your time and consideration,

Alexis Jacoby

Appendix C: Classroom Observation Protocol

Classroom Observation Protocol

Teacher (Number): _____ Date: _____

Grade Level (circle one): Primary / Intermediate    Observer: _____

Time: _____    Subject Observed: _____

| | Notes |
|---|---|
| Technology Complexity | |
| Student Tech Integration | |
| Topic Integration | |
| Student Engagement | |
| Technological Pedagogical Knowledge | |
| Technological Content Knowledge | |
| Pedagogical Content Knowledge | |

*Describe classroom activities:*


*Teacher's Technology Use:*


*Student's Technology Use:*

Appendix D: Interview Protocol

Participant (Pseudonym):

Interviewer:

Date:

Time:

Location:

Say: I am conducting this study as part of my doctoral work at Walden University. Through this interview, I will gather information regarding your perspectives and experiences with the one-to-one iPad initiative adopted by the school district, and the influence of that on your classroom pedagogy and self-efficacy. No one will treat you differently based on the responses that you give for this interview. There are no rewards or compensation associated with this study. All information collected during this process will be reported confidentially, with a randomly assigned number used for you and a pseudonym for the school. You may choose to end this interview at any point or back out of this research project entirely at any time. Your participation is voluntary. I will give you the opportunity to review the findings to ensure that I have adequately and truthfully represented your opinions and experiences before the completion of this study.

Interview Questions for Participants

1. Tell me about your overall experience in using one-to-one technology in your classroom. Please talk about instances where you have adjusted your instructional delivery to integrate technology and specific ways in which you and the students use technology.

2. Please describe in detail any pedagogical changes that you made in the way that you taught your class after you were given regular access to technology.

   a. To what extent do you plan to continue with the changes that you've made to your pedagogy?

3. What changes, if any, had a noticeable change in student achievement or engagement?

   a. How often do you incorporate technology into your classroom instruction?

4. A) [If the teacher answers yes to changes in number 2] Why did you continue to use the mentioned pedagogical changes in your classroom?

B) [If the participant answers no to changes in number 2] Why did you cease using pedagogical changes that you may have initially used?

5. How effective do you think iPads and one-to-one technology have been to increase student achievement and engagement?

    a. What positive changes, if any, have you seen since the technology adoption?
    b. What negative changes, if any, have you seen since the technology adoption?

6. How confident are you in your ability to integrate technology in your classroom?

    a. How do you self-navigate and troubleshoot issues, new programs, or new ideas independently?
    b. How does professional development from the county for training, troubleshooting, and access to new ideas and programs help support technology integration in the classroom?

7. How have you handled any difficulties that have arisen while using technology in your classroom?

    a. What support do you wish you had regarding technology integration?

*Follow up questions as necessary:*

Could you tell me more about _____.

You mentioned _____. Tell more about this.

When you used the term _____, what did you mean by that?

Say: Thank you for your time today. I appreciate your sharing your experiences and perspectives. If you think of anything else that you wanted to add to any of the questions from the interview in the coming day, please do not hesitate to reach out to me via phone or email.

Appendix E: Member Check Email

Date:

Dear_____,

I appreciate your participation in the qualitative study to understand elementary school teachers' perspectives of utilizing one-to-one iPads to improve literacy instruction. I found your thoughts and experiences to be very insightful. Attached to this email, you will find a copy of the interview transcript, a quick reference point at the bottom of each transcript with a bulleted list of valuable takeaways, potential themes, and summarized points from the data, and a copy of the coded observational and interview data. Please review this information and confirm that the findings are an accurate representation of your input. Also, please let me know if there is any additional information that you would like to include. You can email me at _____ or call me at _____ if you would like to add, modify, or remove information. Also, please contact me with any questions. Thank you for your participation.


Sincerely,


Alexis Jacoby