Teachers' voices in one-to-one technology integration professional development programs

Williams-Britton, S.M.; Sahin, I.; Admiraal, W.F.

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Dedication

I dedicate this dissertation to my adorable children, Shaniqua, Carey Jr., and Khy'Ree, my husband, Carey, and family members. Throughout this dissertation, I have stolen quality time from you and spent it on the completion of this chapter of my life. I know you have been patient in allowing me the time needed to complete tons of assignments, and I promise I will make it up to you. To Khy'Ree, my baby boy, your conception was realized a month before the commencement of this program, and I want to thank you for staying the course with me. I remember after your delivery, I had my laptop in the hospital to complete assignments that were due in two days. As you grew older, some days, you would make sure to get the attention you needed, I gave you just that because you deserve it. I love you Baba (baby name).

Shaniqua and Carey Jr., I want to tell you both how much I appreciate you for allowing me to share the time with you and my school work. Both of you play soccer, and I may have missed a few of your games along with a few of Shaniqua's tennis games, but I assured you both that those were days when the time was limited. I know you both understand the importance of education, as I have encouraged you to always do well in school. I am so proud of you, Shaniqua, for completing an Associate of Science degree in high school. You did it, baby girl! You earned an associate's degree before your High School Diploma. I love you! Carey, my middle child. The love for you is unexplainable. I see where you have grown academically and how skilled you are with your hands. You bring joy to our lives, and you have been maturing in a fine young man. We see you have shown growth in all areas, and we all love you.

Carey, It has been a rough ride for us during this journey. There were days when everything fell in place. But they were also days when nothing seemed to go right. Through it all, you were there. Whether you provided an encouraging word, prepared our meals, or hold things together, it made a considerable difference throughout the journey. All your efforts are appreciated, and I love you. My family members, to include my mother, sisters, and friends who have become family. Thank you for sharing this experience with me. You understood my plight and supported me in whatever way you could. It makes a difference when there are people around who care. I want you to know I appreciate and thank you for being there for me through all the struggles and accomplishments. Let us celebrate!

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CHAPTER 1: THE CONTEXT OF TEACHER PROFESSIONAL DEVELOPMENT AND TECHNOLOGY INTEGRATION

Research showed administrators arranged for students to access one-to-one (1:1) technology devices in the forms of laptops, tablets, or Chromebooks to increase learning. Sixty percent of school principals have adopted 1:1 programs for classroom instruction, with 53% reporting the implementation improved the effective use of technology and educational benefits in core subjects. Students and parents support 1:1 initiatives; 83% of students in a 1:1 program reported improving skills in school is essential, while 49% stated skills acquired are vital for the future (Evans & Annan, 2018). Eighty-three percent of parents believe the use of technology is essential for preparing students for the future. The primary concern of 51% of the parents was technology use varied from teacher to teacher (Project Tomorrow, 2018). An essential factor for technology integration, rare in the utilization as participatory designers in a technology-enhanced learning environment, is the teacher (Cober, Tan, Slotta, So, & Könings, 2015). Because teachers are critical for successful innovation implementation, understanding teachers' perceptions toward the new initiative are necessary (Bertiz, & Kocaman Karoğlu, 2020; Ghavifekr, Kunjappan, Ramasamy, & Anthony, 2016). Successful and valuable technology integration is dependent on teachers' desires, intentions, and technological skills (Kayalar, 2016). Teachers are valuable in sharing opinions for implementing 1:1 programs before, during, and after a technology-related implementation process (Harris, Al-Bataineh, & Al-Bataineh, 2016).

To acquire pedagogical changes, reflecting on findings from teachers' perceptions and attitudes is vital because personal technology alone may not be sufficient to obtain the objective (Peled, Blau, & Grinberg, 2015). Some areas of focus, when evaluating 1:1 technology, are teacher outcomes, including instructional practices and technological skills (Islam & Grönlund, 2016). Areas featured in 1:1 programs are technology availability and access in the classroom (Perry, 2018). Because the use of 1:1 technology programs may be

assets to institutions, teachers who use 1:1 technology programs have a more significant advantage over teachers who do not have the accessibility (Harris et al., 2016). To ensure integration of technology, educational administrators should endorse and incorporate teachers' voices at different stages of a 1:1 program.

Many schools have adopted 1:1 technology to promote 21st-century skills and afford teachers the capability to adjust teaching styles and accomplish student-centered learning conditions (Minshew & Anderson, 2015). The increase in 1:1 programs has contributed to the abundance of literature on the utilization and implementation of 1:1 programs. Researchers have recognized the need to incorporate teachers' ideas and thoughts in technology integration and recommended the inclusion of teachers' voices in (1:1) programs (Heath, 2017; Reichert, 2016). The purpose of this study was to narrow the literature gap and delve into the importance and utilization of teachers' voices in a 1:1 program. Teachers are needed to facilitate activities in a 1:1 program. As a result, excluding teachers' points of view may encourage the failure of the program.

A need to explore teachers' voices in a 1:1 program is necessary for understanding teachers' perceptions of the initiative. Several researchers identified a gap in the literature and promoted the incorporation of teachers' voices in a 1:1 program (Heath, 2017; Reichert, 2016). Though numerous studies are available on 1:1 programs (Downes & Bishop, 2015; Harris et al., 2016), little research details the benefits of integrating teachers' voices in 1:1 programs. Additionally, the gap in the literature highlights the need for this study's exploration of teachers' voices in a newly implemented 1:1 program at the focus school district. Teachers in a southern South Carolina school district were the focus of the study.

Background of the Problem

Since the advent of computers in the 1970s, teachers have debated how students' learning could be enhanced (Akturk, 2020; Alharthi, 2020; Benek & Akcay, 2019; Hew & Brush, 2007; Omiles, 2019; Preuss et al., 2020). The implementation of technology in the curricula spiraled after the No Child Left Behind Act was incepted (Harris et al., 2016). School administrators scurried to identify remedies to promote student achievement in the classroom, and technology integration was one option. Technology has since become a critical tool in secondary (Akinbadewa & Sofowora, 2020; Hebebci, 2019; Keskin, Akcay, & Kapici, 2020;

Olowo et al., 2020; Prasad, Lalitha, & Srikar, 2015) and elementary schools (Bursal & Yetiş, 2020; Cayvaz, Akcay, & Kapici, 2020; Edwy & Vodanovich, 2017; Seage & Türegün, 2020).

In some states, the central government has recognized the importance of adopting technology in the classroom to enhance teachers' efficiency in teaching (Prasad et al., 2015). Though schools have incorporated technologies in the school, studies have shown academic achievements are still wavering (Bradley, 2020; Doğru, 2020; Mishra, Koehler, & Kereluik, 2009; National Center for Education Statistics, 2013). A report showed test scores in reading and mathematics were approximately the same as 40 years before technology integration (National Center for Education Statistics, 2013). Additionally, new digital technologies' problematic nature may promote complications when teaching with technology (Mishra et al., 2009). Teachers' voices become beneficial as the literature review revealed teachers could use experiences to govern "goodness of fit" between context, curriculum, and available technology (Hamilton, 2017).

Additional difficulties include ever-changing, unpredictable, and varying forms of digital technologies (Hamilton, Rosenberg, & Akcaoglu, 2016). Engaging teachers in productive communication is necessary to provide information on the desired device and voice potential risks or uncertainties when implementing 1:1 devices (Reichert, 2016). Communicating with teachers before making final decisions on a 1:1 program should be mandatory for educational administrators. Teachers' voices should be honored voices in technology-integrated programs. The importance of technology in society has prompted some school districts to transform computer usage into classrooms. Islam and Grönlund (2016) stated the implementation of 1:1 technology evolved in the 1990s. One-on-one technology permits the pairing of every child in every classroom, school, or school district with a technological device (Islam & Grönlund, 2016). The technological device may include tools such as a laptop, tablet, or device to manipulate and learn with (Harris et al., 2016). Instead of providing desktop computers and relying on stationary labs, some schools in the United States are implementing 1:1 programs (Zheng, Arada, Niiya, & Warschauer, 2014). Allowing students to take devices home outside school hours is a benefit of 1:1 programs as well as placing technology into the home of the students which schools serve (Zheng et al., 2014).

On December 10, 2015, the release of the 2016 National Education Technology Plan (NETP) came with a commitment to strengthen school districts across the United States (U.S.

Department of Education, 2015). One of the main objectives of the 2016 National Technology Plan is to improve teaching and student achievement through practical technology usage (U.S. Department of Education, 2015). The state of South Carolina has historically created educational technology plans every five years and utilizes the NETP goals as the foundation. South Carolina educators continue to use leading educational technology solutions to motivate modern students to explore technology (Zais, 2014).

Educators have recognized how technology's role in modern classrooms has increased (Zais, 2014). The recognition prompted the school district studied to adopt a 1:1 laptop initiative to enhance student achievement. Introduced in the school year 2016-2017, the school first provided all middle and high school students with a laptop device. In the school year, 2017-2018, kindergarten classes and grades three through five of the elementary school gained access to 1:1 laptop devices. Students from middle and high schools are allowed to take the devices home to complete assignments while elementary students are not.

Statement of the Problem

The problem is pre-K-12 teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop device remains a fertile area of study. An abundance of literature provides known evidence on technology integration in 1:1 programs (Williams, 2017). Some known data are the availability of technology in classrooms does not make teaching easier (Harris et al., 2016). Additionally, 1:1 technology can be a factor for student achievement and motivation (Harris et al., 2016). Fostering technology integration through 1:1 programs does not necessarily transfer high academic performance is known (Islam & Grönlund, 2016). Recognizing the importance of teachers in the processes of a 1:1 program can offer a universal view of technology integration (Luo & Murray, 2018). Teachers' voices are not recognized or are visible in 1:1 technology programs. Lack of teachers' voices may decrease the chances of improving effective technology usage in the classroom.

Qualitative studies of teachers' voices through perceptions, practices, and professional development with a newly implemented 1:1 program may inform educational administrators about improving the initiative. Lamb and Weiner (2018) described the institutional theory as the understanding of how individuals such as teachers interrelate in an environment to either endorse or resist change. Lamb and Weiner explained that 1:1 programs have encouraging

benefits concerning student education and engagement. Most research on 1:1 technology programs focused on data, abilities, and beliefs of individuals who are using the technology with less emphasis on how the adoption of the 1:1 program impacts teachers (Berger-Tikochinski, Zion, & Spektor-Levy, 2016; Harris et al., 2016). Lamb and Weiner concluded more research using the institutional theory needs might aid in comprehending and supporting 1:1 processes to improve results for teachers, schools, and students.

The implementation processes of the 1:1 technology program are critical for successful technology use by teachers and students. Educational administrators implementing 1:1 technology programs should be aware of implementation strategies for a successful program (Warschauer & Tate, 2015). Because new technologies are changing, teachers' practices with 1:1 technology are a factor to be considered (Luo & Murray, 2018). Educational stakeholders should work collaboratively to plan how teachers incorporate technological devices in the daily curriculum for a 1:1 program to be successful (Downes & Bishop, 2015). In a need analysis, Vatanartiran and Karadeniz (2015) showed teachers need training in developing basic technology knowledge, effective training before and during technology adoption for the classroom and managerial and technical support from school administrators.

Many school districts in South Carolina are excelling in utilizing technology in the classroom. As a result, the South Carolina Education Department created purchasing agreements with educational technology vendors while school districts assess, implement, and support classroom technologies with little reliance on the state (Zais, 2014). Evaluating and integrating technology in the classroom reflects greater success in some school districts than others do. Zais (2014) stated the use of a methodical approach during the implementation of technology gains more success compared to schools without a dedicated evaluation period. Pertinent to a 1:1 program is a blueprint of how the program may operate with emphasis placed on teachers' perceptions.

The popularity of 1:1 programs has prompted numerous researchers to conduct studies on the topic (Luo & Murray, 2018; Mounts, 2019). Conversely, implementing 1:1 programs in urgency may lead to training and support challenges and issues (Zais, 2014). Before implementing 1:1 programs, educational administrators need to assess how teachers' contributions may be valuable. Unknown in the study is the utilization of teachers' voices in the newly implemented 1:1 program. Reviewing the literature on 1:1 programs revealed a gap

in the literature concerning the paucity of research on teachers' voices in 1:1 programs (Heath, 2017; Reichert, 2016). This study aims to narrow the gap in the literature on honoring teachers' voices in a 1:1 program.

Purpose of the Study

This research study explored the utilization of teachers' voices in a newly implemented 1:1 program. Exploring pre-K-12 teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop devices is the purpose of this qualitative instrumental case study. Examined in the exploration were the experiences of certified teachers who were a part of the new initiative and taught in the school district for at least one year before the 1:1 initiative. Assessing teachers' involvement in the newly implemented 1:1 program, determining the benefits associated with practices, and the impact of the professional development experiences are the study's objective. Additionally, the conduction of the research identified strategies school districts may implement when introducing new technologies into classrooms.

Although the implementation of 1:1 programs is frequent in schools, there is minimal evidence of teachers' input in the programs. The focus of this case study was on teachers' experiences in a newly implemented 1:1 program. The expectation of this study was to determine how the voices of teachers are incorporated before, during, and after the implementation of a 1:1 program. Results from the study were shared with the southern school district in South Carolina in the form of a presentation to the school board, administrators, and at a faculty meeting after the completion of the study. Additionally, neighboring school districts utilizing or intending to implement 1:1 programs may benefit from the sharing of the study. The intention was to assist the school districts in becoming better informed on the importance of teachers' voices in a 1:1 program.

This qualitative instrumental case study allowed the primary researcher to obtain information from teachers in a natural setting. Teachers were encouraged to provide data through the use of a questionnaire, in a focus group, and individual face-to-face interviews. To be included in the study's population is certified pre-K-12 teachers in a rural southern school district. An identified gap in the literature, paucity of information on teachers' voices in the implementation of 1:1 programs stimulated the study. The research aims to fill the gap in the

literature by understanding teachers' voices in a 1:1 program through questioning and interviewing teachers in a focus group session and individual interviews. Perceptions, practices, and professional development in a newly implemented 1:1 program were areas teachers explained (see Appendix A for the definitions of terms used in the book).

Research Questions

The research objective is to extend the body of study on 1:1 programs by identifying teachers' perceptions, practices, and professional development in a newly implemented 1:1 program. Educational stakeholders may gain an understanding of the teacher's view of 1:1 technology programs from the study. The following questions guided the qualitative instrumental case study:

Research Question One. What are pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in the classroom?

Research Question Two. How do pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success?

Research Question Three. What professional training was provided to pre-K-12 to integrate newly implemented 1:1 device into classrooms to promote students' success?

Assumptions

Assumptions in research may be social, historical, political, or cultural. Anticipating how research problems are framed and formulating solutions for the problem defined assumption in research (Wolgemuth, Hicks, & Agosto, 2017). Given the rate at which the implementation of 1:1 programs increases student achievement and motivation in the classroom, the study might be a triumphant gesture. Included in the study were four assumptions included in the research. The first assumption was all participants would respond to the questionnaire instrument honestly. The second assumption, the questionnaire instrument would be completed and returned promptly. The third assumption, participants who completed the questionnaire would volunteer to provide further information in the focus group and individual face-to-face interviews. The final assumption was participants do not assume the findings of the study are binding for all school districts implementing 1:1 programs.

Chapter Summary

The preceding chapter summarized the importance of the teachers' voices in technology integration in a newly implemented 1:1 program. Following the introduction of the study is the background of the problem. Identified in the problem was a gap in research. This gap promoted the study's purpose for conducting a qualitative instrumental case study to explore teacher's perceptions, practices, and professional development in a newly implemented 1:1 laptop program. Exploration occurred through an investigation of certified teachers who taught in the school district before the implementation of the initiative. Relevant to the study was the significance and purpose of the study to inform administrators and other educational stakeholders of the importance of teacher's voices in 1:1 programs.

Utilizing the findings to understand teachers' perceptions, practices, and considerations for professional development in a 1:1 laptop program is the study's aim. Identified in literature review was the theoretical framework used in the research and the theory of planned behavior. An in-depth exploration of the theoretical framework and the review of literature on technology integration, educational technologies, 1:1 programs, professional development, national technology standards, and technology frameworks follow in the literature review. The literature review connects to the problem statement and description of the gap in the literature.

Citation

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CHAPTER 2: THE LITERATURE REVIEW OF TEACHER PROFESSIONAL DEVELOPMENT AND TECHNOLOGY INTEGRATION

In the National Center for Education Statistics report, teachers described activities, which promote educational technology in instruction. Sixty-one percent of the teachers described professional development as a necessary activity to promote technology integration, 61% described training from a staff member responsible for technology integration and/or support, and 78% described independent learning (Gray, Thomas, & Lewis, 2010). Teachers are navigators in the classroom and should be the first contacts to acquire or deliver information on a 1:1 program. The literature review exposed a paucity of research on teachers' voices in a 1:1 program.

The purpose of this instrumental qualitative case study was to explore pre-K-12 teacher's perceptions, practices, and professional development with a newly implemented 1:1 laptop initiative. Lack of exploration of pre-K-12 teacher's perceptions, practices, and professional development with the newly implemented 1:1 laptop device at the focus school district is the problem in the study. The extent of the problem is a deficiency of technology integration in classroom practices can hinder student motivation, academic achievement (Harris et al., 2016) and student engagement (Carver, 2016).

The literature reviewed was literature pertaining to teachers and technology integration in a 1:1 program. Despite the variety of educational stakeholders, daily facts of technology integration are experienced by teachers (Akar, 2020; Celebi, 2019; Dittmar, & Eilks, 2019; Elliston, 2020; Lawrence, Al-Bataineh, & Hatch, 2018; Sisman & Kucuk, 2019). Teachers' opinions and attitudes toward technology integration have assisted in establishing, applying, and sustaining school procedures concerning technology implementation programs (Lawrence et al., 2018; Thompson & McDowell, 2019). Allowing teachers the opportunity to discuss specific selections for the 1:1 initiative and providing suggestions for piloting

opportunities affords details on teachers' perceptions and practices of devices.

Evidence in the literature review revealed teachers' voices are vital in a 1:1 program. Reichert (2016) stated the soliciting of teachers' input should at every stage of the implementation process in a 1:1 program. Gaining information from teachers on device choice and the rationale for preference can aid in a successful 1:1 program (Reichert, 2016). Williams (2017) noted through teachers' voices, frustrations can be validated, and solutions implemented to eliminate obstacles. Educational administrators need to implement strategies to promote success in a 1:1 training program. Taking teachers' voices into account and integrating the feedback provided is one way to obtain success in the different stages of a 1:1 program.

Recent research specified a need for teachers' voices in a 1:1 program. Mounts (2019) recommended the dismissal of teachers' concerns by administrators in the implementation process of a 1:1 initiative is to cease. Heath (2017) reported a 1:1 initiative implementation should honor teachers' voices, beliefs, and day-to-day realities in the classroom. Because a 1:1 initiative may be the catalyst required for school districts in supporting students to achieve higher academic levels (Harris et al., 2016), honoring teachers' voices may empower the behaviors in a 1:1 initiative (Heath, 2017).

The literature review does not provide literature exclusively on teachers' voices, as literature on the topic is limited. In addition to teachers' voices, provided to readers is an overview of technology integrated related topics to include educational technologies, professional development, technology frameworks, and standards. Beginning with the literature search strategy, key terms, and the theoretical framework follow. The research review includes:

- teachers' voices,
- a brief history of 1:1 programs,
- the national technology standards,
- technology integration,
- the impact of technology integration, and
- technology frameworks.

Finally, a review of literature on barriers in integrating 1:1 device and solutions to technology barriers. The literature review concludes with the methodology and summary.

Theoretical Framework

The theoretical construct used to guide the study was the theory of planned behavior (TPB). Teacher integration of technology refers to a specific behavior, theories, models, and ideas. The theory of planned behavior focuses on the actions of an individual which prompted the appropriateness for this study (Ajzen & Fishbein, 1972). Utilizing this theoretical framework aided in understanding teachers' activities with 1:1 technology.

Theory of Planned Behavior (TPB)

Ajzen (1985) first proposed the theory of planned behavior. The TPB robust and well-recognized feature is the rationale for selecting the theoretical model. Because of the influential theory of associating belief systems to actual behavior, description, and prediction, the theory of planned behavior is suitable for this study (Ajzen, 1991).

Several studies utilized the TPB as a technology acceptance model in 1:1 technology settings (e.g., Berger-Tikochinski et al., 2016; Courtois et al., 2014). The TPB was used in this study to understand the intricacies of human behavior as part of the theoretical construct (Ajzen, 1991). Honoring teachers' voices in a newly implemented 1:1 program can aid in filling the gap in the literature, promote understanding of teachers' satisfaction levels, and identify solutions for obstacles, if any.

An individual's intention to accomplish a given action is a joint function of the attitude toward performing a behavior (Ajzen & Fishbein, 1972). The TPB assumes three conditions direct human behaviors. Included in the conditions are; behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs relate to probable penalties or characteristics of behavior. Normative beliefs relate to the expectations of other people to get work done, and control beliefs are the existence of influences promoting or hampering performance behavior (Ajzen, 2006a).

Knowledge from participants on the TPB three conditions can lead to a greater understanding of the importance of teachers' input in a newly implemented 1:1 program for classroom instruction. The instant predecessor of behavior is intentions which are expected to capture motivational powers and influence intentions. An individual's applied effort and willingness

to try a new behavior may determine personal intentions (Ajzen, 1991). Central to the creation of a behavioral intention are attitude toward a behavior, subjective norm, and perception of behavioral control (Ajzen, 2006a). Implementation of the case study was to understand the voices of teachers in a newly implemented 1:1 program and narrow literature gap.

Identifying the determinant of intentions is necessary. Gaining knowledge of teachers' positive or negative evaluation of performing a behavior is the first determinant of intention is (attitude toward the behavior). Teachers' perceptions of societal burdens from authorities to perform or not perform the behavior are the second determinant of intentions is (subjective norm) (Ajzen, 1985). Finally, teachers' ability to perform a behavior (perceived behavioral control) is an essential factor in understanding behavior (Ajzen, 2006a). Teachers who were involved in or voiced concerns in the implementation phase of the 1:1 program may be more empowered to integrate technology in daily instruction.

People with the power of influence over a particular behavior may engage in the activity. Ajzen (1991) stated individuals who are in control to perform or not to perform (under volitional control) a behavior supported by personal social norm, has a positive attitude toward the behavior. A positive attitude increases behavioral intentions (Ajzen, 1991). Perceived behavioral control is the amount of control an individual admits to possessing over a specific behavior (Berger-Tikochinski et al., 2016). Allowing teachers the opportunity to voice concerns in a 1:1 program may provide educational administrators with information on how to support staff members in the transitional phase of the initiative.

This qualitative instrumental case study aims to understand teachers' behavior (in the form of perceptions, practices, and professional development) toward the newly implemented 1:1 technology initiative. Through the utilization of the TPB theory, the voices of teachers may provide an understanding of attitudes, behavioral beliefs, normative beliefs, control beliefs, and intentions to use 1:1 laptop (Ajzen, 2006a). Utilizing the TPB framework may prompt potential facilitators or barriers, which may aid or jeopardize posing a behavior when individuals have limited volitional control (Courtois et al., 2014). A constructed framework utilizing the components of the theory of planned behavior demonstrates plans to synthesize the literature. The framework displays the connection between the variables in the study (see Figure 1).

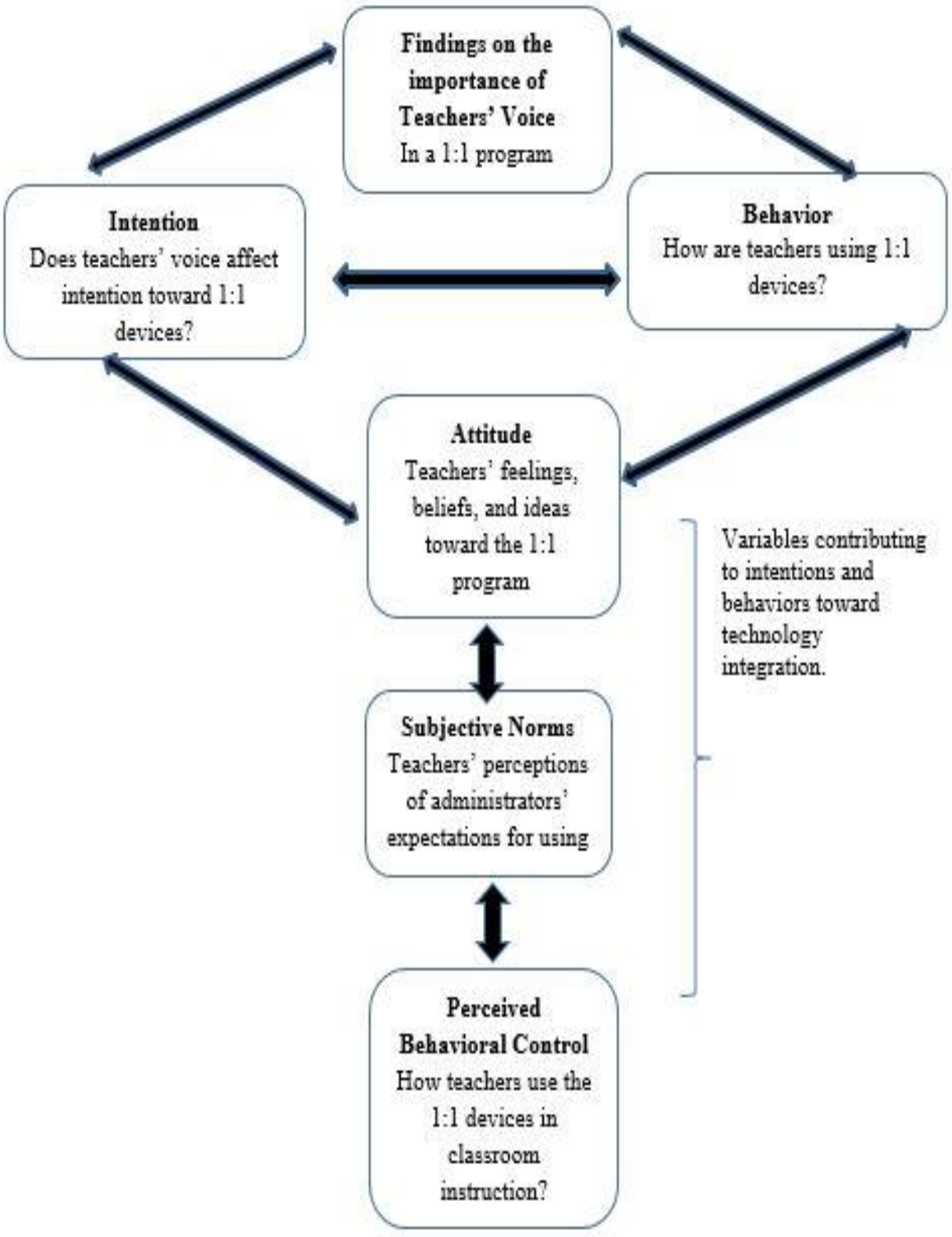

Figure 1. Applied Framework [The creation of the diagram originated from ideas and concepts from Ajzen (1991).]

Research Literature Review

A comprehensive review of the major topics found technology integration in a 1:1 program has several researchers reporting on the subject (Engels, 2016; Harris et al., 2016; Mounts, 2019; Storz & Hoffman, 2013). Harris et al. (2016) conducted a study to determine if 1:1 technology affects the academic achievement of students. Teachers' role in the classroom was evident in the study; attending professional development, activating lifelong learning skills and attitude, and strategizing ways to get students engaged in learning (Harris et al., 2016). Teachers' opportunity to express opinions, feelings, or beliefs toward the 1:1 program was not evident. Islam and Grönlund's (2016) systematic literature review reviewed children's uses, impacts, and implementation of the 1:1 computing initiative. Islam and Grönlund recommended quality leadership to improve technology usage in schools. Allowing leaders to sustain and disseminate methods for integrating technology in the classroom may be beneficial. Similarly, M. Williams (2017) qualitative study, which explored in-service teachers' perceptions of building-level support for technology information, highlighted a challenge former President Clinton instigated through the Technology Literacy Challenge Fund. M. Williams stated educational stakeholders faced challenges to target specific goals in the initiative by providing all teachers with the training and support needed to enhance student capabilities with computers. Though teachers are the primary source for integrating technology in the classroom, requesting teachers' input toward 1:1 programs is rare.

Despite numerous studies available on the 1:1 program, the utilization of teachers' voices is unknown. In 2016, Engels conducted action research explored management techniques in a 1:1 program. Reichert (2016) study described the pedagogical practices of teachers in a 1:1 iPad initiative. Gunter and Reeves' (2017) sequential explanatory research study gained an understanding of teachers' dispositions toward mobile learning and the type of professional development, which afforded empowerment. In 2019, Mounts conducted a causal-comparative strategy research study aimed to determine the effects of cultural background and 1:1 initiative participation on academic performance. After reviewing the literature on a 1:1 program, one article titled, "Examining the response to a one-to-one computer initiative: Student and teacher voices", explored the voice of teachers *(*Storz & Hoffman, 2013). Critical to the success of any school-related program are teachers. The implementation of a 1:1 program should not exclude the voices of teachers.

Teacher's Voice

To understand teachers' beliefs, perceptions, practices, and professional development on a 1:1 program, the voice of teachers is vital. Focusing on teachers' voices in a 1:1 program may elevate teachers' role in implementing and evaluating new efforts within a school (Storz & Hoffman, 2013). Hargreaves (1996) stated, "The voices of those whose lives are managed and assigned meaning by others deserve to be heard with attentiveness and sincerity, lest researchers misassign meanings to their actions, and policymakers mismanage their lives" (p. 16). Educational administrators aiming to implement a 1:1 program should recognize the importance of teachers' voices throughout a 1:1 program and take advantage of the suggestions provided.

Educational leaders should value teachers' divulged expertise as an integral factor in successful decision-making for a 1:1 program. Educational administrators should take advantage of the invaluable professional and practical wisdom teachers possess (Quaglia, 2014). Thompson (2014) conducted a study and examined methods for implementing a 1:1 program. Thompson stated the promotion of opportunity to meet teachers' needs stem from teachers' voices, which may allow the navigation in a 1:1 program to be less complicated. Thompson recommended administrators utilizing a 1:1 program should listen to teachers' voices through the use of qualitative open-ended questions to understand the perceptions and concerns of teachers (Thompson, 2014). Teachers with a voice in a 1:1 program may 'buy-in' to the initiative.

A Brief History of 1:1 Technology

In 1985, the Apple Classrooms of Tomorrow (ACOT) delivered individual computers (1:1 device) to five public school teachers for students to use at school and home (Sandholtz, Ringstaff, & Dwyer, 1990). The ACOT objective was to provide students and teachers with immediate access to a variety of technologies to include computers, videodisc players, video cameras, scanners, CD-ROM drives, modems, and online communication services (Dwyer, Ringstaff, Haymore, & Sandholtz, 1994). Classrooms involved in the ACOT initiative viewed technology as an instrument for providing knowledge, aid in thinking, collaborating, and communicating. Apple Classrooms of Tomorrow's research revealed 1:1 technology introduction in classrooms could increase learning (Dwyer et al., 1994).

The use of 1:1 technology initiatives increased as other school districts took advantage of this new practice. Cincinnati Country Day School (CCDS) was first introduced to computers in 1967 and recognized as the first school in the nation to go 1:1 with technology. Provided in 1996 to all students in grades five through twelve at CCDS were laptop computers (Cincinnati Country Day School, n.d.). In 2003, Cincinnati Country Day School transitioned from computers to tablets.

Cincinnati Country Day School transition to tablet promoted one of the first schools in the world to take advantage of the power of digital ink (Cincinnati Country Day School, n.d.). One2One Chromebook Program is another 1:1 technology initiative started in the 2016-2017 school year at the Solon City School District. Solon City School District was ranked the seventh-best school by Niche, an American ranking company (Niche, 2019). Preparing students for the 21st-century, improve academic achievement, and enhance collaborative and communicative skills is the goal of the One2One program (Solon City School District, 2016).

1:1 Technology Integration

The use of a 1:1 program has promoted positive advances in the classroom. Luo and Murray (2018) stated teachers embrace student use in 1:1 environment and personal connected mobile devices. Additionally, a 1:1 program may lead to meaningfully advanced scores in reading and math achievement (Delgado, Wardlow, McKnight, & O'Malley, 2015). In a study done by Silvernail and Gritter (2007), Maine Middle School highlighted the positive impact on middle school students' writing since the implementation of the 1:1 laptop initiative. Another study identified yearly increases in usage in developing curriculum and providing instructional practices with 1:1 technology at Maine Middle School (Silvernail, Pinkham, Wintle, Walker, & Bartlett, 2011). Literature on a 1:1 program confirms incessant practice can lead to academic achievement and an overall improvement in the program.

Though the outcome of 1:1 technology initiatives has seen positive advances, research has shown teachers are essential to the success of the program. Teachers are conscious of prospective drawbacks, can implement different productive strategies to balance device usage in the classroom, and enhance student engagement (Luo & Murray, 2018). Teachers are aware 1:1 programs may offer requisite competencies identified by the Partnership for 21st-century learning (P21) (California Department of Education, 2019). The Partnership for 21st-

century learning (P21) competencies also recognized by the U.S. Department of Education Office of Education Technology (2010) in the national education technology plan includes: critical thinking, communication, collaboration, creativity (the four Cs), and technology skills.

A recent study about teachers in a 1:1 technology classroom setting revealed 75% of teachers believed there are enhancements in the four Cs through the implementation of 1:1 technology in the classrooms. Seventy-eight point one percent strongly agreed or agreed 1:1 technology-enhanced critical thinking skills, 76.5% strongly agreed or agreed 1:1 technology-enriched creativity, 84.8% strongly agreed or agreed 1:1 technology promoted collaboration among students, and 70.7% strongly agreed or agreed 1:1 technology added value to communication skills (Ching-Wen, 2016). Ching-Wen statistics provided evidence on teachers' awareness of the benefits of a 1:1 program.

Professional Development

Kennedy (2016) described professional development as opportunities grounded in diverse theories of how students and teachers learn awareness generally accepted to foster enhancement in teaching. Laurillard (2016) stated a useful professional development should encourage teachers to use new learning in local practices. Other researchers specified professional development as a form of learning, which is comprehended better as an activity and not bounded by the limits of a course, presence, or a credential (Alexandrou & Swaffield, 2016; Cadero-Smith, 2020; Davis, Preston, & Sahin, 2009; Sahin, 2007; Thripp, 2019). Rapid changes in the technological era stimulated the need for teachers' voices to specify the type of professional development required.

Explicit professional development on laptop usage to enhance academia was one-stated beliefs by teachers (Maschmann, 2015). Gunter and Reeves (2017) study revealed teachers resisted changing teaching strategies before professional development in a 1:1 program. After receiving authentic, integrated, and subject-specific professional development, teachers' disposition changed toward the value of a 1:1 device (Gunter & Reeves, 2017). Professional development provided based on teachers' requests may be more motivating to attend and adapt.

Research has shown professional development is needed to enhance newly adapted teaching methods (Harris et al., 2016; Sahin & Shelley, 2008). Several researchers support professional development as an essential factor for a 1:1 program to be successful (Dwyer et al., 1994; Engels, 2016; Sandholtz et al., 1990). School districts embracing 1:1 technology initiative should offer vital and fitting professional development opportunities for teachers so students can make the best use of the devices (Fenton, 2017). Professional development needs expressed through teachers' voices may enhance the way technology is used and accepted in a 1:1 program.

Professional Development for a 1:1 Program

Recent studies revealed professional development for 1:1 program is vital (Fenton, 2017; Maigari, Ebinum, Philip, Bolanle, & Magaji, 2018; Sahin, 2006). In Fenton's (2017) research study, which highlighted professional development needs for teachers in an initial iPad initiative, Fenton advocated ongoing differentiated professional development as a necessary practice for teachers introduced to a 1:1 program. Gunter and Reeves (2017) found professional development empowers teachers to change instructional strategies and integrate a 1:1 device in the curriculum. Additionally, Maigari et al. (2018) stated professional development should be mandatory for staff members to use available technologies and funding for training provided. Through professional development, teachers may enhance technical and technological abilities.

Teachers and researchers are not the only stakeholders who believe professional development is necessary for implementing a 1:1 technology initiative. In a study to identify principals' attitudes toward technology integration, professional development, and teacher willingness were the two most active obstacles (Machado & Chung, 2015). Principals from the study suggested providing teachers with coaches and ongoing supportive professional development was necessary in integrating technology in the classroom (Machado & Chung, 2015). Parents have perceptions and concerns toward 1:1 laptop initiatives. Results from the study showed parents had a positive attitude toward 1:1 program implementation and supported the initiative. Furthermore, parents expressed concerns about some teachers integrating 1:1 device in the classroom while other teachers barely did; the suggestion forwarded was for teachers to receive targeted, just-in-time professional development for student engagement and grade improvement (Jin & Schmidt-Crawford, 2017).

Pittman and Gaines (2015) indicated providing professional development opportunities for technology integration does not stimulate high levels of integration in classrooms. Professional development should be advanced and concentrated on improving teachers' attitudes toward technology using specific and practical ways to increase student learning with technology (Albalawi, 2018; Al-Husban, 2020; Basuhail, 2019; Pambayun et al., 2019; Perdana, Jumadi, & Rosana, 2019; Pittman & Gaines, 2015; Serhan, 2019; Wallace-Spurgin, 2018, 2019). Because the opportunities for achievement in technology integration revolve around professional development, school district administrators should learn the latest technology standards from reputable organizations (Machado & Chung, 2015). Learning about technology standards, the International Society for Technology in Education (ISTE) may aid in selecting appropriate professional development for teachers (Machado & Chung, 2015).

National Technology Standards

Two technology recognized standards are the International Society for Technology in Education (ISTE) and the National Council for Accreditation of Teacher Education (NCATE). The NCATE is a teacher accrediting body founded in 1954. The ISTE and NCATE standards were used to create the new accreditation guidelines (Germaine & Spencer, 2016). The ISTE standards are a framework created for educators, students, administrators, coaches, and computer science educators to re-evaluate and produce new methods of advanced and original innovative learning environments (International Society for Technology in Education, 2019b).

International Society for Technology in Education (ISTE). ISTE standards assist educators and education administrators globally to re-design schools and classrooms for digital age learning and educational technology integration (International Society for Technology in Education, 2019a). Through an analysis of findings, Overbaugh, Lu, and Diacopoulos (2015) found teachers' self-efficacy and attitudes toward technology integration improved in all domains after participating in ISTE courses. The International Society for Technology in Education (ISTE) formulated five standards called the National Educational Technology Standards for Teachers (NETS•T).

The five standards are: (a) facilitate and inspire student learning and creativity, (b) design and

develop digital-age learning experiences and assessments, (c) model digital-age work and learning, (d) promote and model digital citizenship, and (e) responsibility, and engage in professional growth and leadership (ISTE, 2008). All standards promote the integration of technology in the classroom and require teachers to meet performance indicators. The creation of the ISTE standards promoted the operation of technological approaches to influence knowledge, instruction, and preparing for the technology era. Although the ISTE standards are among the most recognized educational technology frameworks, research has shown a small percentage of implementation of standards for teachers (60. 9%) (Ayad & Ajrami, 2017).

There are 14 critical elements used by the International Society for Technology in Education (ISTE) to improve technology for learning. Elements used by ISTE are called ISTE Essentials Conditions. Steps administrators should take to promote technology integration are the conditions. Educators and school leaders afford a research-backed framework to guide the implementation of the ISTE Standards, technology planning, and system-wide change through the ISTE Essential Conditions (International Society for Technology in Education, 2019a). School districts implementing a new 1:1 program can benefit from guidance and best practices when collaborating with the ISTE.

Essential Conditions included in ISTE are: (a) shared vision, (b) empowered leaders, (c) implementation planning, (d) consistent and adequate funding (e) equitable access, (f) skilled personnel, (g) ongoing professional learning, (h) technical support, (i) curriculum framework, (j) student-centered learning, (k) assessment and evaluation, (l) engaged communities, (m) support policies, and (n) supportive external context (International Society for Technology in Education, 2019a). Literature reviewed on 1:1 programs and technology integration revealed the ISTE conditions are necessary for technology integration. Additionally, researchers recommended the introduction of ISTE standards to students and teachers through conferences and training, the integration of ISTE standards in pre-service training, providing continuous teacher development through professional and lifelong practices, and encouraging teachers and students to embrace the standards (Ayad & Ajrami, 2017).

National Council for Accreditation of Teacher Education (NCATE). All teacher preparation programs are required by the NCATE committee to provide preservice teachers an opportunity to complete a sequence of technology-related courses (Germaine & Spencer,

2016). Courses included the use of technology to structure skills, core concepts, ideas, values, facts, and methods of inquiry in subjects to be taught. The National Council for Accreditation of Teacher Education merged with a teacher accrediting body founded in 1997, Teacher Education Accreditation Council (TEAC) (Council for the Accreditation of Educator Preparation, 2015a). Teacher Education Accreditation Council (TEAC) and the NCATE merger in 2013 formed the Council for the Accreditation of Educator Preparation (CAEP). Legacy standards from NCATE and TEAC no longer offer accreditation services (Council for the Accreditation of Educator Preparation, 2015a).

The CAEP provides indirect professional accountability for educational institutions, teacher education, and teachers (Cochran-Smith et al., 2016). Content and pedagogical knowledge, clinical and partnerships practice, candidate quality, recruitment, and selectivity, program impact, and provider quality, continuous improvement, and capacity are the five standards of the Council for the Accreditation of Educator Preparation CAEP (Council for the Accreditation of Educator Preparation, 2015b). The technology-related standard in CAEP states, "providers should ensure candidates' model and apply technology standards as to design, implement, and assess learning experiences to engage students and improve learning; and enrich professional practice" (CAEP, 2015b).

Though the design of the CAEP standards promotes accountability, Schwartz (2016) stated the standards have serious flaws. Schwartz (2016) noted the construction of the standards prompts underlying suspicion of and disregard for teacher educators, problematic, domineering, one-dimensional, and technical to orient. Administrators implementing a 1:1 program have to initiate steps to research different technology standards because changing the educational system necessitates the reconsideration of how we teach and learn (International Society for Technology in Education, 2019b). Selecting appropriate standards is a pertinent factor to consider when integrating technology.

Technology Integration

Strategies used by teachers to integrate technology into instructions change frequently. Persistent changes in establishing and testing new techniques and tools either take root or die quietly within education (Ruggiero & Mong, 2015). Scherer, Tondeur, Siddiq, and Baran (2018) stated integration of technology is dependent on the beliefs and attitudes of teachers.

Similarly, Ruggiero and Mong's (2015) study concluded teachers described technology-integrated practices from personal perspectives. One group of teachers from Ruggiero and Mong study explained technology integration is the process in which personal background experiences play an integral part in implementation. Another group of teachers described technology integration as the intertwining of technology devices in the curriculum, using different learning and teaching techniques as a scaffold (Ruggiero & Mong, 2015).

Technology integration is the understanding of pedagogy for teaching specific content and knowing how technology can promote learning goals achievement (Davies & West, 2014). Researchers have noted deficiency in connecting content to technology can lead to failure because content and pedagogical knowledge are predecessors for technology integration (Ruggiero & Mong, 2015). Possessing the ability to transfer understanding of the technology, becoming competent, and knowing when and how to use technology to promote practical usage, is technology integration (Davies & West, 2014). Consequently, teachers' exposure to practical technology usage may provide information on the impact the device has on instruction.

Technology integration in a 1:1 program is differentiated (Downes & Bishop, 2015). Downes and Bishop stated some research on 1:1 technology integration has solid confirmation of enhanced educational outcomes for students, while others do not. The misunderstanding is the ratio of technology access description and not necessarily the use of the technology to stimulate learning in a 1:1 program (Downes & Bishop, 2015). Because technology integration supports a diversity of instructional methods, access to technology, quality technical support, teachers' confidence, and comfort using technology are necessary for a 1:1 program (Liu, Ritzhaupt, Dawson, & Barron, 2017). Additionally, teachers' experiences with technology influence technology integrations (Liu et al., 2017). Literature has revealed whether integrating a 1:1 program or utilizing general technology; teachers are an essential factor in the integration process.

Impact of Educational Technology in Technology Integration

The presence of educational technologies is increasing in classrooms, and students are entering schools ready to manipulate new devices. Educational technologies play a vital role in a student's learning and cognitive knowledge. Incorporating new technologies in the

curricula can promote an explosion of learning and receiving further information, with mobile devices (Lazar, 2015; Ozkale & Koc, 2020). Many students are without access to educational technologies, and the digital divide still exists. Although some school districts have provided 1:1 technology involvement for students, some schools may take many years for 1:1 technology to exist in all classrooms (Harris et al., 2016; Hebebci, Bertiz, & Alan, 2020).

The use of 1:1 educational technology is a rather new phenomenon in the educational sphere and requires careful introduction in the classrooms (Harris et al., 2016). Exposure with 1:1 technological tools and instructions afford teachers the ability to transform teaching skills. Transformations are beneficial in providing students with a 1:1 opportunity with teachers, obtaining immediate feedback, and utilizing advanced materials (Delgado et al., 2015). Delgado et al. explained a 1:1 computing environment could promote higher reading and math scores in achievement tests. Students in a 1:1 technology setting display improved educational accomplishment, better-quality engagement, research abilities, and teamwork skills (Delgado et al., (2015). Gaining first-hand experiences from teachers involved in a 1:1 program can confirm or not confirm how school-issued laptops have affected students' grades in the content area.

Integration of Technology

Learning technologies and instructional technologies together are considered educational technologies; the integration of learning and instructional technologies in classrooms is technology integration (Akturk & Saka Ozturk, 2019; Hebebci, Celik, & Sahin, 2016; Davies & West, 2014; Hill & Uribe-Florez, 2020; Sahin, 2006, 2011). In addition, the use of a technology integration model can promote the use of available technologies. There are a variety of technology integration models, which include (a) technological pedagogical content knowledge (TPACK) model; (b) substitution, augmentation, modification, and redefinition (SAMR) model; (c) technology integration model (TIM), technology integration planning (TIP) model; and (d) replacement, amplification, and transformation (RAT) model (Kimmons & Hall, 2018).

Hilton (2016) stated the TPACK and SAMR models were the newest during the conducting of a case study on two social studies classrooms, which used an iPad cart initiative (Hilton,

2016). Furthermore, Kimmons and Hall (2018) stated the TPACK and SAMR frameworks are the most used of the technology integration models. Even though some schools have adopted a technology integration model to guide the 1:1 initiative (Kimmons & Hall, 2018), research has shown not all educators integrate technology (Liu et al., 2017).

A variety of factors may account for teachers' lack of integration of technology into the classrooms. Some factors include teacher confidence using technology, support using the technology, and access to technology (Liu et al., 2017). Teachers' beliefs, values, and attitudes toward using educational technology are additional factors (Kimmons & Hall, 2018). Additionally, teachers may perceive different models to be valuable for various reasons (Hilton, 2016). School districts need to introduce teachers to different technology models, adopt, and utilize the one, which complements the school culture.

Exposing teachers to all technology models may be beneficial because no one model may be universally appreciated, comprehensible, or advantageous to all shareholders (Kimmons & Hall, 2018). Hilton (2016) revealed how the introduction of the SAMR and TPACK model to two social studies teachers showed both teachers displayed preferences in terms of differences and similarities the models possess. Teachers need to gain an understanding of technology integration and contributions to the instruction of the theoretical models.

Technology Integration Models

Kimmons and Hall (2018) stated acquiring knowledge of theoretical models is beneficial for understanding teachers' attitudes, beliefs, and values about technology integration. Additionally, learning about theoretical models may reveal appealing characteristics of technology models in instructions (Kimmons & Hall, 2018). The subsequent section discusses some of the different technology integration models available to use when implementing a 1:1 initiative.

Technological Pedagogical Content Knowledge Model (TPACK). Mishra and Koehler (2006) created the TPACK model in response to the lack of theory guiding technology integration in education (Rosenberg & Koehler, 2015). The TPACK framework mimics and extends on Shulman's (1986) pedagogical content knowledge (PCK) by adding the technology aspect for teachers (Koehler, Mishra, & Cain, 2013). Three knowledge type objectives teachers need to

integrate technology-related skills are technological, pedagogical, and content knowledge (Sancar-Tokmak, Surmeli, & Ozgelen, 2014). All three skills form the core of TPACK (Koehler et al., 2013). Teachers who are skilled in technology integration possess all three skills and can enhance students' motivation and academic achievement through a 1:1 program. Applying the TPACK framework may promote opportunities for encouraging investigation in teacher edification, teacher professional development, and teachers' use of technology (Koehler & Mishra, 2009). Knowledge of technology (TK), pedagogical knowledge (PK), and content knowledge (CK) are the three main components in the Technological Pedagogical Content Knowledge (TPACK) framework. All the components intersect to form the technological pedagogical knowledge (TPK), pedagogical content knowledge (PCK), and technological content knowledge (TCK). The intersecting of TPK, PCK, and TCK form TPACK. The TPACK model represents the complex relationships integral to all areas of knowledge teachers should possess for technology integration (Rosenberg & Koehler, 2015).

Application of the model. The TPACK framework has become famous for examining teachers' technological skills. Mtebe and Raphael (2018) found there was a disparity in students' skills and 21st-century abilities to maintain economic improvement and used the TPACK framework to analyze teachers' confidence in integrating technology. Concluded in the study is, teachers were sensibly assertive in content and pedagogical knowledge but portrayed minimal knowledge to integrate technology in lesson delivery (Mtebe & Raphael, 2018). A factor contributing to the possession of minimal knowledge is, the TPACK framework does not provide specific procedures and contribute to teachers' knowledge when integrating technology during instruction (Lazonder & Janssen, 2016). Findings from TPACK related studies reveal training is needed for teachers to utilize TPACK related skills during instruction.

Substitution Augmentation Modification and Redefinition (SAMR). The Substitution Augmentation Modification and Redefinition (SAMR) model is a technology integration framework created by Dr. Ruben Puentedura in 2003. Assisting teachers in making informed decisions for technology implementation processes are the focus of the SAMR framework (Kurbaniyazov, 2018). Incorporated in the SAMR framework are four stages for the integration of technology in the classroom. Stages include substitution; technology replaces paper and pencil, augmentation; technology is used to promote learning interaction,

modification, adjusting learning task, and redefinition; exploring task, which is impossible without technology use (Alberta Education, 2016). Utilizing the SAMR framework could be a possible option when implementing a 1:1 program as the model is useful for assessing the impact digital technology has on learning and teaching (Hamilton & Bird, 2016). The Substitution Augmentation Modification and Redefinition (SAMR) framework is not just a guide to replace chalk and paper with projectors and individual devices (Alberta Education, 2016). An essential factor considered in the creation and designing of the SAMR framework was to assist teachers in integrating technology into a productive learning environment. A valued factor of SAMR is the practical guide provided to educators when moving from substitution to redefinition of learning tasks; and the promotion of thinking when using technology (Kihoza, Zlotnikova, Bada, & Kalegele, 2016). Different researchers have utilized the SAMR framework in studies and have revealed the impact the model has on findings.

Application of the model. Hilton (2016) analyzed the use of the SAMR and TPACK frameworks through a study on two eighth grade social studies teachers. Results from the study revealed both frameworks offer significant guidelines for maximizing the use of resources to integrate technology and promote learning for students. Lobo and Jiménez (2017) stated Puentedura saw benefits in pairing the SAMR model with the Bloom's taxonomy and was confirmed by teachers in Hilton's study who compared the SAMR framework to Bloom's taxonomy. Bloom's taxonomy sort educational learning objectives in stages of difficulty and specificity (Adams, 2015). Similarly, the SAMR framework matches technology to specific learning objectives to reach higher levels without neglecting lower levels in the process. Technology-related thinking and student-centered activities connect when using the SAMR framework (Hilton, 2016). Teachers may benefit from the SAMR framework by receiving guidance for integrating technology.

Technology Integration Matrix (TIM). The Technology Integration Matrix (TIM), created in 2006, was funded by the Florida Department of Education and serves as an inclusive structure for assessing technology integration within instructional practices. Additionally, the development of the TIM framework expands opportunities for educators, administrators, and school district personnel. Furthermore, the technology integration matrix observes exemplary technology integration strategies and enhance students' learning experiences (Welsh, Harmes, & Winkelman, 2011). The technology integration matrix is an acknowledged tool in K-12 learning communities; and is perceived as a reliable measure to identify the extent to

which technology integration is part of the classroom curriculum (Arizona K-12 Center at Northern Arizona University, 2012). The Technology Integration Matrix (TIM) offers teachers and other educational stakeholders more than professional development. Educational stakeholders can view videos in subject areas such as math, science, language arts, and social studies. The videos are recordings of classrooms across Florida showing concrete examples of technology integration (Welsh et al., 2011). Additionally, the technology integration matrix contains teacher assessment tools. The teacher assessment tools focus on the levels of technology integration in the classroom curriculum and the features of the learning environment (Allsopp, Hohlfeld, & Kemker, 2007). Teachers may engage in more opportunities to understand how to integrate technology using the technology integration matrix. The features of observing different audio-visuals and manipulating the teacher assessment tools may increase usage.

Application of the model. Previously used in Barbour's (2014) and Phillips' (2018) studies is the technology integration matrix. Barbour (2014) utilized the technology integration matrix to measure the level of technology integration in a class and concluded the TIM model is an outstanding instrument for teachers, administrators, and professional development specialists. Phillips (2018) used the technology integration matrix to identify and align instructional practices and explained the opportunities provided to students to take control of learning with the use of the TIM model. Opportunities allowed students to make meaningful connections and construct knowledge. Barbour (2014) further concluded the utilization of resources, money, and time used with the technology integration matrix may capture student engagement in technology classrooms.

Technology Integration Planning Cycle (TIPC). After recognizing how the TPACK framework explained knowledge teachers should possess to integrate technology but does not provide a distinctive method for developing the knowledge, the Technology Integration Planning Cycle (TIPC) was created (Hutchison & Woodward, 2014). Lack of clarity in developing knowledge for TPACK lead to the creation of the TIPC model in 2014 (Hutchison & Woodward). Hutchison and Woodward utilized Mishra and Koehler's (2006) TPACK framework as a guide for developing the TIPC and recommended the model to literacy teachers when integrating technology (Hutchison & Woodward, 2014). The main objective for developing the technology planning cycle was to provide teachers with a planning tool for promoting the utilization of technological, pedagogical, and content knowledge when

planning for technology instruction (Hutchison & Colwell, 2016).

Application of the model. Beschorner and Kruse (2016) and (Hutchison & Colwell, 2016) utilized the technology integration planning cycle in previous studies. Both studies used the TIPC to gather data from pre-service teachers. The technology integration planning cycle was used on Beschorner and Kruse's (2016) study to increase pre-service teachers' thoughtfulness for using digital technology tools. Furthermore, Hutchison and Colwell (2016) utilized the technology integration planning cycle to provide pre-service teachers a method for planning instruction and integrating technology in the content area. Both studies revealed the invaluable benefits of the TIPC model. Findings from Beschorner and Kruse's (2016) study revealed patterns and themes using the technology integration planning cycle. Themes included (a) sensible planning, (b) vague instructional goals, (c) instructional approach determined, and (d) digital technology decisions. Results from the study showed pre-service teacher's use of technology integration planning instruction is laudable. Hutchison and Colwell's (2016) study utilized both the technology planning cycle and the TPACK framework. One of the findings from Hutchison and Colwell (2016) showed the technology integration planning cycle could provide support to pre-service teachers when applying technological pedagogical content. The technology integration planning cycle is supported and grounded in the TPACK framework (Hutchison & Colwell, 2016). Beschorner and Kruse (2016) stated pre-service teachers do not need a theoretical understanding of technology pedagogy content knowledge (TPACK) to utilize the technology integration planning cycle. Teachers need knowledge of the different components of TPACK before making decisions about intersecting the different areas of knowledge. Findings from both studies suggest exposing teachers to the TPACK framework before the technology integration planning cycle may be beneficial for technology integration.

Replacement, Amplification, and Transformation (RAT). Dr. Joan Hughes developed the Replacement, Amplification, and Transformation (RAT) framework in 1998. The RAT framework is a self-assessment tool for comprehending the role of technology in instruction, learning, and curricula practices (Hughes, Thomas, & Scharber, 2006). The RAT framework was created for pre-K-12 education. Usage of the RAT framework expanded into higher education by pre-service and in-service teachers to improve critical technological management. Replacement is the use of modern technology to substitute traditional practices, amplification is utilizing technology to improve an unchanged assignment, and

transformation is to integrate technology (Blackley & Walker, 2015). Researchers compared the RAT framework and Substitution, Augmentation, Modification, and Redefinition (SAMR) for similarities in technology integration. Kimmons (2016) stated the RAT model is used by researchers, while teachers are the primary users of the SAMR (Kimmons, 2016). Both frameworks introduce technology in learning experiences and aid in understanding how to use technology in a meaningful way (Kimmons, 2016). Conversely, pre-service teachers display high levels of amplification while thinking about applying technology in the classroom; teachers seldom refer to technology use with unclear advantages in the classroom (replacement). Kimmons, Miller, Amador, Desjardins, and Hall (2015) expounded, there were no relationships between students and thinking about technology.

Application of the model. Amador, Kimmons, Miller, Desjardins, and Hall (2019) and Kimmons et al. (2015) utilized the RAT framework in different research studies. Amador et al. (2019) use the RAT to broaden existing research on pre-service teachers' feelings about technology integration influence, self-reflection, and self-assessed technology integration capabilities. An objective for using the RAT model was to define the components of the framework, which would emerge from pre-service teachers' reflection and performance tasks. Amador et al. (2019) concluded pre-service teachers demonstrated exceptional levels of amplification in technology application, but teachers seldom mentioned the technology to replace previous methods.

Findings from Amador et al. (2019) study revealed no connection amid preservice teachers' consideration of technology and self-assessment of technology capability. Pre-service teachers' self-reflection and self-assessment showed a fondness for technical fluency instead of thoughtful classroom outcomes. An analysis of pre-service teachers' thoughts of technology integration and the replacement, amplification, and transformation model found a significant effect of performance applied in a transformative manner. Still, there was no overall effect on amplification and replacement (Amador et al., 2019).

Barriers in Integrating 1:1 Technology

Identifying and addressing technology integration barriers may improve 1:1 practice. Educational administrators need to recognize technology barriers and implement elimination strategies. Teaching in the 21st century inspires teachers to be imaginative with technologies

by maximizing thought-provoking instructions for students (Fatimah & Santiana, 2017). Teaching with technology can be complicated as teachers experience significant challenges with the presence of new technologies (Koehler & Mishra, 2009). Listening to teachers' voices may provide appropriate solutions to eliminate some of the barriers.

Johnson, Jacovina, Russell, and Soto (2016) stated some external barriers to technology integration are inadequate resources or connectivity (access constraint). Another barrier is teachers are not prepared through active professional development for using new technologies (training) and inadequate technical, administrative, or peer support (support constraint). Internal barriers to technology integration include attitudes, beliefs, skills, and knowledge (Johnson et al., 2016). Identifying and eliminating barriers to technology integration are two ways to ensure technologies are utilized in schools. One sure way of identifying barriers is through the teachers' voices.

With greater emphasis placed on 1:1 technology, another barrier of technology availability was found (Carver, 2016). Technology availability is a vital element affecting both teachers and students in daily classroom instructions. In addition to technology availability, researchers listed instructional time schedules and curricular concerns as other barriers to technology integration (Carver, 2016; Pittman & Gaines, 2015). Knowledge from teachers on device usage and student preparedness with devices may highlight barriers to technology integration. Additional barriers hindering the use of technology included lack of funding, technical support, confidence, and adequate training opportunities are all deterrents to technology integration. Teacher confidence is vital in technology integration and may aid in decreasing the barriers of technology support and technology usage (Nikolopoulou & Gialamas, (2015). An additional barrier for integrating technology was time, teachers complained about the time for developing lesson plans, learning how to use technology, students' use of technology, and finding appropriate uses of technology for instruction posed a problem in technology integration (Pittman & Gaines, 2015).

Solution for technology barriers. Different factors are taken into consideration when identifying technology integration barriers. Professional development is one barrier identified by several researchers in technology integration (Johnson et al., 2016; Nikolopoulou & Gialamas, 2015). Pittman and Gaines (2015) stated only eight percent of respondents selected a lack of professional development as a first-order barrier. The majority of the respondents

rated the overall practicality and applicability of technology-related professional development as inadequate. A proposed solution for addressing the inadequacies of technology-related professional development is to provide tailored training or mentoring involvements. Training should demonstrate precise strategies for technology integration. With intentional training for direct implementation in classrooms, the level of technology integration may increase (Gokbel & Alqurashi, 2018; Kaleli, 2020; Kara, 2020; Pittman & Gaines, 2015).

Other researchers recommended strategies to overcome first order (external) technology integration barriers. Recommendations include strategies such as obtaining guidance from the International Standard of Technology Education (ISTE) to identify options for professional development including taking advantage of master teachers' expertise through professional development, requesting training from software companies when implementing newly adapted educational technologies, and providing adequate technical, administrative, and peer support during the implementation process (Johnson et al., 2016). Solutions to second-order (internal) barriers include promoting constructivism and student-centered teacher training where teachers are included in the decision-making process when implementing new technologies (Johnson et al., 2016). Implementing these strategies can provide teachers with needed empowerment through activities and provide the space to hear voices of teachers as recommended by Heath (2017).

Methodology in Integrating 1:1 Technology

One-to-one programs are becoming popular in the classrooms. Despite the popularity, the utilization of teachers' voices in a 1:1 program is unknown. Ajzen (1985) created the theory of planned behavior which was applied to this study. Articles included in this study relates to technology integration in a 1:1 program and highlighted researchers who discussed technology integration in schools, promoted the continuous use of technology, and the importance of teachers' voices (Heath, 2017; Reichert, 2016).

Researchers included Davies and West (2014), Ruggiero and Mong (2015), and Liu et al., (2017). Davies and West (2014) reviewed technology integration around a framework based on access to educational technology, the use of technology, and the effects of technology. Included in the study are 1:1 programs and the use of professional development to increase technology integration. Researchers from the literature review concluded there is a need to

emphasize students and teachers' universal access to new technologies and educational resources. Providing universal support can improve instructions and learning with educational technology. Ruggiero and Mong concluded simply exposing teachers and students to technology does not facilitate 21st-century learning skills. Liu et al. (2017) tested a model of classroom technology integration in a K-12 context in a multilevel path analysis. Liu et al. (2017) concluded the general influence of technology integration is teachers' comfort and confidence in utilizing the devices.

Chapter Summary

Despite extensive research available on 1:1 programs and technology integration, the literature review identified a gap in the literature. The inclusion of teachers' voices in a 1:1 program is limited in the literature review. In addition, the literature showed assessments of a 1:1 program focused on the availability of devices as opposed to the promotion of students' educational advancements. An exploration of teachers' voices through shared beliefs, feelings, and perceptions may provide a more precise understanding of the importance of the voices of teachers in a 1:1 program. Furthermore, the study may provide administrators with information on how to value and incorporate teachers' perceptions, practices, and professional development in a 1:1 program.

The theory of planned behavior was applied to the methodological plan, data collection procedures, and the presentation of the study's findings (Grant & Osanloo, 2016). Five components of the theory of planned behavior (attitudes, subjective norms, perceived behavioral control, intentions, and behavior) aided in understanding the focus of the study. Areas to be explained in the research method include: the research design and rationale, researcher's role, research procedures, data collection, data analysis, reliability and validity, ethical procedures, and a summary.

Citation

Williams-Britton, S. M. (2021). The literature review of teacher professional development and technology integration. In I. Sahin & W. Admiraal (Eds.), *Teachers' voices in one-to-one technology integration professional development programs* (pp. 9–32). ISTES Organization.

CHAPTER 3: MEASURING TEACHERS' PROFESSIONAL DEVELOPMENT IN TECHNOLOGY INTEGRATION: A QUALITATIVE INSTRUMENTAL CASE STUDY

The purpose of this qualitative instrumental case study was to explore pre-K-12 teachers' perceptions, practices, and professional development with a newly implemented 1:1 laptop program. Islam and Grönlund (2016) stated the use of technology could advance or worsen students' academic results. Furthermore, teachers' positive beliefs toward technology are essential for 1:1 technology integration (Heath, 2017). Islam and Grönlund (2016) posit, good pedagogy guarantees advances in education. School districts implementing technology use in daily classroom instructions should ensure evidence-based strategies are endorsed and vain practices identified and discontinued (Islam & Grönlund, 2016). Exploring the voices of teachers is one way of promoting technology practices.

The implementation of technology-rich instruction is dependent on teachers; hence, gaining insights on teachers' perceptions, practices, and professional development with newly implemented 1:1 technology is beneficial (Rehmat & Bailey, 2014). Knowledge of teachers' perceptions, practices, and professional development can provide administrators with information to support educators through professional development and specific training in the implementation of 1:1 device usage in classrooms (Engels, 2016). The research questions for the qualitative instrumental case study are:

> Research Question One. What are pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in the classroom?
>
> Research Question Two. How do pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success?
>
> Research Question Three. What professional training was provided to pre-K-12 to integrate newly implemented 1:1 device into classrooms to promote students' success?

The research method includes a discussion of the research design, rationale, and the role of

the researcher in this qualitative instrumental case study. Further discussions include the research procedures, the population sample, instrumentation, data collection methods, and data analysis. Additionally, this chapter presents the reliability, validity, and ethical issues relevant to the study.

Research Design and Rationale

For this research, the use of a qualitative instrumental case study design explored pre-K-12 teachers' perceptions, practices, and professional development of the newly implemented 1:1 laptop program. Qualitative research designs indicate a degree of openness, which produces more surprising results than other research (Haunschild & Eikhof, 2009). The use of a qualitative case study generated rich data through a level of directness (Haunschild & Eikhof, 2009). Additionally, case studies are research designs recognized and used across all disciplines, including social sciences.

The use of a case study provides a profound appreciation of an issue (Crowe et al., 2011). A case study design is suitable when researchers want to answer "how" and "why" questions, has no authority over behavioral events, and the focus of the study is current (Yin, 2018). Instrumental case studies use a specific case to increase broader gratitude for a topic or phenomenon (Crowe et al., 2011). An instrumental case study is appropriate in providing data on teachers' experiences and defined actions. Additionally, an instrumental case study promotes a level of resilience not offered through other qualitative research approaches (Hyett, Kenny, & Dickson-Swift, 2014).

The rationale for using a case study approach is to acquire an in-depth understanding of the newly implemented 1:1 laptop program in a natural setting (Crowe et al., 2011). A case study allowed the exploration of an issue occurring in present-day with one specific group (Yin, 2003). Because this study focused on one educational institution, a single case study approach was most appropriate for the research project to stimulate understanding of a larger unit (Hyett et al., 2014). Conducting a single case study allows further investigation into the subject and generates high-quality theory. Additionally, single case studies are inexpensive and not as time-consuming as multiple case studies, which seek the understanding of similarities and differences of multiple cases during the research process (Gustafsson, 2017).

Acquiring knowledge from participants about the implementation process of a newly implemented laptop program is an intention of the study. Participants were encouraged to explain views on the professional development training provided for the 1:1 laptop initiative and the utilization of the devices. The collection of in-depth firsthand experiences from teachers on the usage of a newly implemented 1:1 laptop program provided administrators with the information needed to prepare teachers for technology integration. Teachers can learn new technology related techniques, increase student learning, and determine specific areas for professional development from data collected in the study.

Role of the Researcher

The role of the primary investigator in the proposed study was an observer. The primary investigator is a second-grade teacher at the southern school district and maintains a professional relationship with the participants. Backyard research is the process of gaining insights from a researcher's work environment to understand a specific situation (Creswell, 2013b). Backyard research fits this study because the primary investigator may gain an in-depth understanding of teachers' perceptions, practices, and professional development in the recent implementation of 1:1 laptop devices. Gaining understanding may aid in supporting educators' usage of the 1:1 device. Because the primary investigator is a regular classroom teacher in the school district with no dual roles or administrative control over the participants, the use of backyard research did not deteriorate the reliability of the data or the validity of findings and conclusions.

The sample population was a southern rural school district known by the primary investigator. Familiarity with the school community and staff members validate emic perspective or insider view in qualitative research. Emic perspective, known as the insider's perception, is the views of a social group on a specific topic (Peters, 2018). Researching from an insider's perspective can either cause disputes and coercion or promote convenience and higher availability to participants. To eliminate issues of insider perspective, the primary investigator maintained a safe environment for both participants and followed ethical research guidelines (Heslop, Burns, & Lobo, 2018).

Qualitative research is an easy target for ethical, political, and methodological attacks. Researchers are encouraged to take appropriate steps to promote ethical guidelines in

research (Karagiozis, 2018). All ethical issues to protect the collected data were considered, addressed, and participants' confidentiality maintained. Steps to be taken to ensure bias does not occur in the study are obtaining expert review for data collection tools, respecting all participants throughout the study, and reporting honest data results. Declaration of the primary investigator's relationship with participants may promote the credibility of the study.

Research Procedures

The research procedures for this qualitative instrumental case study include the following sections: (a) population and sample selection, (b) instrumentation, and (c) data collection. A description of the population, sample, instrumentation, and data collection process follows. Each section provided detailed description of the study's procedures.

Population and Sample

The target population for the proposed study included certified pre-K-12 teachers who had taught at least one year in the southern school district before the implementation of the 1:1 laptops and was employed at least a year after implementation. Salingkat (2017) stated certified teachers are proficient in a specific educational component after completing a test directed by a certified institution. Certified possess the knowledge and experience needed to obtain in-depth and generalized information to answer the research questions (Palinkas et al., 2015).

The purposeful sampling method allows researchers to identify and select information-rich cases from individuals knowledgeable about a phenomenon or experienced in the area (Palinkas et al., 2015). Purposeful sampling was utilized in this study to seek detailed characteristics from certified teacher participants (Palinkas et al., 2015). A goal of the study was to have 25 to 30 participants complete and return the questionnaire and five to seven participants to participate in the focus group and the individual face-to-face interviews. Participants included teachers from elementary, middle, and high schools in a southern school district. The goal was to have at least three certified teachers from each school level for the proposed study.

Approval from the superintendent was necessary before the study commenced. The procedure

for recruiting and contacting participants started first with an email sent to the southern school district's superintendent. This email explained the purpose of the study and request permission to research the selected schools. After receiving approval from the superintendent, permission was requested from the three school principals (elementary, middle, and high) to conduct the study and to access teachers' email addresses.

Once the superintendent and principals approved the conduction of the study, teachers' introduction to the study was during a monthly staff meeting. Provided at the meeting were descriptions of the research and an invitation extended to certified teachers working in the district one year before the implementation of the 1:1 program. Inviting all certified teachers from the school district to participate in the study provided rich data on teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop program. Volunteers received an email to electronically select agree or do not agree to the study. A pseudo email was sent with the informed consent form after teachers agree to participate in the study.

Instrumentation

Instruments are tools used in a study to collect data. Selecting research tools are dependent on what the study aims to find and how the tool fits the purpose of the data collection process (de Trigueros & Sandoval, 2017). A questionnaire, a focus group, and individual face-to-face interviews were the data sources for collecting data in this qualitative case study. Subsequent sections include the detailed explanation and rationale for selecting the instruments.

Rationale for Not Using Observation

Observing teachers is one option for understanding how teachers use the newly implemented devices and how actions can alter the response to situations over time (Walshe, Ewing, & Griffiths, 2012). The use of observation as a data-collecting tool allowed the understanding of participants' in-depth thoughts, the type of professional development received, and the experiences encountered with the newly implemented 1:1 program. Additionally, observation was eliminated as an option to lessen the possibility of bias through the practice of the Hawthorne Effect. The Hawthorne Effect implies participants may modify performances during observation because of the focused attention (Sedgwick & Greenwood, 2015).

Questionnaire

A questionnaire may be administered to a specific target population with ease to obtain large volumes of data fast and in an inexpensive manner (Rice, Winter, Doherty, & Milner, 2017). The rationale for utilizing a questionnaire in this study was the flexibility offered through the use of administering the data collection process on a secured online medium. Participants could access the questionnaire at leisure. Utilizing a questionnaire design was best for this study, as the research did not impose on teachers' space using observation.

The questionnaire contained open-ended questions. Open-ended questions may allow respondents to respond with personal words, using unstructured responses, and not selecting answers from closed response items (Popping, 2015). The collection of original data not seized by closed questions promoted the rationale for using open-ended questions (Popping, 2015). Questionnaires encourage participants to respond to questions from personal perspectives and opinions. Participants received a pseudo email with a link and a password permitting access to the password-protected questionnaire, no direct contact was made with participants. A password ensured unauthorized access to questionnaire data is restricted. Included in the email was a timeframe for completing and returning the questionnaire. This study utilized an adopted questionnaire which used earlier with a group of high school teachers who engaged in a 1:1 laptop initiative study (Appendix C).

Adopted instrument. An instrument created for a research project by Dr. Damon McDonald (2015) was adopted into a questionnaire in this study. McDonald's research study entitled "One-to-One laptop initiative and perceptions of teachers and administrators." Permission was obtained from McDonald's questions from the instrument. The instrument was first used online by McDonald to collect data and provide accurate results from teachers about perceptions of a 1:1 environment. McDonald stated the instrument questions were open-ended and offered participants a chance to elaborate and follow up with information. McDonald's instrument was modified into a questionnaire form and contained open-ended questions to collect qualitative data from participants for this study.

McDonald's (2015) purpose for creating the instrument was to gain an understanding of teachers' and administrators' perceptions in a 1:1 initiative made the tool suitable for this research. The similarities with McDonald's and this study are both seek to understand

teachers' perceptions regarding 1:1 device implementation. The difference is, McDonald's study included administrators and focused only on high school teachers while only Pr-K-12 teachers received an invitation to participate in this research.

Need for expert review. McDonald (2015) did not clarify the piloting of the instrument before use. Two subject-matter experts in the field of technology checked the contents of the questionnaire for validity. Both reviewers have experience in the field of technology through profession and training.

Background on expert reviewers. One subject matter expert (SME) was the director of assessment and technology at a higher education institution. The SME completed a Bachelor and a Master of Science Degree in Industrial Engineering from Clemson University and holds a Ph.D. in Systems Engineering. The SME has experience in instructional technology, educational technology, technology support, digital literacy, and program assessment.

The second SME is a licensed educator who teaches in a Google school. The SME is experienced in instructional technology, Google classrooms, Schoology, NearPod, and other technology tools. The SME has further experience in the use of classroom technology, technology implementation, and technology-related professional development for daily instructional technology.

Questionnaire instrument expert review. Both SME analyzed the questionnaire instrument for alignment and made recommendations for improvement. Recommendations made by both experts were used to adjust the questionnaire to improve the quality of the data collection tool. Two main recommendations made by both experts were to formulate the questionnaire in a more manageable format from the original context. Additionally, the SME's encouraged the use of open-ended questions to promote the collection of qualitative data and highlighted grammatical errors. The feedback from the SME's was accepted, and the research tool modified to reflect the recommendations.

The revised questionnaire provided answers to the research questions and used the majority of Dr. McDonald's instrument contents. The cross-referencing of the research questions and questionnaire questions increased the integrity of the study. Questionnaire questions served the purpose of exploring teachers' perceptions and practices with the 1:1 program. Described in the tables below are the questionnaire questions, the rationale for the question, and the

related research questions. Table 1 asked participants to provide background information on the subject area and the level of engagement among students with the newly implemented 1:1 laptop program.

Table 1. Background Experiences of Participants

Questionnaire Questions	Rationale for question	Related Research Question	Question Letter/ Number
I primarily teach (subjects)	Understanding the discipline, the participants teach, how often students are allowed to use laptops at school and estimate how often students used device at home for school-related assignments.		A
On average, how many hours per week (during school hours) do your students use school-issued laptop computers?		Research Question Two	Q1
On average, how much time might students spend using a laptop at home to complete assignments from class?		Research Question Two	Q2

Table 2 correlates with research question one in gathering evidence on teachers' perceptions of students' engagement with laptop devices. Questionnaire questions three, four, and five provide responses to research question one. The rationale for the questions was to identify engagement with the laptop program.

Table 2. Teachers' Perceptions of Students Engagement

Questionnaire Questions	Rationale	Related Research Question	Question Number
How engaged were students after the laptop initiative?	Identifies engagement after laptop program	Research Question 1	Q 3
How engaged were students before the laptop initiative?	Identifies engagement before laptop program	Research Question 1	Q 4
Do you believe school-issued laptops have affected students' grades in the content area?	Identifies effects on student grades	Research Question 1	Q 5

Table 3 includes generated questions to understand laptops usage in classrooms and provide an answer for research question one and two (see Appendix C). Questions six, seven, and

eight provided responses to the research question two. Questionnaire question number nine provided responses to research question one.

Table 3. The Use of the 1:1 Program

Questionnaire questions	Rationale for question	Related Research Question	Question Number
Do you incorporate the use of laptops with the following activities in the classroom?	Discover how 1:1 program is used in the classroom.	Research Question 2	Q6
Do your students use the school-issued laptops for the following activities?	Discover different activities 1:1 program is used for in the classroom.	Research Question 2	Q7
On average, how many hours per week do you spend with school-issued laptops doing the following?	Determine the amount of time the 1:1 program is used in the classroom.	Research Question 2	Q8
When students come to class at the beginning of the school year, how prepared are students with using technology?	Identifying teacher's perceptions of student's preparedness.	Research Question 1	Q9

Focus Group

The rationale for using a focus group was to promote the collection of evidence from different participants on viewpoints through conversational exchanges. Focus groups are forms of interviews, which allow researchers to interview participants in a group setting with the interviewer in control of the line of questioning (Creswell, 2013a). Additionally, focus groups are essential in providing data on in-depth thoughts and feelings on circumstances from participants (Stalmeijer, McNaughton, & Van Mook, 2014). A focus group was beneficial for the collection of data from individuals in a natural setting (Heary & Hennessy, 2006).

Focus groups are fruitful in identifying data on new programs to assess strengths or

weaknesses (Villard, 2003). The use of a focus group provided pertinent information as participants exchanged relevant information to answer the research questions (Wutich, Lant, White, Larson, & Gartin, 2010). Participants selected for the focus group possess specific characteristics connected to a topic. The connection the topic participants possessed allowed the freedom to express points of view and offer indicators of the program's influence. Through the flexibility of questioning, group members can influence each other by responding to ideas and questions, not brought up (Villard, 2003).

The focus group collected rich data on the case after the return of all questionnaires. Adopted questions in the focus group were from Dr. Megan Knops (2017) previous study. Dr. Knops created the face-to-face interview protocol for a research dissertation entitled "Teachers' perceptions of professional development for 1:1 technology integration in an elementary school setting." Because focus groups are forms of interviews, the focus group questions came from Knops' face-to-face interview protocol.

The rationale for adopting Knops' (2017) face-to-face interview instrument for this study is the similarities and the purpose of both studies. Findings from the literature review, key terms from both studies, teachers' perceptions, and professional development with 1:1 device had a role in the instrument selection. Additionally, specific responses required to answer the research questions are factors for selecting Knops' instrument. Knops granted permission to use interview questions in the focus group.

Adopted instrument. Dr. Knops' adopted instrument was pilot tested and verified. Knops (2017) created the interview protocol questions using data gathered from an instrument in the study. The instrument was generated using Qualtrics software and pilot tested before used in the study. Knops' purpose for pilot testing the instrument was to determine if the items were clear, answered the research questions, and to determine the completion time. Graduate students writing a dissertation, faculty researchers, teachers, and administrators (participants not from the study) participated in the piloting of the instrument. Out of the eleven reviewers involved in the pilot study, eight reviewers responded to the instrument. Knops amended the instrument based on feedback individuals provided from the pilot study before actual usage in the research (Knops, 2017).

The main modification to Knops (2017) adopted face-to-face interview protocol was the

usage in the study's focus group interview. Open-ended questions used in the focus group interview collected short answers from participants allowing the opportunity to explore the topic in-depth (Weller et al., 2018). Because focus group interviews are in a group setting, responses may vary in length. Within a focus group, participants can share views and construct constructive solutions. The insider view of the school community and collaborative efforts for high achievement prompted the decision to conduct a focus group interview and individual face-to-face interviews.

A focus group ideal size is five to eight participants. Group restrictions of five to six people are encouraged when invited expert participants are passionate about a topic (Krueger & Casey, 2015). The attempt was to get eight participants to participate in the focus group interview. The focus group interview took place in a permitted conference room on the school premises outside of instructional time. Attention to communication among participants aided in stimulating the discussion (Stalmeijer et al., 2014). Probing questions are not included on the tables; all questions for the focus group are listed in Appendix B. Table 4 asked participants general information, grade level taught, experience (if any) with a 1:1 program, and confirmed a presence in the southern school district before the implementation of the 1:1 program.

Table 4. General Information

Focus Group Questions	Rationale for Questions	Related Research Question	Question Number
General information. Please tell me your name. What grade level do you teach? How many years have you been teaching? What device do you teach 1:1 with? How many years have you been teaching with 1:1 device?	Understanding participants' educational experience.	Background information	Q1 Q2
Were you working in the district prior to the implementation of the 1:1 program?	Understand teachers' perceptions of the newly implemented 1:1 device.	Research Question 1	

Some questions from the focus group correlate with questions in the questionnaire and aim to

understand teachers' use of laptop devices. Table 5 reflects questions, which aim to inquire about how participants were prepared for device usage. The questions explored first-hand experiences of teachers with the newly implemented 1:1 program is of importance.

Table 5. Preparation and Use of 1:1 Program

Focus Group Questions	Rationale for Questions	Related Research Question	Question Number
How were you prepared for the 1:1 program implementation introduced to you?	Understand how teachers were prepared to use the 1:1 laptop program.	Research Question 3	Q3
How do you use a 1:1 device in your instruction? What is the expectation of your administration for using a 1:1 device in the classroom?	Identify how teachers are using the newly implemented 1:1 device.	Research Question 2	Q4

Table 6 explores participants' perceptions of the impact the 1:1 program has on daily instruction. Question number five from the focus group provided responses to the question. The rationale for the question was to gain information on the influence of 1:1 programs.

Table 6. Impact of 1:1 Program

Focus Group Questions	Rationale for Questions	Related Research Question	Question Number
How does the presence of a 1:1 device impact your instruction?	Gain information on the influence of new laptop devices.	Research Question 1	Q5

Participants may first be encouraged to discuss involvement in any ongoing training for the newly implemented 1:1 program, the utilization of the program instructions, and the impact of the program in the classroom. The focus may shift to the professional development received in preparation for the program. Participants may be encouraged to provide more insights on the type of training, the length of the training, and the impact of the training. The type of professional development participants received or did not receive is shown in Table 7.

Table 7. Professional Development for 1:1 Program

Focus Group Questions	Rationale for Questions	Relate Research Question	Question Number
Question 6. Can you please describe the continued training you have received since implementing 1:1 device?	Explore training provided for teachers to implement the devices and by whom.	Research Question 3	Q6
Question 7. According to participants, what are the aspects of an effective 1:1 program implementation? What type of ongoing professional development?	Understand the types of ongoing training provided for teachers to implement the devices.	Research Question 3	Q7

Individual Face-to-Face Interviews

One *rationale for utilizing individual face-to-face interviews* is the promotion of data triangulation. Additionally, face-to-face interviews are valuable in providing researchers with opportunities to inquire into participants' lives with sensitivity (Castillo-Montoya, 2016). Brainstormed and evaluated interview questions encouraged participants to offer experiences one layer at a time (Castillo-Montoya, 2016). Face-to-face interviews are operative in producing brainstorming tasks (Guest, Namey, Taylor, Eley, & McKenna, 2017). Furthermore, face-to-face interviews are useful when participants can provide historical data; researchers need direct control over questioning, and observations may not answer research questions (Creswell, 2013a).

The face-to-face interview protocol included open-ended and probing questions to gather a profound understanding (Creswell, 2013b). Furthermore, questions were few in numbers to stimulate views and opinions from participants (Creswell, 2013b). Questions were adopted from Dr. Eric Shafer's (2017) study. Similarities in Shafer's and this study is the rationale for using the interview protocol. Shafer granted permission to use the interview protocol in the study.

Adopted interview protocol. Shafer (2017) stated the development of the interview questions started during the conduction of a capstone experience (small-scale pilot study) with

assistance from a dissertation committee. Questions added to the pilot study increased the depth and established meaning from teachers in the study (Shafer, 2017). Selected questions from Shafer's interview protocol were in a face-to-face interview protocol. Interview questions aided in developing an in-depth understanding of the case and increased validity in the study. Adopted questions were under three headings; (a) teachers' perceptions of 1:1 laptops, (b) teachers' practices with 1:1 laptops, and (c) teachers' training with 1:1 laptops. All three headings promoted the collection of rich data. Displayed in Tables 8, 9, and 10 are the questions participants utilized in the study, the rationale, and relation to research questions. Table 8 encourages teachers to explain perceptions towards 1:1 laptops.

Table 8. Teachers' Perceptions of 1:1 Laptops

Face-to-face Interview Questions	Rationale for Questions	Related Research Question	Question Number
How have laptops supported your way of teaching?	Explore teachers' perceptions of 1:1 laptop devices as it relates to teaching and attitude.	Research Question 1	Q1
How would you describe your attitude toward instructional technology (laptops) in regard to its role in education and as an instructional tool?		Research Question 1	Q2
What worked and did not worked using laptops in your instruction?		Research Question 1	Q3

Fourteen participants volunteered to provide data for the three sources of data tools utilized in this qualitative instrumental case study. All 14 participants completed the questionnaire, nine volunteered to participate in the individual face-to-face interviews, and six participants in a focus group. The data collection process started on December 3, 2019, through to January 3, 2020. Before the data collection process began, participants gained information about the study through a monthly staff meeting. Participants who met the criteria for the study and agreed to volunteer received a pseudo email as established in the research method. The email included an explanation of the study's future data collection and the informed consent form. Table 9 displays the breakdown of respondents to the questionnaire and level of qualification.

Table 9. Number of Participants and Qualification Level

Qualification Level	Number of Respondents	Percentage of Respondents
Certified Elementary Teacher	6	42.90%
Certified Middle Teacher	5	35.71%
Certified High Teacher	3	21.42%

Questionnaire

Thirty-two certified teachers received an invitation to participate in the study, with 43.75% (14 out of 32) responding to the questionnaire hosted on Survey Monkey. Response rates for the questionnaire started with two to four participants completing the questionnaire per day in the first week. After a week, the completion rates slowed down but increased again after the automatic questionnaire reminders. Of the 43.75% (14) participants who completed the questionnaire, 42.85% (six) agreed to participate in the focus group interview, and 64.2% (nine) agreed to participate in the individual face-to-face interview. All participants who responded to participate in the study completed the questionnaire by December 15, 2019. All participants who completed the questionnaire received an automatic email with an option to select preferred time for the focus group and individual face-to-face interview. Table 10 displays the number and percentage of participants who responded to each data collection tool.

Table 10. Number and Percentage of Participants for Each Data Collection Tool

Qualification Level	Number of Respondents	Percentage of Respondents
Questionnaire	14	100%
Individual face-to-face Interview	9	42.85%
Focus group	6	64.28%

Forming Focus Groups

Because of the time constraint, the participant agreed on two focus groups in order for the six participants who agreed to participate. The focus group schedule changed several times to ensure all participants were available for the selected time. The concluded scheduled the first focus groups with four participants and a second focus group with two participants. The first

focus group, which lasted one hour and 10 minutes, took place on December 16, 2019, in an approved conference room on the school grounds after school hours. Included in the first focus group were two certified pre-K teachers and two certified third grade teachers. Due to further time constraints, the second focus group, which lasted 50 minutes, was conducted later the same evening of December 16, 2019, via a telephone conference call and included a fourth and fifth grade teacher.

Individual Face-to-face Interviews

Individual face-to-face interviews were scheduled after the conclusion of the focus group interviews. Participants had an idea of time availability. Some of the scheduled times stayed the same, while some were changed. Of the nine participants who agreed to participate in the individual face-to-face interview, six were conducted face-to-face in the approved conference room on the school grounds after school hours. The other three individual interviews were conducted via telephone as participants preferred to participate in the comfort of personal homes long after school hours. The individual face-to-face interview comprised of seven questions and numerous probing questions. Conducted from December 17, 2019, to January 3, 2020, the interviews lasted between 30-45 minutes (see Appendix D).

Data collection included the use of an online questionnaire hosted in SurveyMonkey. After agreeing to participate in the study, each participant received an email with the link and password to the questionnaire. Participants were encouraged to write responses to the questionnaire questions then click submit after the completion of the questionnaire. Ten questions were included in the questionnaire. After the completion of the 14 questionnaires, the NVivo software secured the uploaded data and managed, organized, and configured the information. NVivo software analyzed the questionnaire responses and identified common themes.

One of the focus groups was face-to-face with the participants while the others via a telephone conference call. Out of the nine led individual face-to-face interviews, six were in-person and three via a telephone call. A USB Flash, 6165 Z voice, and the audio recorder recorded the two focus group interviews and the nine individual face-to-face interviews. Backup data included scribes taken throughout the interviews. The focus group comprised of seven questions and at least three probing questions on each. Included in the individual face-

to-face interview are seven questions and seven probing questions.

After the focus groups and individual interviews completion, the A USB Flash, 6165 Z voice, and the audio recorder stored the recorded data. The data were uploaded and transcribed in the NVivo software. Scribed collected during the interviews were used as a reference for clarification of any inaudible words or phrases which the transcription software did not capture. The transcribed data were read over while listening to the recording to ensure the transcription was correct.

Once the transcription and reading over process was over, the nine individual interview participants and the six focus group participants for member checking received the transcribed discussion in an emailed. Participants were encouraged to review and provide feedback on any potential error in the transcript. The returned data were then once again uploaded in NVivo software for coding.

Deviations from the original data collection plan include the number of focus group interviews and participants, the number of certified teachers, the research targeted, the location for the focus and individual interviews, and gathering demographics for the study. The first deviation was two focus group interviews conducted (one with four participants the other with two) from the original aim of one focus group with a maximum of eight participants. A second deviation included the target number of certified teachers in the school district. The initial goal was a target number of 25-20, but 32 certified teachers received an invitation to participate in the study. Of the 32 participants invited, 14 responded.

Deviation three was the location of the individual and focus group interview. Initially, the focus group interviews, and individual face-to-face interviews schedule were to take place in an approved conference room on the school grounds. Because of time constraints, one of the focus groups was via a telephone conference call, and three of the nine individual interviews were via a telephone call because of participants' preferences. A fourth deviation of the study was asking participants who did not participate in the focus group to complete the general information section to gather demographics for the study. There were no unusual events or significant circumstances during the data collection process.

The physical location of the participants originated from the diverse population of teachers

working in a rural school district in the southern part of South Carolina. The diversity of teachers included Africans, Americans, Indians, Jamaicans, and Filipinos. All these educators have taught in countries other than the United States. Educators possess knowledge and expertise in educating our future generation. The school district's population, according to the World Population Review (2019), most recent census updates estimated the total number of people was 1800. The town is diverse, with a population comprises of 81% Black or African American, 15% white, and 4% of other races. Concerning education, 8% of the population has earned a bachelor's degree (World Population Review, 2019). All participants in the study have at least a bachelor's degree, with some obtaining a master's degree.

Participants' Relationships

All participants share similarities of working in the school district one year before the implementation of the 1:1 laptop initiative and are certified to teach in South Carolina classrooms. Certified teachers who have experience in the case studied provided first-hand experiences on the device's usage, perceptions, what worked, what did not work, and further suggested strategies or ways to incorporate 1:1 laptop in schools. In addition, one of the participants' education includes a Masters in Instructional technology. With this participant's expertise in the classroom and knowledge from studying the topic, data provided may be valuable to any future 1:1 initiative. Teacher participants explained diversity in areas they have taught, the capacities they have worked in, and preferences.

Demographics

Participants in the study though working in a southern school district in South Carolina. All participants are from differentiated backgrounds and origins. Of the 14 participants in the study, 14% (two) were Jamaican origin teachers, 7% (one) Filipino, 21% (three) Indian, and 57% (eight) American teachers.

South Carolina, known to have a high teacher shortage. In the 2014-2015 academic year, 5,277 teachers left teaching positions to work in different districts or left teaching in general (Walker, 2019). This number has since increased as 7,000 teachers left the teaching profession in the 2018-19 school year (Walker, 2019). This shortage has affected the school districts and has forced administrators to hire international teachers. A presentation of

participants' years of teaching experiences is in Table 11.

Table 11. Participants Years of Teaching Experience

Participants	Years of Experience
1	10
2	5
3	18
4	6
5	Over 20
6	19
7	12
8	28
9	Over 30
10	11
11	Over 20
12	Over 20
13	4
14	15

Table 12 encourages participants to explain practices with 1:1 programs. Questions four and five from the face-to-face interview provided responses to the questions. The rationale for the questions was to understand how teachers used laptops in classrooms.

Table 12. Teachers' Practices with 1:1 Laptops

Face-to-face Interview Questions	Rationale for Questions	Related Research Question	Question Number
How do you use the laptops in your lessons?	To understand how teachers are using laptops in classrooms through given experiences.	Research Question 2	Q4
Tell me a story about using laptops in your classroom.			Q5

Table 13 encourages participants to explain acquired training with 1:1 programs. Questions six and seven of the face-to-face interview provide responses to the question. The rationale for the study is to understand how teachers use laptops in classrooms.

Table 13. Teachers' Training with 1:1 Laptops

Face-to-face Interview Questions	Rationale for Questions	Related Research Question	Question Number
Describe what your school has done to prepare you or support you with the 1:1 laptop implementation.	To understand how teachers are using laptops in classrooms through given experiences.	Research Question 3	Q6
What types of opportunities for learning about laptops have you been presented with?		Research Question 3	Q7

Data Collection

Any data collection method used in a study may promote the generation of large amounts of data (Sutton & Austin, 2015). This section explains the data collection process, data management, and data storage method. Three data sources for the study are an open-ended qualitative questionnaire, a focus group, and individual face-to-face interviews — Table 14 displays which data instrument may provide answers for the different research questions.

Table 14. Research Questions and Data Source

Research questions	Questionnaire	Focus Group	Face-to-face interview
Research Question One. What are PK-12 teachers' perceptions regarding the newly implemented 1:1 laptop program in the classroom?	X	X	X
Research Question Two. How do PK-12 teachers integrate the newly implemented 1:1 laptop program into classrooms to promote students' academic success?	X	X	X
Research Question Three. What professional training was provided to PK-12 to integrate the newly implemented 1:1 program into classrooms?		X	X

Open-ended Qualitative Questionnaire

The first sources of data were collected using the adopted questionnaire from McDonald's (2015) study to collect qualitative data. Participants received a pseudo email with an open-ended qualitative questionnaire to complete and return. Creswell (2002) stated web-based questionnaires have much software available for designing, gathering, and analyzing questionnaire data. SurveyMonkey hosted the questionnaire for this research.

The design of the open-ended qualitative questionnaire on SurveyMonkey permitted participants to expose personal identity. Participants received an email with a link and a password to access the password-protected questionnaire. Questionnaire deadline completion was visible in the email. Once participants click the link in the email and enter the password presented, the questionnaire opened and was ready for completion. Follow up reminder emails were sent one week after the initial email reminding participants to complete the questionnaire, if necessary. Survey Monkey stored the completed questionnaire data on a secured server with restricted access.

Focus Groups

Because participants maybe passionate about the topic, eight participants were the limit for the focus group. Limiting the number of participants for the focus group lessened the chance of excluding participants' participation during the interview session (Krueger & Casey, 2015). After the completion deadline for the questionnaire completion passed, a week after was the conduction of the focus group interview. Knops (2017) adopted (see Appendix B) face-to-face interview questions gathered data from pre-K-12 teachers in the focus group. The use of a focus group may provide answers to teachers' practices, opinions, and experiences during the 1:1 laptop program (Merriam & Tisdell, (2009). Participants signed informed consent forms for the focus group. The focus group interview protocol is as follows.

Focus group sessions are typically 60 – 90 minutes long, the scheduled time for the focus group was 60 minutes to assure all participants have a chance to provide personal experiences on the case (Leung & Savithiri, 2009). Before the focus group participants arrived, there was an appropriate arrangement of the room. Notepads, pens, and water were available at the focus group interview. Participants obtained information on how confidentiality and

anonymity maintained throughout the study to promote research ethics. A one-page document captured participants' signature. Signatures granted permission for recording the focus group. Once all participants agreed, the recorders switched on, and the focus group interview began.

Questions for the focus group were open-ended to allow participants to express perceptions, practices, and professional development with the use of a newly implemented 1:1 laptop program. A USB Flash, 6165 Z voice and audio recorder, was the recording device used to record the interview in the focus group. Storage for the recording device was at the private residence in a secure access code cabinet. The data will be available three years after the completion of the research. After the three years, the data will be burned to destroy any evidence of data collection. Anonymity and confidentiality were maintained with no access permitted to the storage cabinet.

Face-To-Face-Interviews

Face-to-face interviews were conducted a week after the focus group. Participants from the focus group received an invitation for individual face-to-face interviews. A relationship with the participants developed from the focus group interview, which prompted participants to volunteer for the interviews. Individual interview dates and time schedules depended on participants' availability. A maximum of six participants was the estimate for interviews. Participant's responses were recorded during the interview, while the interviewer notes. Participants were reminded of the time and venue for the interview one day before the scheduled time. On the day of individual interviews, the interviewer arrived early for the interviews. Once participants arrived, greeted, and received the interview protocol, the recording device was switched on, and the interview began after the signing of the informed consent form.

Study Data

To ensure the security of data, a Computer Assisted Qualitative Data Analysis Software (CAQDAS), NVivo software, was used in this study to house the questionnaire, focus group, and individual face-to-face interview data. Researchers who need to organize and analyze an extensive diversity of data use NVivo software. Data organization includes documents, audios, images, and videos (Edhlund & McDougall, 2019). Organization of the collected data

were prepared through the use of the NVivo software, which may aid in less time spent on the analysis process and boosting the accuracy of data findings (Zamawe, 2015). The NVivo software managed all collected data to include audio and transcripts in one area. Additionally, NVivo provided security, and ethical concerns research necessitates.

Best practices in research include a debriefing procedure for participants close to the end of a study. Debriefing requirement is necessary for studies, which employ deception or used as an educational tool (University of Massachusetts Amherst, 2015). Close to the end of the study, participants participated in an exit debriefing session. The hosting of the debriefing session took place in a conference room at the school district. The session was an educational tool for teachers and administrators. All participants were engaged in an informative explanation of the study's purpose, data collection methods, and the rationale for the research design. Participants received data from the study's findings (University of Massachusetts Amherst, 2015). The study ended after no follow-up procedures were outstanding.

Data Preparation

Preparation of the collected data took place before the collected data analysis. Respectable preparation of data is vital before the data analysis process starts (Spruit, Dedding, & Vijlbrief, 2020). Data preparation began with the categorizing of data for each participant group. Focus group, questionnaire, and individual face-to-face responses were first separated in prospective participant groups, next by individual participant responses. First, the separation of the focus group, questionnaire, and face-to-face interview were organized and categorized into different participant groups: elementary teachers, middle school teachers, and high school teachers. Transcript preparation occurred after the interviews.

Data Analysis

The use of a content analysis approach aided in understanding data through coding and recognizing themes. Content analysis is not linked to one specific science as it arranges and produces meaning from data collected to draw sensible conclusions (Bengtsson, 2016). Three approaches to content analysis are conventional content analysis, direct content analysis, and summative content analysis. All three approaches have a specific goal.

The goal of conventional content analysis describes a phenomenon. The direct content

analysis extends a theoretical framework or theory, and the summative content analysis identifies and quantifies specific words or content in a text to comprehend the background use of the words or content (Hsieh & Shannon, 2005). This study used conventional content analysis. The use of conventional content analysis provided direct access to information from participants. Direct access promoted the understanding of the specific phenomenon and aided in defining codes derived from the data collection process during data analysis (Hsieh & Shannon, 2005). Additionally, the conventional content analysis may be beneficial to this study by gaining quality information through the process.

Questionnaire Analysis

Data collected from the questionnaire incorporated electronic open coding (Saldaña, 2009). After preparing and uploading the raw data, the NVivo software stored the content. The NVivo software stored, manage, organize, and configure the data (Saldaña, 2009). Online questionnaire results were reviewed and analyzed in the NVivo software. Open coding promoted the analysis of each question and identification of common themes emerging from the data.

Identified themes were pre-coded by color-coding significant words or phrases (Saldaña, 2009). Themes and ideas were coded independently in small portions using conventional content analysis. Common themes determined by keywords and word repetition aided in creating parent and child nodes in NVivo software. The succeeding chapter presents a discussion of the data analysis.

Focus Groups and Individual Face-to-face Interview Analysis

Before the focus group and individual face-to-face interviews, data analysis began; spoken words from both data collection tools recordings were converted into written words to simplify the analysis (Sutton & Austin, 2015). An online professional transcription service converted the recordings from both data instruments separately and individually. After the completion of the transcriptions, the data were simultaneously read and listen to the original recordings of the focus group and individual face-to-face interview transcriptions separately and make necessary corrections (Sutton & Austin, 2015). Corrected transcriptions were uploaded in the NVivo software, reviewed, and the focus group and individual face-to-face

interviews result analyzed.

Open-end coding allowed the analysis of the data and the identifying of common themes emerging. The themes identified were pre-coded by color-coding significant words or phrases (Saldaña, 2009). Themes and ideas were coded independently in small portions until completed. Common themes allowed the creation of parent and child nodes using conventional content analysis. Open coding prompted the presented the characteristics of each separate data (Saldaña, 2015). Conducted in this study is a holistic analysis of the collected data for the case. A holistic approach promoted the reflection on how data from each data source relate to each other (Yazan, 2015). With the holistic analysis, there was a comparison between the questionnaire and the focus group data interrelations. The NVivo software noted the similarities and differences (if any).

Ethical Procedures

Qualitative research requires ethical procedures. Researchers who care about ethical concerns encourage integrity in studies. The disclosure of the primary investigator's role as a second-grade teacher at the southern school district aided in eliminating potential bias in the study. All participants received an informed consent form. Participants had an option to withdraw from the study without penalty after the signing of the form. Included in the informed consent forms are the study's purpose, type of study, the method to be used, requirements, threats, problems, results, and distribution (Petrovic, 2017). There was no coercion of participants to participate in the study. The research interferes with regular school hours. The use of pseudonyms sustains participants' anonymity.

Ethical concerns due to human subjects are of paramount importance (Yazan, 2015). Descriptors not easily identified protected the participants and the school after the presentation of the research. Experts in the field of educational technology checked the validity of the questionnaire. Two neutral educators reviewed the open-ended qualitative questionnaire questions to lessen bias in the study before requesting IRB approval. The focus group interview utilized Knops (2017) face-to-face interview, which was piloted and verified before use. Individual face-to-face interviews adopted from Shafer (2017) were pilot tested and confirmed before use. A password-protected cabinet stored the collected data. Participants were notified of the completion of the research process and offered a copy of the

study. Collected data will be kept for a minimum of three years and destroyed after the specified time.

Chapter Summary

Outlined in the preceding chapter is the methodology implemented to explore PK-12 teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop program. Provided during the study was a thorough explanation of the researcher's role and functions. The research procedures section provided the sample population and desired participants for the study. Questionnaires, a focus group, and individual face-to-face interviews are the three data collection tools used in the study. A comprehensive explanation of the data collection tools is in the instrumentation section of the study.

The use of tables announced the questionnaire, focus group, and individual face-to-face interview questions. Techniques used for data preparation and analysis were shared. To ensure the reliability and validity of the study, the study was credible, transferable, dependable, and confirmable through the use of triangulation, member checking, thick description, peer-reviewed, and the practice of reflexivity. Protocols were used to assist in creating trustworthiness in a qualitative study and ethical procedures incorporated to avoid bias in the study.

The following chapter presents an introduction and a summary of the findings. Findings included themes emerging from the data collection process. Data displayed in the results were text; the description of participants was in the form of pseudonyms and specific answers provided for each research question.

Citation

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CHAPTER 4: FINDINGS FOR TEACHERS' PROFESSIONAL DEVELOPMENT IN TECHNOLOGY INTEGRATION

The results explain research findings from a questionnaire, individual face-to-face interviews, and a focus group protocol. Findings fulfilled the purpose of this qualitative instrumental case study. The organization of the results includes a review of the purpose of the study and the research questions. Data collection, data analysis, responses to the research questions, and themes identified from the results follow. Included in the chapter are the reliability, validity, and a summary.

The purpose of this qualitative instrumental case study was to explore pre-K-12 teachers' perceptions, practices, and professional development with a newly implemented 1:1 laptop program. Utilized in this study were a questionnaire, a focus group, and individual face-to-face interviews to collect. Participants in the study were certified teachers throughout the school district ranging from grade levels pre-K-12. All participants taught at least one year before the one-on-one (1:1) laptop implementation in the district. Research questions for the qualitative instrumental case study, are as follows:

Research Question One. What are pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in the classroom?

Research Question Two. How do pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success?

Research Question Three. What professional training was provided to pre-K-12 to integrate newly implemented 1:1 device into classrooms to promote students' success?

Results from the data collection tools revealed individualized learning, teacher involvement, providing support, and quality resources are significant attributes to a 1:1 laptop initiative. Subthemes emerging from the study were student engagement and specific training. The themes and subthemes aided in understanding teachers' voices in a 1:1 program.

Data Collection

Fourteen participants volunteered to provide data for the three sources of data tools utilized in this qualitative instrumental case study. All 14 participants completed the questionnaire, nine volunteered to participate in the individual face-to-face interviews, and six participants volunteered for a focus group. The data collection process started on December 3, 2019, through to January 3, 2020. Before the data collection process began, participants were informed about the study through a monthly staff meeting. Participants who met the criteria for the study and agreed to volunteer received a pseudo email as established in the methodology. The email included an explanation of the study's future data collection and the informed consent form. Table 15 displays the breakdown of respondents to the questionnaire and level of qualification.

Table 15. Number of Participants and Qualification Level

Qualification Level	Number of Respondents	Percentage of Respondents
Certified Elementary Teacher	6	42.90%
Certified Middle Teacher	5	35.71%
Certified High Teacher	3	21.42%

Questionnaire

Thirty-two certified teachers received an invitation to participate in the study, with 43.75% (14 out of 32) responding to the questionnaire hosted on SurveyMonkey. Response rates for the questionnaire started with two to four participants completing the questionnaire per day in the first week. After a week, the completion rates slowed down but increased again after the automatic questionnaire reminders. Of the 43.75% (14) participants who completed the questionnaire, 42.85% (six) agreed to participate in the focus group interview, and 64.2% (nine) agreed to participate in the individual face-to-face interview. All participants who responded to participate in the study completed the questionnaire by December 15, 2019. All participants who completed the questionnaire received an automatic email with an option to select a preferred time for the focus group and individual face-to-face interview. Table 16 displays the number and percentage of participants who responded to each data collection tool.

Table 16. Number and Percentage of Participants for Each Data Collection Tool

Qualification Level	Number of Respondents	Percentage of Respondents
Questionnaire	14	100%
Individual face-to-face Interview	9	42.85%
Focus group	6	64.28%

Focus Group

Because of the time constraint, the participants agreed on two focus groups for the six participants who agreed to participate. The focus group schedule was changed several times to ensure all participants were available for the selected time. The finished schedule included the first focus group with four participants and a second focus group with two participants. The first focus group, which lasted approximately one hour and 10 minutes, took place on December 16, 2019, in an approved conference room on the school grounds after school hours. Included in the first focus group were two certified pre-K teachers and two certified 3rd grade teachers. Due to further time constraints, the second focus group, which lasted approximately 50 minutes, was conducted later the same evening of December 16, 2019, via a telephone conference call and included a fourth and fifth grade teacher.

Individual Face-to-face Interviews

Individual face-to-face interviews were scheduled immediately after the conclusion of the focus group interviews. Participants had an idea of time availability. Some of the initially scheduled times stayed the same, while some were changed. Of the nine participants who agreed to participate in the individual face-to-face interview, six were conducted face-to-face in the approved conference room on the school grounds after school hours. The other three individual interviews were conducted via telephone as participants preferred to participate in the comfort of personal homes long after school hours. The individual face-to-face interview comprised of seven questions and numerous probing questions. Duration of the interviews was between 30-45 minutes and was conducted from December 17, 2019, to January 3, 2020. Data collection included the use of an online questionnaire hosted in SurveyMonkey. After agreeing to participate in the study, participants received an email with the link and password to the questionnaire. Participants were encouraged to write responses to the questionnaire

questions then click submit when they had completed the questionnaire. The questionnaire comprised ten questions. After the completion of the 14 questionnaires, the NVivo software secured the uploaded data and managed, organized, and configured the information. NVivo software analyzed the questionnaire responses and identified common themes. One of the focus groups was conducted face-to-face with the participants while the other via a telephone conference call. Out of the nine led individual face-to-face interviews, six were in-person and three via a telephone call. A USB Flash, 6165 Z voice, and the audio recorder recorded the two focus group interviews and the nine individual face-to-face interviews. Throughout the interviews, notes were scribed for backup data. The focus group comprised of seven questions and at least three probing questions on each. Seven questions and seven probing questions comprised the individual face-to-face interview. After the focus groups and individual interviews were completed, the USB Flash, 6165 Z voice, and the audio recorder saved, and the recorded data were uploaded and transcribed in the NVivo software. Scribed collected during the interviews were used as a reference for clarification of any inaudible words or phrases which the transcription software did not capture. The transcribed data were read over while listening to the recording to ensure the transcription was correct. Once the transcription and reading over process were over, the nine individual interview participants and the six focus group participants received the transcribed discussion for member checking. Participants were encouraged to review and provide feedback on any potential error in the transcript. The returned data were then once again uploaded in NVivo software for coding.

Deviations from the original data collection plan include the number of focus group interviews and participants, the number of certified teachers, the research targeted, the location for the focus and individual interviews, and gathering demographics for the study. The first deviation was two focus group interviews conducted (one with four participants the other with two) from the original aim of one focus group with a maximum of eight participants. A second deviation included the target number of certified teachers in the school district. The initial goal was a target number of 25-20, but 32 certified teachers received an invitation to participate in the study. Of the 32 participants invited, 14 responded yes to participate in the study. Deviation three was the location of the individual and focus group interview. Initially, the focus group interview, as well as individual face-to-face interviews, was to be conducted in an approved conference room on the school grounds. Because of time constraints, one focus group was via a telephone conference call, and three of the nine individual interviews were via a telephone call because of participants' preferences. A fourth

deviation of the study was asking participants who did not participate in the focus group to complete the general information section to gather demographics for the study. No unusual events or significant circumstances were encountered during the data collection process. The physical location of the participants originated from the diverse population of teachers working in a rural school district in the southern part of South Carolina. The diversity of teachers included native Africans, Americans, Indians, Jamaicans, and Filipinos. All the educators taught in countries outside the United States and possessed knowledge and expertise for educating the future generation. According to the World Population Review (2019), the most recent census update estimated the population at 1,800. The diverse town comprises of a population of 81% Black or African American, 15% white, and 4% of other races. Concerning education, 8% of the population has earned a bachelor's degree (World Population Review, 2019). All participants in the study have received at least a bachelor's degree, with some obtaining a master's degree.

Participants' Relationship

All participants share similarities of working in the school district one year before the implementation of the 1:1 laptop initiative and are certified to teach in South Carolina classrooms. Certified teachers who have experienced the case studied can provide first-hand experiences on the usage of devices, perceptions, what worked, what does not work, and further suggest strategies or ways to incorporate 1:1 laptop in schools. In addition, one of the participants' education includes a Masters in Instructional technology. With this participant's expertise in the classroom and knowledge from studying the topic, data provided may be valuable to any future 1:1 initiative. Teacher participants explained diversity in areas they have taught, the capacities they have worked in, and preferences.

Demographics

Participants in the study though working in a southern school district in South Carolina. All participants are from differentiated backgrounds and origin. Of the 14 participants in the study, 14% (two) were Jamaican origin teachers, 7% (one) Filipino, 21% (three) Indian, and 57% (eight) American teachers. South Carolina, known to have a high teacher shortage; in the 2014-2015 academic year, 5,277 teachers left teaching positions to work in different districts or left teaching in general (Walker, 2019). This number has since increased as 7,000

teachers left the teaching profession in the 2018-19 school year (Walker, 2019). This shortage has affected the school districts and has forced administrators to hire international teachers.

Data Analysis

Data collected from the questionnaire, focus group, and individual face-to-face interviews were reviewed and analyzed to reveal the findings of the study. To ensure the data were confidentially secured, the study used the following process. A locked cabinet stored all hard copy documents to include the USB Flash 6165 Z voice and audio recorder, scribed data from the focus groups, and individual interviews. Stored data will be available for a minimum of three years after the completion of the study. Once the three-year period has passed, the stored data will be destroyed. Soft copy data stored electronically are password accessible with the sole individual with access to the data being the primary investigator. All soft copy data were backed up electronically in multiple locations. The use of pseudonyms for each participant and recognizable characters removed from documents to safeguard further and protect participants' identities. During the transcription process, the school's name, or any individual's name, mentioned in the interviews or focus group, was edited to pseudonyms. Individual interviews and focus group discussions coded to safeguard the participants' unrecognizably. Codes used random numbering, and the initials of the school level the participant works are as follows: ES = Elementary School, MS = Middle School, and HS = High School. Documentation of themes emerging from the data required the use of this type of coding to protect the secrecy of the participants.

Data Preparation

The data preparation for analysis began with the transcribing of the focus group and individual interviews from the USB Flash, 6165 Z voice, and audio recorder in the NVivo software. Transcribed data were downloaded in a Microsoft document and sent to each participant for member checking. Participants were given seven-day turnaround time and encouraged to review and provide feedback on potential errors in the transcript. Responses came back from participants with no errors found or necessary changes. Once replies from the participants were received, there was an initial categorization of the data collection tools into separate folders.

The initial separation of data was organized and categorized by three data collection tools a questionnaire, individual interviews, and focus group. After data collection groups were categorized, a separate analysis of the school level in which the teachers worked displayed responses. All elementary teachers, middle school teachers, and high school teachers' responses were in a separate folder. By grouping the data according to the school level, the teachers' work may provide a specific connection with the questions, responses, and type of experience teachers at a different level of the school had.

Coding and Identifying Themes

The use of a conventional content analysis approach promoted the understanding of the data through coding and identifying themes. Utilizing a conventional content analysis approach may provide direct access to the participant's information to understand the case study while defining codes (Hsieh & Shannon, 2005). Collected data from the questionnaire, focus group, and the individual face-to-face interviews were reviewed, categorized, and coded. Individual face-to-face and focus group interviews were re-listened to ensure written transcript content was accurate and free of errors. All the transcribed data from the two focus groups and the nine individual interviews amounted to over 80 pages. The data received coding and themes identified. Identified themes are individualized learning, teacher involvement, providing support, quality resources, and necessary supplemental tool. Subthemes, which emerged from themes, are student engagement, teachers' needs, and specific training. Two separate steps utilized in the coding process (Saldaña, 2015). Saldaña (2015) states it is rare for researchers to complete coding after the first attempt. The first coding process summarized different segments of the data.

The three research questions were utilized and identified as research question one, research question two, and research question three. Each research question had a related question in the three data collection tools. Open coding promoted the analysis of each question and identification of common themes emerging from the data. The use of common themes prompted the creation of parent and child nodes. Observed during the first coding cycle were distinct ideas and categories. Transcripts were color-coded with three different colors to highlight which research question the response answered (Saldaña, 2009). Responses to research question one was color-coded in red, research question two was color-coded in blue, and research question three was color-coded in yellow. Color codes utilized displayed

differentiated each idea and category. During the second cycle of coding, patterns observed to aid in the analysis of the data (Saldaña, 2015). Pattern coding was not in the initial plan for the study, but an indication from Saldaña described the appropriateness of utilizing pattern codes for developing major themes. The research method initial plan focused on open coding to identify themes, but the prominence of patterns in the data stimulated the use of pattern coding. Similarities, differences, and frequencies in responses are some of the patterns, which emerged from the data (Saldaña, 2015).

The coding cycle was related to each question in the three data collection tools. Research question one relates to nine questions overall with three questions from the individual face-to-face interviews, two from the focus group interview, and four from the questionnaire. Seven questions overall were related to research question two, one from the individual face-to-face interview, one from the focus group, and five from the questionnaire. Five questions overall were related to research question three, two from the individual face-to-face interview, and three from the focus group interview. To further break down the coding, each question was assigned a letter code. Table 17 displays an example of the coding process for all three data collection tools with a letter to match the research question and answers. Example, all questions related to research question one was given the code A. All questions related to research question two were given the code B. Questions related to research question three were given the code C. Utilizing this code in the second process of coding promoted the categorizing of all responses related to research question one under code A.

Table 17. Research Question One: What are pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop device in the classroom?

Individual face-to-face interview questions	Rationale for question	Related Research Question	Code
How have laptops supported your way of teaching?	Explore teachers' perceptions of 1:1 laptop devices as it relates to teaching and attitude.	Research Question 1	A
How would you describe your attitude toward instructional technology (laptops) regarding its role in education and as an instructional tool?		Research Question 1	A

Simultaneous coding was utilized in the data analysis process to capture responses from participants, applicable to more than one research question. Coding, which applies two or more codes within a single datum, is term simultaneous coding (Saldaña, 2015). Codes created by the data and later deemed as outliers or irrelevant were collapsed and eliminated. Natural codes emerged from data, which eliminated the use of preset codes. Lewis (2009) stated researchers sometimes have a certain theory or perspective of how data support a study. Ignoring data, which does not support this theory, is termed discrepant data. The study was free of preconceived theory about the outcome of the study and presented the data collected in a neutral manner were held.

Results

Major themes, which emerged from the data were: (a) individualized learning, (b) teacher involvement, (c) providing support, (d) quality resources, and (e) necessary supplemental tool. Subthemes, which emerged from themes, are student engagement, teachers' needs, and specific training. The theme of individualized learning provides an answer for research question two: (a) teacher involvement, (b) providing support, (c) quality resources, and (d) specific training overlap and address research question one and research question two. Table 18 displays the themes and subthemes, which emerged from the questionnaire, individual face-to-face interviews, and focus groups. Some descriptive comments from participants are shown in Table 18.

Research Question One

Examined in research question one was pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in the classroom. Codes which emerged from this examination are greater participation in class, enforcing concepts, differentiated instructions, empowerment for students, working at own pace, responsible for own learning, accessibility to curriculum, positive reinforcement, and necessary tool for future developments. Additional codes which emerged from examining teachers' perceptions toward the newly implemented 1:1 laptop devices are gratefulness for devices, positive benefits, excitement, enjoyment, better classroom management, engaging, need training, need teachers input, need support from technology administrators, one-to-one engagement, and increased motivation and interest in students. The themes, which emerged for research,

question one, are a necessary supplemental tool, individualized learning, providing support, quality resources, and teacher involvement.

Table 18. Themes, Subthemes, and Descriptive Comments from Participants

Themes	Subtheme	Some descriptive comments by participants
Providing support	Specific training	-We have not received any continuing training -We need to educate our parents to make them feel comfortable with the devices - I feel some in-depth training over a long period of time is necessary - The training provided does not really apply to a language classroom very well
Necessary tools for educational development		-Well I think the laptops are an excellent instructional supplemental tool to help close the gap in education -Technology is everything now -Technology is the way of the future -The laptops act as a support to enforce concepts that I teach
Teacher involvement	Teachers' needs	-Find out what is it that we need to know -What is our challenge -what is it we need to integrate the laptops -Allow teachers to experiment and then come back to discuss what works and what does not work
Individualized learning	Student engagement	-School issued laptops gave students the opportunity to be learning at their own pace. -Extend learning beyond the four walls of the classroom -Students are more engaged -Students have a higher level of interest in learning
Quality resources		-We need better devices with better quality -We need state of the art devices something that's durable -The computers are not on the cutting edge and the service can be a high challenge of time

Necessary supplemental tool. The importance of having 1:1 laptop devices throughout the school district emerged as a theme when examining teachers' perceptions and practices with the newly implemented devices. Allowing students to gain experiences of the future was a

significant factor in implementing laptops in the school district. Discussion with almost all participants revealed excitement, positive energies, and comfort with the presence of the devices. One pronounced detail shared was how classes were more manageable with the utilization of 1:1 laptops.

In the individual face-to-face interview participant, ES9 explained the usage of 1:1 laptops in every aspect of the daily schedule. From the experiences of ES9, the newly implemented 1:1 laptops are, "an excellent instructional supplemental tool which helps in closing the educational gap." Additionally, ES9 beliefs were repeated by ES3, who agreed the 1:1 laptops "are great supplemental tools." Emphasized by ES9 is, "the laptops should be utilized after a concept is taught, which will allow students to learn some self-supporting skills on own." The participant ES9 demonstrated high support for 1:1 devices in schools and stated, "We use our laptops religiously; it is the first thing on in the mornings from the onset and throughout the day."

During several of the individual, face-to-face interview participants spoke about the positive effects of 1:1 laptops in the classroom. HS10 stated, "Technology is everything and as such should be integrated in schools from as early as first grade." HS10 shared a personal experience of an offspring. The comment was, "The era we are living in requires the use of technology, my son didn't have computer science in his curriculum but as people come to hire for internship, they are asking for computer practices." MS7 had a similar statement as to HS10. MS7 stated, "I'm all for technology because it is the way of the future." Explanations provided by participants revealed there was a need for 1:1 devices in today's classroom. Children receive exposure to technology devices at home, technologies are utilized in the workforce, and students should get the same exposure at school to technologies.

Participants in the focus group, when asked, what was your initial reaction when you heard you were going to get 1:1 devices shared appreciation for the newly implemented 1:1 devices. ES9 shared, "After seeing how students' academic results were low, any help provided welcomed to get students to the level they should be." ES11 shared, "I was excited as I felt like the laptops will help with individualized learning, especially with so many of my kids on different levels." ES3 shared, "I felt some level of excitement because we're in the twenty-first century where technology plays a vital role." Table 19 provides direct quotes from participants' responses to questions related to research question one.

Table 19. Relevant Quotes from Participants Research Question One

Data Collection Tool	Question	Participants Response
Individual Face-to-Face Interview Question # 1	How have laptops supported your way of teaching?	"Oh my God, tremendously. It's just so easy to access any and everything while you're teaching. You know you can do lessons, whole group from your laptop and with the new curriculum which is World of Wonders all the pieces that you can get physically is also online. It just makes the lesson flows smoothly." (Participant, ES14)
Questionnaire Question # 10	Feedback- Please use this opportunity to offer any opinion and/or advice about your experience on 1:1 technology in your school. Your comments will be anonymous and much appreciated.	"My opinion on experiencing 1:1 technology school is that, it is an essential development program in this emerging technological world. It really helps our students on college and career readiness." (Participant, HS4)

Individualized learning. During the utilization of the newly implemented laptops, students engaged in individualized learning. Each child worked independently on areas needed practice while the teacher had a chance to focus on students who needed additional assistance. Students had access to the curriculum and gained immediate feedback from the programs the school district had purchased. Teachers were able to reassign the task to students who needed extra practice or increase students' rigor to the next level. Students were encouraged to work in small and whole-class activities. Interactive games, educational portals, and working at own pace were some positive factors coming out of the 1:1 laptop initiative. More students were excelling with the use of the 1:1 devices; students were more motivated and interested in academia. The independence student embraced the experience received through the 1:1 program. Students were engaging teachers in further discussion on topics taught and what they had discovered independently.

Participants in the study described how the implementation of the 1:1 laptops promoted individualized learning in classrooms. Participant MS7, in the individual face-to-face interview, shared, "Laptops support my way of teaching because they allow me to

differentiate instruction and allow students to learn at own pace for personalized learning." MS7 shared, "Level up tutorials are used by students to review concepts and create presentations, the tutorials also aid in finding solutions online which help them to further grasp concepts." During the completion of questionnaire, MS7 shared, "Laptops have given students more opportunities for success and the ability to personalize the learning so that they work on tasks on level." In an individual face-to-face interview, ES11 shared, "Our students learn in different ways, and the 1:1 laptop initiatives help with individualizing learning." To add to the individualize aspect, ES11 shared, "students and teachers get immediate feedback on students' progress." Accessing immediate feedback promoted the positive enhancements the laptops had in the classroom. ES11 expounded, "Classrooms today consist of students on many different levels which makes it hard for one teacher to reach every child at once; having the 1:1 devices allows teachers to assign task on students' level and check in with them….if necessary do some re-teaching and reassign the task for additional practice".

Student engagement. Further analysis of the data indicated the subtheme of student engagement. This subtheme emerged during the identification process of the presence of 1:1 laptops in the classroom. Throughout the utilization of 1:1 laptops, students were more engaged and responsible for learning. Teachers would assign tasks already taught in class for reinforcement and additional practices. The use of 1:1 laptops encouraged students to explore different ways to figure out solutions to problems. Questions three and four of the questionnaire, which asked participants to state how engaged students were before and after the implementation of the laptops received positive feedback from participants. Participant ES8 shared, "students are more engaged and have a higher level of interest in learning with the use of the 1:1 laptops". ES8 expounded, "Students were more motivated and utilized the devices to improve academic ability." Similar responses received from other participants revealed students' engagement increased after the implementation of the 1:1 laptops initiative. MS7 shared, student engagement increased from 70% - 95%, and HS10 shared engagement increased from 50-80% after the implementation of the laptop devices.

Providing support. Having a strong support system for teachers, parents, and students was a theme, which emerged from the examination of the case. Participants felt the need for training before, during, and after the implementation of the 1:1 laptop devices. Providing teachers with a technology department with skilled professionals in the field was the request of most participants. Additionally, participants felt the response time was too long when

teachers reached out for help from the meager technology team available in the district. Support from the technology department was, in most cases, limited as teachers who were less technologically savvy needed more support.

When participants were asked if there was any additional information they would like to share in the focus group interview, responses included better training for teachers and the need for available technology assistant personal. ES11 shared, "Better training should be implemented for teachers and students for the overall usage of the 1:1 laptop devices". ES9 agreed with ES11 and provided a scenario which linked to the overall belief of how the 1:1 laptop devices should be introduced and utilized. ES9 stated, "It's like having a vehicle, if you put the engine oil in your vehicle and change it like you're supposed to, you expand the life of the vehicle." Teachers shared the overall usage of the laptops cannot be experienced if teachers did not receive training to use the devices. When asked in the questionnaire tool to provide feedback or offer devices about the experience with 1:1 laptops, HS4 suggested, "Please have the technology assistant person available in school every day."

Specific training. Findings coming out of this subtheme were teachers felt the need to acquire training specific to the subject they teach. Teachers who taught languages and sciences expressed the need. Teachers thought it would have been more beneficial for them as some of the training received was general and did not go well with subjects. Participant HS12 described in an individual interview the type of master's degree possessed and how the training received impacts the subject area taught. HS12 shared, "A lot of the support provided doesn't really apply to a language classroom very well but is appropriate for a lot of the other classes." HS12 further explained, "More specific training focusing on the subjects taught would be helpful."

Quality resources. Emerging for the examination was the need for quality resources. The durability of the laptop devices, which were purchased, was a cause of concern. Some students' device stopped working after a while. Some devices froze up and took some time to go back to normal. Students were given the laptops without any protective casing to secure them in which led to further damage. This lack of protective casing which secure the device and charger posed a problem for students. Laptops selected for the 1:1 initiative were not considered by teachers to be child-friendly in terms of durability and dependability. Participants shared in the focus group interview the need for quality resources. ES14

suggested, "We need better devices with better quality." A similar concern shared by ES14 in an individual interview is, "We need devices with better quality." ES9 shared, "The computers are not on the cutting edge, and the service can be a high challenge on time; in other words, there is a lot of work to be correctly done."

Teacher involvement. The degree in which teachers are engaged in daily instructional activities, knowledge about students' motivation and interest, and the role teachers play in the educational development of children prompted the emergence of the theme teacher involvement. All participants, whether they participated in the questionnaire, individual face-to-face interview, the focus groups, or all three data collection tools, shared beliefs concerning the need for involving teachers before, during, and after any implementation process of 1:1 programs. Teachers were introduced to the initiative after the devices were already purchased and were given the devices to utilize in classrooms.

All members of the focus group agreed with participant ES14, who shared, "We were not involved in the device selection, we were not asked if we had any request for training or if we felt comfortable integrating the laptops in our classroom." ES3 shared, "The laptops were just delivered to the classrooms." The second focus group provided a similar response to teachers' involvement as participants ES8 and ES5 responded, "We were not involved at all in the selection of the devices they grade level received."

Teacher needs. A subtheme emerged from the findings concerning the needs teachers possess as it relates to 1:1 laptop devices. Administrators implementing these devices should allow teachers to voice needs as it relates to training, types of devices, and the quality devices required. Another requirement for several of the participants was for the school district to block inappropriate sites so students could not access them on the laptops.

Participant HS10 shared, "My personal opinion is the district has to block some sites like YouTube." HS1 shared, "Restrict any websites that students use for cheating on assessments." Overall, the individual face-to-face interview responses from the nine participants who participated in the study had a positive attitude toward laptops as an instructional tool. Table 20 provides participants' response to interview question two, how would you describe your attitude toward instructional technology (laptops) regarding the role in education and as an instructional tool.

Table 20. Participants' Description of Attitude toward Instructional Technology (laptop)

Participants	Description of attitude towards laptops
1	Positive
3	I would say well all the way. Positive attitude.
4	For me using technology is a very comfortable way of teaching.
7	I am all for technology because it is the way of the future.
9	Good tool which allows students to learn self-supporting skills.
10	Technology is everything now.
11	I think it provided additional ways to teach a concept.
12	If laptops are use well it can be great.
14	I am definitely positive because everything is in one spot.

Research Question Two

Research question two examined how pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success. Codes, which emerged from this examination, are one-to-one practices, small group practices, whole group practices, and use of OneNote, creating presentations, presenting findings, researching the topic, project-based learning, renaissance learning (STAR 360), Kahoot, BrainPop, and educational games. Other codes emerged from examining how pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success are discovery sites, YouTube, classroom social sites, tutorials, Turtle Diary, sending video, and audio clips to students. The theme, which emerged for the research question, two are individualized learning and providing support.

Individualized learning. Participants who responded to question one of the questionnaire shared the average time students used laptops during school hours. Weekly hours ranged from two hours to 25 hours. Findings revealed students utilized laptops to complete homework, classwork, online research, vocabulary building, creating presentations, and reviewing subject content. OneNote was one of the popular programs used by middle and high school teachers. Students who were out of school could continue the learning process from home on the 1:1 devices. USATestprep and A+ were other programs utilized and promoted individualized learning. Participants' response to questionnaire question one, "How many hours per week (during school hours) do your students use school-issued laptop computers," is shown in Table 21.

Table 21. Weekly Hours Participants Students use School-Issued Laptop Computers

Participants	Hours
1	4
2	6
3	20-25
4	15
5	4
6	5
7	10
8	8
9	4
10	15
11	10
12	2
13	6
14	2

Response to questionnaire question seven, do your students use the school-issued laptops for the following activities – example, homework completion, finding information, or in-class completion was as follows: HS4 responded, "I assign homework on Aleks.com where students have to complete the work at home within a timeline every week." HS4 further explained, "Students use the school-issued laptops to find information online for projects as well as finding some definitions on given vocabulary." Participant HS12 shared, "we rarely use our 1:1 for homework, and our main use is for working on projects (including finding information) in class and at home." ES11 shared a similar experience to question seven of the questionnaire, "Students are allowed to find information using laptops during class time." In the face-to-face interview, participant HS4 shared, "laptops are used to do now (bell work) in the morning to the closure of the class." ES3 expounded, "Students are allowed to practice certain skills using 1:1 laptops." Additionally, ES3 explained, "since students are now required to do most exams using laptops (computers) specifically they are asked to do a text-dependent analysis (TDA); one way to get students to practice these skills is getting students within TDA writing sessions to type response to questions." Teachers also use school-provided laptops to communicate with parents, students, administrators, and colleagues on school-related businesses.

Student engagement. A before and after comparison of student engagement of the implementation of the 1:1 laptop initiative revealed more student engagement after the

implementation process. Some activities students were engaged in were note-taking, group discussions, hands-on activities, worksheets, and paper assessments. Before the implementation of the 1:1 laptop, students depended on teachers' guidance, with limited exploring. Table 22 provides direct quotes from participants about research question two.

Table 22. Relevant Quotes from Participants Research Question Two

Data Collection Tool	Questions	Participants' Response
Questionnaire Question 7	Do your students use the school-issued laptops for following activities? Examples: homework completion, finding information, in-class completion. Please explain.	"Students are given the opportunity to complete online assignments that are aligned to the standards that is being taught within class on a daily basis. Students are also able to use these laptops to research information." (Participant, HS4)
Individual Face-to-Face Interview Question # 4	How do you use the laptops the laptops in your lessons?	"Well we use them in regard to calendar, identifying the star letter of the week, sounds, playing interactive games, using educational portals such as BrainPOP Turtle Diary and viewing Jack Hartman videos." (Participant, ES9)

After the 1:1 laptop initiative, students had an opportunity to explore additional information and expand experiences. Students were engaged in lessons after the integration of 1:1 laptops in the classroom. Participant ES3 shared, "With the infusion of laptop usage heightens more interest and get students more in tune and engaged." With the integration of the 1:1 laptops, student motivation increased. ES3 stated, "Students are more eager to learn when they know they will be using the devices as oppose to paper and pencil." ES3 explained, "The use of the computers in class heightened students' interest and engagement in lessons being taught." Similar views were shared by MS6, who stated, "Students were more engaged as they explore more information and experiences." Participants' responses to questionnaire question four, how engaged were students after the laptop initiative, provided positive feedback. One participant did not see engagement improved. MS2 shared, "The engagement level remained the same." This level of engagement explained by MS2 through the response to questionnaire question six, gives two examples of how school-issued laptops affected students' grade in the content area. MS2 shared, "It has been negative as the students expect things to be simple and

quick not being willing to engage with harder tasks until the last minute and put them off." When asked, do you believe school-issued laptops have affected your students' grades in the content area, MS2 stated, "It has been positive in the fact that students can be better prepared for digital testing."

Providing support. Students' exposure to 1:1 devices varied in participants' responses. To some participants, students were not aware of how to care for the devices or how to take advantage of the educational opportunities the device offers. Students knew the basics like turning the laptops on and off; how to browse the internet, as well as get on programs asked to access. Social media such as Facebook, Snapchat, and Instagram were some areas students were comfortable using. Participants shared how they assisted students who needed support. ES11 shared "students are generally proficient with using technology for communicating; however, most students need help with using technology for academic research." HS12 had similar views, "Students can do a basic search, but almost none know about how to apply Boolean logic to a search, determine the trustworthiness of a site, and analyzes the accuracy of results." ES8 shared "students who were not prepared were taught." HS10 stated, "The students were trained to take care of the laptops and instructed to use the appropriate site for research." In these instances, participants shared how students were supported to develop needed skills in using technology.

Research Question Three

Research question three examined the types of professional training provided to pre-K-12 to integrate newly implemented 1:1 device into classrooms to promote students' success. Codes which emerged from this examination are ongoing professional development, guidelines for implementing 1:1 laptop devices, structure, training for parents, training for teachers, training for students, subject-specific training, training from highly qualified personals. The main theme which emerged for research question three is providing support with a subtheme of specific training. Participants' responses to research question three was diverse. Participants reported contrasting findings on the training received for the implementation of the 1:1 devices. Some participants agreed to receiving some form of training while other participants received no training. Additionally, participants shared the training received was not ongoing and the focus of the training was specific to a particular program the school district demonstrated for integrating technology in the classrooms. The participants offered

suggestions on the type of training or support needed. Table 23 show responses to questions 7b and 7c on the individual face-to-face interview.

Table 23. Opportunities and Frequency of Learning about Laptops

Participant	Opportunities	Frequency	Something learned
1	Technology Tuesdays	Started off every Tuesday then slowed down	How to navigate to different programs
3	None	-	Learned from peers
4	Technology Tuesdays	Started off every Tuesday then slowed down	OneNote
7	None	-	Learned from peers
9	None	-	Learned from peers
10	Technology Tuesday/One distant yearly workshop (district sent participant to)	Started off every Tuesday then slowed down	OneNote
11	None		
12	Technology Tuesday	Started off every Tuesday then slowed down	OneNote Class note
14	None	-	Learned from peers

Providing support. When asked to describe what school administrators have done to prepare or support with the laptop implementation in the individual interview, HS4 shared, "We got a number of professional developments at school that taught us how to use technology with the students and 1:1 laptops." HS4 shared, "During Technology Tuesdays, they used to teach us how to use OneNote and class notebook with the students." HS4 expounded, "Training was presented by the Assistant Principal and sometimes by staff members experienced with technology, and we were made to feel comfortable using these programs as each time we would be trained before actually using them." MS7 response to the same question was, "I think they trained us on several different online programs… I think they could have done a little better with giving specific lessons for the 1:1 classroom." Participants expounded on the question describe what school administrators did to prepare or support the laptop implementation in the individual interview from participant. ES3, ES9, ES11, and ES14 all provided a similar response but were the opposite of HS4 and MS7 responses. ES3 shared

"there was no real support." ES9 shared "nothing." ES11 answered, "Basically, as a teacher, we would ask our peers about what they did and tried the same strategy," and ES14 shared "They try to encourage us to integrate the devices daily in our lesson." Participants provided perceptions on how training should have been provided to the teachers to integrate the 1:1 devices in classrooms including receiving in-depth training over a long period of time, providing teachers with guidelines describing how many minutes students are expected to be on the laptops each day, websites students need to utilize, and a structured plan for the integration of the laptops.

Specific training. Although limited information was received from participants concerning training and ongoing support, they voiced how specific training would be beneficial in the 1:1 laptop programs. Participants who received training to utilize the 1:1 laptop devices shared the training was specific to the programs and not to laptop usage. Additionally, participants shared the training was general and not specific to a special subject area. Teachers of languages to include Spanish and English requested training specific to the subject. Table 24 provides direct quotes from participants in relation to research question three.

Table 24. Relevant Quotes from Participants Research Question Three

Data Collection Tool	Question	Participants' Response
Individual Face-to-Face Interview Question 6	Describe what your school has done to prepare you or support you with the 1:1 laptop implementation.	"I think they trained us on several different online programs that students could use in order to know the stuff with their instructors. I think they could have done a little better with giving us specific lessons for the 1:1 classroom. I don't recall them being specific. But giving us tools to use online, they've been doing a good job with that." (Participant, MS7)
Individual Face-to-Face Interview Question 7e	In an ideal situation, how do you feel you would best learn how to integrate laptops into your teaching practices?	"By getting some more professional training from technology savvy persons outside of my school environment who can help us learn new things besides what we are already accustomed to, like new ways to navigate different programs and new ways to engage students using technology." (Participant, ES3)

Reliability and Validity

Good research requires careful validity and reliability testing (Singh, 2014). The threats to the reliability and validity described in the research method were either controlled or eliminated in this study. All qualitative study needs to possess the quality criteria for research; these criteria are credibility, transferability, dependability, and confirmability (Korstjens & Moser, 2018). This section describes how threats to reliability and validity were controlled or eliminated, additionally the implementation of transferability strategies.

Credibility

As discussed in the research method, credibility is the established truthfulness in the explanation of data, which is reinforced in a qualitative case study (Cope, 2014). Triangulation, self-description, prolonged engagement, peer debriefing, and member check promoted the credibility of this study. With three data collection tools, a questionnaire, individual face-to-face interviews, and focus group triangulation is promoted (Hadi & Closs, 2016). The use of self-description reduced researcher bias in the study. Additional activities which promoted the elimination of personal biases included recording individual interviews on an audiotape and manually scripting the interview. To gain participants trust a good rapport was developed to prompt more in-depth data on the case (Hadi & Closs, 2016).
Utilizing peer debriefing promoted credibility in the study. The study's research method, data collection, and data analysis were discussed with a peer not related to the study to promote. Discussions prompted researcher's interpretation of the study through meaningful questioning and critical thinking (Hadi & Closs, 2016). Lincoln and Guba (1985) stated the single most important method to ensure credibility is member checking. Member checking was used as a means of ensuring transcribed data reflected participants' responses. During the member checking process, all participants were provided with the transcribed script to review and provide feedback on any potential errors.

Transferability

The applicability of the study, transferability was promoted (Lincoln & Guba, 1985). Thick description of the step-by-step processes of the study, the participants, and descriptions of the participants' responses shared in the study. Allowing readers to experience the transparency

of the study promoted the assessment of whether or not the study is transferable to personal settings (Korstjens & Moser, 2018). Providing readers with proof of the study's findings may be related to other environments, circumstances, times, and populace promoted the transferability of the study (Maher, Hadfield, Hutchings, & de Eyto, 2018). Variations of the demographics were established through volunteered participants, which accounted for teachers at three different levels (elementary, middle, and high) of the educational system. Findings from the study were gained through intense interaction with participants, which recognized lessons learned might be connected to theories (Williams, 2007).

Dependability

Dependability was promoted through the utilization of triangulation and member checking in the study. Additional sufficient details were provided in a manner, which may allow another researcher to repeat the study (Maher et al., 2018). There were no adjustments made to the dependability strategies stated in the research method. Because dependability is the consistency aspect in a study, the analysis processes of the study were checked to ensure the alignment with the accepted standard in a case study was practiced (Korstjens & Moser, 2018).

Confirmability

The confirmability strategies remained the same, as stated in the research method. Through the utilization of participants' rich quotes, self-description, and validated assumptions, confirmability of the study was promoted. Data were reported using direct quotes from participants. Personal values, beliefs, and perceptions, which may affect the reporting of information and conclusion, were identified in the study. Assumptions were validated to understand the collected data (Cope, 2014). Reflexivity is the recurrence of learning and unlearning (Palaganas, Sanchez, Molintas, & Caricativo, 2017).

Chapter Summary

Reviewed in the results are the data collected from the questionnaire, individual face-to-face interviews, and the focus groups. Fourteen participants participated in this instrumental case study. Three research questions guided the study and were reviewed and answered in this

chapter. Five major themes and two subthemes emerged from the collected data. The five themes are providing support, necessary tools for educational support, teacher involvement, individualized learning, and quality resources. Subthemes are specific training and student engagement. The themes were used to answer the research questions and address teachers' perceptions of the newly implementing 1:1 laptop. Additionally, the themes were used to discover device utilization and the type of professional development teachers received to integrate the devices.

Influences of laptops in classrooms were identified and teachers' perceptions discussed. Teachers utilized laptops several ways. Some strategy includes individualized learning, small groups, and the whole group. Additionally, the type of professional development for 1:1 integration is important. However, issues around receiving training have been identified. Findings are further discussed in the discussions, conclusions, and recommendations, with a recap of the findings, the implications, and recommendations for the future.

Citation

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CHAPTER 5: IMPLICATIONS FOR TEACHERS' PROFESSIONAL DEVELOPMENT IN TECHNOLOGY INTEGRATION

Explored in this instrumental qualitative case study were pre-K-12 teachers' perceptions, practices, and professional development with a newly implemented 1:1 laptop program. A gap found in the literature revealed there is a paucity of research on teachers' voices in 1:1 programs. Because teachers are the primary contact with students in 1:1 classrooms, gaining insights from teachers on the initiative may provide administrators with a solid plan for implementing 1:1 programs in schools. An anticipated benefit of this study is to lay the foundation for further research on the effects of teachers' voices in 1:1 programs.

The investigation captured the voices of certified teachers who taught in the school district one year before the implementation of the one-to-one initiative. Conducting the study allowed teachers to voice experiences, practices, and professional development with the new initiative. Utilized in this instrumental qualitative case study's methodology are a questionnaire, a focus group protocol, and individual face-to-face interviews. Overall, 14 certified teachers participated in the study. Five major themes emerged from the data collection process: (a) providing support, (b) necessary tools for educational development, (c) teacher involvement, (d) individualized learning, and (e) quality resources. Subthemes which emerged for the data include specific training, teachers' needs, and student engagement.

Research question one explored pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in the classroom. Themes emerging from research question one are necessary supplemental tool, individualized learning, providing support, quality resources, and teacher involvement. How pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success was the exploration for research question two. Individualized learning and providing support were the themes emerging from research question two. Student engagement and specific training were

the subthemes emerging from research questions one and two, while teachers' need was a subtheme for research question one. Explored in research question three was professional training provided to pre-K-12 teachers to integrate newly implemented 1:1 device into classrooms to promote students' success. The exploration found the theme of providing support and a sub-theme of the need for specific training.

Key findings detailed in the results revealed the theme and sub-theme of providing support and specific training overlapped in research questions one, two, and three. An additional overlap with research questions one and two was the theme individualized learning and student engagement. Table 5 specified some descriptive comments participants provided related to each theme and sub-theme. The experiences shared by certified teachers aided in supporting the key findings of the study.

Findings, Interpretations, and Conclusions

The gap in the literature identified in this study is a paucity of research on teachers' voices in a 1:1 program (Heath, 2017; Reichert, 2016). This study begun to address the gap in the literature by exploring teachers' voices on 1:1 programs. The study's significance is to include teachers' voices in 1:1 programs (Heath, 2017). Through the investigation of teachers' perceptions, practices, and professional development in a 1:1 program, the populace understands the importance of teachers' voices in 1:1 initiatives may increase. Teacher's optimistic opinions about technology and professional development are necessary for a 1:1 program (Heath, 2017). The need for quality resources and support for malfunctioning devices was also identified.

Analysis from the research questions unearths teachers' voices toward the implementation process of a 1:1 program in the school district. Teachers' voices emerged as themes in the study, which include: (a) providing support, (b) necessary tools for educational development, (c) teacher involvement, (d) individualized learning, and (e) quality resources. Specific training, teachers' needs, and student engagement are the subthemes teachers' voices provided. In literature review, researchers stated the importance of including teachers' voices in the implementation process of a 1:1 program. In discussions, conclusions, and recommendations, there is a comparison of researchers' findings in literature review and the emerging themes found in this qualitative instrumental case study.

Research Questions

Research question one asked: What are PK-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices in their classroom? The analysis of the data revealed similar findings to the ones spoken by Reichert (2016). Soliciting teachers' input, every stage of the implementation process should be a factor when implementing 1:1 programs in schools (Reichert, 2016). Reichert believed once teachers' voices were shared, 1:1 programs could be more successful as teachers can provide information on device choice and the rationale for the selection. In this research, teachers shared beliefs about implementing 1:1 programs in schools. Teachers stated administrators needed to request suggestions from educators for the implementation of the 1:1 program at every stage of the implementation process. Furthermore, teachers in this study believed the use of 1:1 devices is a necessity in the classroom as the devices promote individualized learning and student engagement. Williams (2017) spoke on teachers' frustration level. A. Williams stated teachers' voices might uncover frustrations and aid in providing solutions, which may eliminate obstacles. Participants in this study felt the implementation process did not include teachers' voices, which may have led to the program not being successful. Birkinshaw (2017) stated an overall buy-in and commitment into a program increases when people are involved from in a process. Though teachers welcomed the 1:1 initiative, concerns and frustrations were shared, including limited or no professional development, lack of quality resources, a need to block unnecessary sites on the devices, and to include teachers' voices during the implementation process.

Research question two asked: How do PK-12 teachers integrate the newly implemented 1:1 laptop devices in their classrooms to promote students' success? The literature review revealed beliefs and attitudes of teachers are dependent on the integration of technology in the classroom (Scherer et al., 2018). One participant shared how experience in an educational program aided in the integration process in the classroom. Another participant shared a belief of being technologically savvy and this experience aided in the integration of technology in the classroom. Additionally, in the literature review, Ruggiero and Mong (2015) shared how teachers revealed technology integration practices emerged from personal experiences. Teachers in this study referred to background experiences as a means of aiding in the integration of technology in the classroom. Participants referred to technology courses completed, and practices learned independently. Another area participants discussed is the

quality of the devices. Participants explained the quality of the devices was inadequate since the device would not always access the internet or was lacking needed programs. Participants expressed a need for protective resources to aid in the longevity of the devices to include laptop bags, laptop covers or cases, and commercial charging ports.

Reviewed in the literature review was teachers' description of technology as the intertwining of technology devices in the curriculum, using different learning and teaching techniques as a scaffold (Ruggiero & Mong, 2015). Discovered in this study was, teachers appreciated the embedding of the curriculum in some of the programs utilized in the classrooms. Participants shared different educational software that engage students with the curriculum and aid in scaffolding learning for better understanding. Some of the examples of the software included Gizmos, Kahoot, OneNote, and Classnote.

The literature review showed not all educators integrate technology in teaching. Kimmons and Hall (2018) expounded on some of the irregular usage factors in the classroom. Factors included teacher confidence, support using technology, and access to technology (Liu et al., 2017). In this study, teachers did not display a lack of confidence in using technology and showed the majority of the participants embraced the integration of technology in the teaching and learning. One issue shared was the lack of support for using the technology in the classroom. One participant shared, "Please have the technology person available every day at school." Others explained how the waiting period to get assistance from the technology assigned person was extensive. The majority of the participant had access but complained about the quality of the resources.

The inquiry of research question three was: What professional training was provided to PK-12 to integrate newly implemented 1:1 device in classrooms to promote students' success? In the literature review, Gunter and Reeves' (2017) findings revealed professional development empowers teachers to change instructional strategies and integrate 1:1 device in the curriculum. Additionally, Gunter and Reeves shared teachers' dispositions changed toward the value of 1:1 device after receiving authentic, integrated, and subject-specific professional development. In this study, all the participants shared a need for professional development.

Participants believed ongoing professional development would render more strategies for integrating technology in the classroom. One participant admitted to receiving a form of

professional development but mentioned an ongoing structured format would be more beneficial. Another participant expressed the idea of providing teachers with small segments of professional development, which may encourage feedback on areas which are working, and areas which did not work. Some participants stated there was no access to professional development. These participants stated the experience of technology integration could increase with ongoing professional development.

As reviewed in the literature review, professional development for available technologies should be mandatory for all staff members (Maigari et al., 2018). Findings from this study revealed mixed messages from participants concerning professional development. Most of the participants from the middle and high school expressed some form of professional development was received. Participants from the elementary school revealed professional development was not received.

The professional development received was in the form of Technology Tuesday. Technology Tuesday is the participation in some form of professional development every Tuesday for approximately one hour. Though some participants stated Technology Tuesday provided some strategies, participants stated the sessions dwindled after some time and were no longer every Tuesday. Repercussions for the decrease in Technology Tuesday may include redundant technology integration and unmotivated teachers and students.

Teachers' voices. The literature reviewed recommended administrators to desist from dismissing teachers' voices in the implementation process of a 1:1 initiative since allowing teachers a voice may aid in meeting the needs of 21st-century learners (Mounts, 2019). The implementation or decision-making process for implementing the 1:1 devices in a southern South Carolina school district did not include teachers. There was no solicitation of teachers' voices about the type of devices preferred, perceptions toward the initiative, and no sharing of specifics about the implementation process commencement and goals. One teacher stated, "The laptops were brought to our classes and we were told to use them in the classroom." The administrator's actions of presenting teachers with laptops revealed the lack of teachers' voices in the selection and involvement in the 1:1 initiative.

Teachers stated administrators did a poor job by excluding teachers' voices in the implementation process by excluding teachers from all the processes of the 1:1 program

initiative. Since teachers are the ones using the technology for teaching and learning in the classroom, time, and space for input should have been provided. The literature supports the idea of honoring teachers' voices, beliefs, and day-to-day realities in the implementation process of a 1:1 program to empower behaviors in the initiative (Heath, 2017). Harris et al. (2016) stated 1:1 initiative could be the substance necessary for supporting student achievement. Participants from this study supported the view as teachers stated the use of the 1:1 initiative enhanced student's academic performance. Additionally, teachers shared the need for technological devices in classrooms to meet 21st-century learner's needs.

Limitations

Researchers should reveal comprehensive and authentic limitations existing in a study (Ross & Zaidi, 2019). Limitations represent the weaknesses in research, which may influence outcomes of conclusions of a study (Ross & Zaidi, 2019). The limitations of the study remained as stated in introduction of the study. Limitations included a small number of participants, time constraints, and slow returns from the questionnaire tool. The school district selected for the study is small and has a high staff turnover. Because the study used purposeful sampling to promote the selection of certified teachers in the school district, the study was limited to a small number of participants. Time constraints were another limitation as the school district has many activities throughout the school day, which extends into after school hours caused the completion of the questionnaire instrument to take longer to complete than expected.

Initially, gaining access to all teachers to participate in a focus group was a limitation as teachers' schedules vary. The focus group date and time rescheduled numerous times due to the various schedules. Two separate focus groups were scheduled. The first focus group was conducted in a face-to-face format and included four participants, while the second focus group included two participants and took the form of a telephone conference. Research factors which may assist readers in understanding the study's result are the types of questions the participants responded the depth of the participant's responses to the questions, and the level of experience participants have on the topic. The more experienced participants are, the more visible the confidence in providing answers to research questions. Furthermore, teachers with a voice in 1:1 programs may be enthusiastic about providing information on how the implementation process can be successful.

Limitations of the study may aid in providing the first steps in shaping the next phase for further research and formulating research questions (Ross & Zaidi, 2019). A possible bias in the sample is the study's limitation to one school district in the state of South Carolina. The findings of the study may not be generalized to all school districts implementing a 1:1 program. An acknowledged limitation was the lack of behavioral opinions, such as nonverbal indications, to control the process. Credibility and dependability limitations were controlled using member checking and triangulation. Reflexivity controlled the confirmability of the study.

Results from the study may be transferable to school districts planning to implement 1:1 programs in schools. Participants' norms varied across grade levels and focused on certified teachers who taught in the district one year before the implementation of the program. The conclusion and results of the study are honest demonstrations of interpretations disclosed by the 14 participants. Through the research process, member checking, triangulation, and reflexivity improved the credibility and dependability of the study.

Recommendations

Three recommendations for implementing 1:1 programs based on themes identified in the study are ongoing professional development, including teachers' voices, and quality devices. Recommendations for future research support changes in practices and policies. All recommendations emerged from the outcomes of the three research questions.

The first recommendation is to provide teachers with ongoing specific professional development. Teachers in the study expressed needs for ongoing professional development. Some went further to add a preference in receiving professional development specific to the subject taught and the devices implemented. By providing educators with professional development related to subjects and the devices utilized, teachers' implementation and empowerment may increase in regard to integrating technology in classrooms.

Findings in this study were unclear on how school districts' technology personnel trained teachers to utilize the laptops in the 1:1 program. The recommendation is to employ qualified technology resource personnel for the school district. Qualified technology personnel should be responsible for training teachers on how to utilize the device the district implemented. As a part of the educational training, software should be introduced, tested, and tried. After the

trial of the software training, there should be feedback sessions where teachers can provide information on the pros and cons of using the devices. Providing teachers with the opportunity to offer feedback can prompt communication of the program's success and comfortability, which may lead to more usage of the program. The ongoing professional developments should be mandatory for all teachers. Though all teachers need training, it is crucial to meet teachers at the level of mastery they possess. Meeting teachers at levels of mastery may prompt more confidence in using the devices and increase motivation in trying to learn more. Professional developments should be flexible, where teachers can request areas for training. Teachers are the primary stakeholder in the classrooms utilizing the devices daily and can describe areas of need.

The second recommendation is to involve teachers in the 1:1 implementation process. The implementation of any program in a school, which requires teachers' utilization, should involve teachers in the decision-making process. Teachers are the main connectors to students in the classroom. A teacher can inform an administrator about the different educational levels of the children in a class, students' abilities, and weaknesses. Because teachers are exposed to all the details, promoting teachers' involvement may improve the chances of the program's success. Soliciting teachers' advice about the types of devices required and the training type may promote an environment of appreciation. Teachers are more confident when suggestions made are utilized in the school.

Teacher involvement can take the form of a teacher representative on committees to discuss educational targets for a school's success. In cases of teacher representations, staff members can vote for a teacher representative to represent all staff members in administrative meetings. The teacher representative should share with the staff: (a) the goals of the district, (b) information shared at the meeting, and (c) provides feedback to other staff members. Staff members should provide feedback to the representative to take to the next meeting. Another way of involving teachers is through questionnaires. Questionnaires are useful data collection tools to gather information from teachers on the district's goals, soliciting feedback, opinions, and suggestions from the teachers. Administrators can gather vital information through both mediums.

Involving teachers in the decision-making process could take the form of a pilot test. Through a pilot test, teachers' exposure to the program initiated for implementation can provide

valuable information. The pilot test should allow teachers' exposure to practices of the program utilized with a smaller number of students. After the pilot test, teachers can state practices considered beneficial for the educational development of the students. Using a pilot test, teachers' involvement is enabled as teachers share the program's usage and dependability. Additionally, suggestions for areas of concern in a 1:1 program may be highlighted and addressed.

Administrators implementing technological tools should consider the durability, dependability, and quality of the devices. Devices utilized daily should be of high quality for a greater life span of the products. To gain access to quality devices, administrators should assign technology personals to research the type of devices on the market. This research may lead to the discovery of the quality and durable devices compatible with the districts' needs. In the purchasing budget, administrators should include a list of protective resources, which may promote the life span of devices and lessen wear and tear.

Concerns arising from this study included the damaging of the devices since there were no protective materials provided. Some protective materials requested were covering for devices, laptop bags, or areas to store devices. Administrators are to take into account the security of the devices to promote more responsibility. Providing students with protective materials for the devices may promote the longevity of the laptops.

Implications for Leadership

This study's results are significant to educators, administrators, and educational stakeholders in the United States because findings expose the importance of teachers' voices in a 1:1 program. A discovery of general impressions was the significance of teachers' voices in a 1:1 program. Data gathered aided in the appreciation of the lesson learned and exploring future research on the topic. This study may benefit educational administrators in improving implementation practices when implementing 1:1 technological devices in classrooms, including teacher voices, planning for professional development, and planning for the adoption of 1:1 devices, including methods of protecting the devices from damage and wear.

Findings from the study can be lessons learned by providing administrators with positive and negative approaches when implementing a 1:1 program. Administrators may want to build

partnerships before, during, and after the implementation of a 1:1 program. The partnership may contribute to further understanding of teachers' needs in a 1:1 program. Because research on teachers' voices is limited, administrators can use knowledge gained from this study as an outline for promoting 1:1 programs in schools including how vital teachers' voices are in the implementation process of a 1:1 program.

Teachers' voices in this study may provide a base for understanding the perspectives of teachers who involve in the integration of 1:1 devices in the classrooms. Because there is limited research on teachers' voices in 1:1 programs, this study may provide educational stakeholders with first-hand experiences, viewpoints, and beliefs of teachers who have experienced 1:1 technology in the classroom. This study contributes to a narrative reporting on teachers' voices through perceptions, practices, and professional development in a 1:1 program. The study aims to contribute to positive changes in policies when school districts implement 1:1 programs in classrooms. Additionally, this information found from the study can be shared with other school districts implementing 1:1 programs. Sharing findings of this study may provide administrators with improvement strategies for implementing 1:1 programs in schools.

Based on the findings of this study, the recommendation provided may aid educational leaders in selecting strategies based on data retrieved from teachers. Though findings from this study are similar to the literature reviewed in the study, administrators should not generalize this study to all school districts implementing 1:1 programs in the school. School districts are unique and have different attributes; a different methodology and research design may be used to gather additional information on the topic.

Recommendations for Future Research

There are three recommendations for future research and changes in policy practices, which links to themes emerging in this study from the data analysis and findings. Recommendation one is to conduct further research on how educational administrators plan for the implementation of the 1:1 program. The research should identify participants in the planning phase, goal setting for the implementations, and the conduction of the plan. Further research in this area may provide details about the steps administration take when implementing 1:1 programs in school districts.

Recommendation two is to research how administrators plan professional development for teachers in a 1:1 program. Through this research, a need for purposeful planning for training teachers in a 1:1 program may reveal. Data collection instruments for the recommendation could include questions related to teacher involvement, teachers' voices, and teachers' needs in the process. All teachers should receive comprehensive organizations and applications of professional development as a mandatory asset for 1:1 programs.

A final recommendation is to conduct a quantitative study for generalizability. A quantitative study may extend the study to a larger population to include additional certified teachers. Because this study population is a small rural community, teachers involved in other 1:1 programs may experience different perceptions, practices, and access to professional development focused on the implementation and use of 1:1 devices. Repeating this study with a larger population may generate new data to the literature.

Conclusion

The purpose of this qualitative instrumental case study was to explore pre-K-12 teachers' perceptions, practices, and professional development focused on the implementation of a newly implemented 1:1 laptop program. This qualitative instrumental case study investigated how one school district in the southern region of South Carolina implemented teachers' voices in a 1:1 program. Research participants' perceptions of 1:1 programs implementation in school provided a basis for future research on teachers' voices in 1:1 programs. Results from this study exposed five themes and three subthemes.

Five themes emerging from the study included providing support, necessary tools for educational development, teacher involvement, individualized learning, and quality resources. Subthemes emerged through further analysis of the data are specific training, teachers' needs, and student engagement. Through the analysis of data was the recognition of themes: teacher involvement, providing support, quality resources, and specific training overlap and provided answers to research questions one and two. Themes and subthemes emerging from this study complimented some of the studies explored in the literature review. Furthermore, rich experiences provided by certified teachers assisted in the revealing of key findings in the study.

A limitation of this study was the school district, which is in a small rural community with a high teacher turnover rate, resulting in a small number of participants in this study. Other limitations included time constraints and a slow return of the questionnaire document. Though the study experienced some limitations, the participant selection reflected the diversity of the school district. Diversity included certified teachers with different background experiences. Additionally, teachers from the elementary, middle, and high school participated in the study.

Teachers are the leading stakeholders working nonstop with students in a 1:1 program. Providing a platform for teachers' voices, professional development needs, and high-quality devices should promote integration of the implemented laptop devices. Exploring teachers' voices in the implementation of a 1:1 program may offer a teachers' perspective on which device to purchase, how to provide support, protection for devices, and specific professional development needed to implement a successful program. Furthermore, the research aids in filling the gap in the literature. Allowing teachers to voice perspective may help meet the needs of 21st-century learners and deepen understanding of the impact of teachers' voices in implementing a 1:1 program. Proper inclusion of teachers' voices may promote practical usage, which may lead to educational success.

Citation

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APPENDIXES

Appendix A. Definitions of Terms

The key terms utilized in this study are 1:1 technology, technology integration, teachers' voices, professional development, educational technology, and educational stakeholder. All the terms are vital in providing a transparent understanding of the study. Definitions for the key terms are as follows:

Behavioral Intention. Self-directed instruction targeted by an individual to perform an action to obtain a specific outcome. Intentions may catch a behavior or the level of a goal (Sheeran & Webb, 2016).

Case Study. Case studies are empirical research methods examining current occurrences in a real-life context. Planning, designing, preparing, data collecting, analyzing, and reporting are the six elements of a case study (Yin, 2014).

Educational Stakeholder. Educational stakeholders are people interested in the academic achievement of students. Parents, school board members, school staff members, taxpayers, the business community, other community members, and students are some educational stakeholders (Sustainability Series, 2009).

Educational Technology. The application of modern technology in an organized way to improve the quality of education. Knowledge of pedagogy and computer sciences are some areas required for the utilizing of educational technology (Lazar, 2015).

Professional Development. The structuring of professional learning to promote changes in teaching practices and enhancing students learning outcomes. Professional development may focus on purposeful teaching strategies, which may enhance teaching practices (Darling-Hammond, Hyler, & Gardner, 2017).

Teacher Voice. Teachers' voices are the values, opinions, beliefs, perspectives, expertise, and cultural backgrounds of teachers. Teachers' voices may extend to teacher unions, professional organizations, and other entities advocating for teachers (Education Reform, 2013).

Technology Integration. Technology integration is the utilization of computers in general content to promote students' ability to apply meaningful computer skills. Using the curriculum to initiate technology usage and not technology driving the curriculum is technology integration. Technology integration incorporates business world software in real-world applications to develop students' computer skills to be flexible, creative, and purposeful (Dockstader, 1999).

1:1 Technology. The technological drive, which allows every child in a classroom, school, or school district to have a laptop or related device to manipulate and learn with as a tool in the classroom. A 1:1 technology environment promotes hands-on teaching with the teacher roaming around and engaging students through posing questions and providing needed assistance (Harris et al., 2016).

Theory of Planned Behavior. The theory theorizes beliefs influence behavior about attitude, control, and norms, which are mediated by intentions. In the theory of planned behavior, the behavior may be predicted through intentions (Kautonen, van Gelderen, & Fink, 2015).

Appendix B. Focus Group Interview Questions (adopted from Knop, 2017)

Participant Pseudonyms:

Date of Focus Group:

Time:

Interviewer (I): Thank you for agreeing to participate in this focus group it is highly appreciated. The purpose of this project is to explore PK-12 teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop program. You are free to opt out of participating or remove yourself from the focus group and withdraw from the study at any time without upsetting our relationship or relationship with the school district. This focus group will be recorded and last approximately 45-60 minutes. Are you ready to begin?

1) General information
    a. Please tell me your name.
    b. What grade level do you teach?
    c. How many years have you been teaching?
    d. What device do you use for the 1:1 initiative?
    e. How many years have you been teaching with 1:1 devices?

2) Were you working in the district prior to the implementation of 1:1 devices?
    a. If yes…
        i. I want to take you back to when you first found out your grade level would be going 1:1 with devices. What were your initial reactions?
        ii. Why did you feel that way? iii. What device did your grade level receive?
        iv. What was your involvement in the selection of the device your grade level received?
        v. Have you been teaching with the same device the entire time?
    b. If no…
        i. Skip to section 4

3) How were you prepared for 1:1 devices in the classroom?
    a. How was the topic of 1:1 device implementation introduced to you?

b. Tell me about how the device was selected for 1:1 implementation for your grade level.
c. Tell me about your opportunity to pilot the device prior to implementation.
d. What training did you receive for 1:1 devices **prior** to the implementation with your students?
    i. Who facilitated the training? ii. How long was the training?
    iii. Where did the training take place?

4) How do you use 1:1 devices in your instruction?
    a. What is the expectation from your administration for using 1:1 devices in the classroom? Frequency?
    b. How do you use 1:1 devices in the classroom?
    c. What percentage of your instructional time does your students use devices?

5) How does the presence of 1:1 devices impact your instruction?
    a. How did the presence of 1:1 devices impact your day-to-day instruction?
        i. What changed?
        ii. What stayed the same?
        iii. Has it changed the way you teach? If yes, how?
    b. Do your students enjoy the use of 1:1 devices?
        i. Does your students' enjoyment of the devices impact how frequently you use laptops within the classroom?

6) Can you please describe the continued training you have received since implementing 1:1 devices?
    a. Who facilitates the training?
    b. How often do you receive professional development for the devices?
    c. Does the professional development impact your ability to integrate technology into your instruction?
    d. What is your ideal type of professional development to assist with the implementation of technology into your instruction?
    e. Are there opportunities for peer training?
        i. If yes, do you utilize these opportunities? Why or why not?
    f. Is there instructional support staff available in your building on a daily basis?

g. Is there instructional support staff available in your district on a daily basis?

7) According to participants, what are the aspects of an effective 1:1 device implementation?
    a. What type of ongoing professional development have you received in concerning 1:1 device implementation?
        i. Does the professional development occur during contracted school hours?
            1. Do you have opportunities to participate in professional development outside of contracted hours? If yes, do you take advantage of these opportunities? Why or why not?
        ii. Do you feel you receive enough professional development to meet your individual needs?
        iii. Where does technology professional development take place?
        iv. How often do you implement the information you learn at professional development?
        v. Please describe the type of technology professional development that you feel would be most worthwhile to you as a teacher.

Is there any other information you would like to share?

Appendix C. Questionnaire

Dear Teachers:

You are being asked to participate in the following questionnaire because you are a certified PK-12 teacher. The researcher is interested in teachers' perceptions, practices, and professional development with the newly implemented 1:1 laptop program. Your input is very valuable. Please complete each section of the questionnaire sharing your background experiences with the newly implemented 1:1 laptop initiative. Thank you for your time.

Questionnaire Questions

A. I primarily teach (subjects)

_____

1. On average, how many hours per week (during school hours) do your students use school-issued laptop computers?

_____

2. On average, how much time per week might students spend using a laptop at home to complete assignments from your class.

_____

3. On average, how engaged in learning were students before the laptop initiative?

_____

_____

4. How engaged in learning were students after the laptop initiative?

_____

_____

5. Do you believe school-issued laptops have affected your students' grades in the content area?

_____

Has the effect been positive or negative?

_____

Give two examples of how you see school issued laptops have affected your students' grades in content area(s) you teach:

_____

6. Do you incorporate the use of laptops with the following activities in your classroom? Examples: in-class research, drill, and practice assignments create original product. Please explain.

_____

_____

7. Do your students use the school-issued laptops for following activities? Examples: homework completion, finding information, in-class completion. Please explain.

_____

_____

8. Do you use school-issued laptops for any of the following? Example: email, social networking, making, and sharing movies/phots. Please explain.

_____

_____

9. When students come to your class at the beginning of the school year, how prepared are your students with using technology? Example: using technology for communication, using technology for research. Please explain

_____

_____

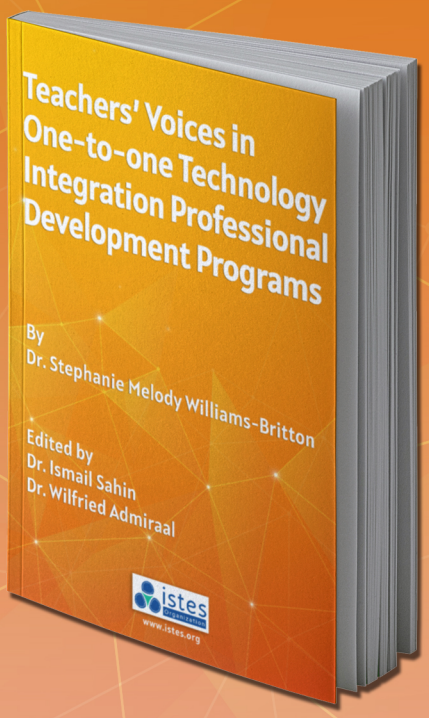
10. Feedback- Please use this opportunity to offer any opinion and/or advice about your experience on 1:1 technology in your school. Your comments will be anonymous and much appreciated.

Appendix D. Individual Face-to-face Interview Questions

Research Questions	Interview Questions
Research Question One. What are pre-K-12 teachers' perceptions and practices regarding the newly implemented 1:1 laptop devices into classroom?	Teachers' perceptions of 1:1 laptops. 1. How have laptops supported your way of teaching? 2. How would you describe your attitude toward instructional technology (laptops) in regard to its role in education ad as an instructional tool? 3. What worked and did not worked using laptops in your instruction? a. How were the adjustments made? b. How do you know what worked and did not work?
Research Question Two. How do pre-K-12 teachers integrate the newly implemented 1:1 laptop devices into classrooms to promote students' success?	Teachers' practices with 1:1 laptops 4. How do you use the laptops the laptops in your lessons? 5. Tell me a story about using laptops in your classroom. a. What particular situations stand out in your experience?
Research Question Three. What professional training was provided to pre-K-12 to integrate newly implemented 1:1 device into classrooms to promote students' success?	ers' training with 1:1 laptops 6. Describe what your school has done to prepare you or support you with the 1:1 laptop implementation. 7. What types of opportunities for learning about laptops have you been presented with? a. How have these opportunities been presented? b. How frequent are these opportunities?

	c. Can you describe something you learn from the training you implemented in the classroom? d. Can you describe something that affected your teaching and engaged student in learning? e. In an ideal situation, how do you feel you would best learn how to integrate laptops into your teaching practices?

School district administrators implement I:I programs into classrooms with the expectation to enhance students' academic abilities and promote 21st-century skills. The problem was pre-K-12 teachers' perceptions, practices, and professional development with the newly implemented I:I laptop device remained a fertile area of study. Utilizing teachers' voices in the implementation process of a I:I program was vital, as teachers are leading educational stakeholders integrating the devices into classroom instructions. A profusion of literature emphasized the positive impact of I:I technology usage in classrooms and educational stakeholders' views, but a gap in the literature concerning the paucity of research remained about teachers' voices in I:I programs. The theory of planned behavior (TPB) was the applied theoretical framework for this study. Using the TPB, administrators may obtain answers about teachers' perspectives, practices, professional training, and how I:I laptops are integrated into classroom instructions to promote students' success. The purpose of this qualitative instrumental case study was to explore pre-K-12 teachers' perceptions, practices, and professional development with newly implemented I:I laptop devices. A need for an exploration of how teachers' voices in a newly implemented I:I program can promote I:I program success prompted the study. A purposeful sampling of 14 certified teachers aided in data collection through an open-ended questionnaire, focus group, and individual face-to-face interviews. Data analysis utilized the content analysis approach to understand the data through coding and recognizing themes. Results from the study revealed teachers accepted I:I technologies in classrooms as necessary tools for enhancing students' academic abilities. Teachers utilized I:I laptop devices in different ways and expressed a need for teachers' voices, ongoing professional development, quality devices, and experienced technology support personals for the success of the implementation.



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