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Understanding Elementary Teachers' Experiences Implementing Technology in a 1:1 Classroom

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Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Susan D. McCurry

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University

2025

Abstract

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Classroom

by

Susan D. McCurry

EdS, University of West Georgia, 2017

MA, Kennesaw State University, 2012

BS, State University of New York College at Cortland, 1984

Proposal Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education

Walden University

August 2025

Abstract

The availability of technology resources in elementary classrooms is becoming more commonplace, including environments where every child has a laptop. The problem addressed in this basic qualitative study was that elementary school teachers in kindergarten through the fifth grade struggled to adapt their teaching to the 1:1 technology-based approach at Fennario School District (FSD, a pseudonym), an urban southern elementary schools. The purpose of this study, framed by Magana's translational, transformative, transcendent, framework for innovation in education, and Bandura's theory of self-efficacy, was to explore elementary school teachers' successes, challenges, and the resources needed to integrate 1:1 laptop technology in their instructional practices at FSD. A purposive sampling of 20 teachers was drawn from responses that was sent to all teaching staff at two FSD school locations. Participants completed an email interview or scheduled a semistructured face-to-face interview with the researcher. Data were analyzed using thematic analysis and open coding, using participants' words with gerunds for action and process. The findings of this study highlight the critical importance of continuous professional development for FSD teachers to enhance their confidence and effectiveness in integrating technology within a 1:1 learning environment. Final themes indicated that staff members believed they could integrate technology more intentionally into their daily practices with the guidance of a mentor or coach and access to ongoing, tailored professional development opportunities. The results contribute to positive social change by equipping teachers with the support necessary to develop their instructional skills to meet the students' individual needs.

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Dedication

This work is dedicated to my children. I want them to see that persistence and perseverance will move you toward your goals no matter how old you are or how challenging things may be.

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I would like to thank my chair, Dr. Gina Solano for her unwavering support throughout this endeavor. There were times I felt I could not push forward and each time she gently reminded me that I just needed to breathe and take the next step. I would never have completed this work without her understanding and support. I would also like to thank Dr. David Perry who began this journey with me and Dr. Darci Harland who, with her great understanding of educational technology and the research process, helped get me across the finish line. There were serious life issues that popped up while I was working on this project and with my village of family and friends, I was buoyed and prevailed. Thank you, Jim for your positivity and belief in me.

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Section 1: The Problem

The Local Problem

Technology usage in the classroom is becoming ubiquitous in schools nationwide (Francom, 2020). The adoption and acceptance of technology and its usage by teachers in a school setting is still a concern when considering the integration of information and communications technology (ICT) in educational settings (Doron & Spektor-Levy, 2019). This concern is exacerbated when the educational setting is described as a one-to-one (1:1) environment, which suggests that every child has a computing device as a learning tool throughout the school day and sometimes for use at home (Lawrence et al., 2018). Before teachers know how to integrate technology into their classrooms, they must understand its meaning. This vision must be provided by the school or district leadership to ensure the technology is being used for authentic teaching and learning experiences.

The local problem on which this study is based is in an urban southern elementary school, Fennario School District (FSD, a pseudonym). Although much has been researched on various technology integration strategies (Dinc, 2019; Francom, 2020; Henderson & Corry, 2021; Lawrence et al., 2018), recommendations for authentic application of these strategies in a 1:1 elementary classroom environment resulting in a transformation of teaching practices are scant (Aldosemani, 2019). Confusion from teachers and administrators exists in the local setting about what is meant by purposeful technology integration. After COVID-19 protocols were loosened and students attended in-person and online classes, 1:1 devices were provided to students and staff. This rollout was initiated with some online opportunities for training on how to use the new learning

management system but not on how to make the technology a ubiquitous tool in the classroom. Additionally, expectations for the use of the technology were unclear. “We all need clear expectations on the use of the devices” (Elementary school principal, personal communication, June 5, 2022).

Ross (2020) found that a challenge to technology integration was the need for continuous and quality professional development that could transform teachers' instructional pedagogy to derive the intended benefits of technology integration in the classroom. The increased availability of technology since the COVID-19 pandemic has pressured teachers to change how they teach and to emphasize the teacher as a guide to student learning, which is divergent from pre-service teacher training programs (Frazier et al., 2019). According to Durff and Carter (2019), teachers may only succeed with technology integration with support from training, mentorship, and examples of moving from traditional lecture-based lessons to more student-centric teaching practices. “Our staff is willing to learn but are uncertain about how to approach changes in their daily routine” (Technology support personnel, personal communication, August 4, 2023). “At this time, I feel like staff need PL in effectively incorporating technology into their lessons to support student learning. For example, providing more exploration and project-based learning through technology and which programs to utilize for specific lessons, etc.” (Assistant Principal, personal communication, August 7, 2023). The problem to be addressed through this study is that elementary school teachers in kindergarten through fifth grade are struggling with adapting their teaching to the 1:1 technology-based approach at FSD.

Rationale

Educational technology is becoming increasingly available in classrooms. Many school district administrators, including FSD, have made 1:1 devices available to every student and teacher. School administrators and teaching staff at the local school need guidance on informing instructional practices to leverage the technology for its highest and best use. “I believe the majority are still in a mindset of ‘forcing’ instruction through the devices. Not confident in their ability, lack of knowledge of the capabilities, and trust” (Principal, personal communication, August 8, 2023).

Understanding the teachers’ truths and knowledge is only possible by interacting with practicing teachers. The teachers’ successes, challenges, and resources identified as necessary in this study provided insights into the professional development the teaching staff needs to support their technology integration efforts. This study is unique because there was little research in FSD about technology integration in a 1:1 teaching and learning environment in grades kindergarten through fifth. “The current expectations for technology integration in the classroom vary within the five schools I serve” (Technology Integration Specialist, personal communication, August 9, 2022). Another distinctive aspect of this problem is that the 1:1 implementation has begun; however, the district resources available to support this process at over 100 schools have left teachers and school administration needing more guidance in using the technology to support student success and inquiry (Technology integration specialist, personal communication, August 9, 2022). The purpose of this qualitative study was to explore the successes of elementary

school teachers' as well as the resources they need to overcome challenges when integrating 1:1 laptop technology in their instructional practices at FSD.

Definition of Terms

Technology tools and educational uses have changed quickly and radically over the past decade (Gomez et al., 2022). Educators and students have gone from using whiteboards and dry-erase markers to interactive flat panels, from paper and pencil to tablets and laptops, and wireless connectivity at school and home. It is necessary to provide context and define terms that are now part of the common vernacular for educators when discussing technology integration in K-12 schools.

Educational/instructional technology: “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (AETC, 2008, p 1). Any tool purposefully used in the classroom that supports a teacher’s efforts to create meaningful and authentic learning experiences through technology (Hutchison & Woodward, 2018).

Information and communications technology (ICT): various technological tools and resources used to distribute, store, collaborate with, and create information. These tools include broadcast, radio, internet, and computer information technologies (Cuhadar, 2018; Doron & Spektor-Levy, 2019).

One-to-one technology programs (1:1): An initiative where each teacher and child have a tablet or laptop available throughout the school day and possibly at home (McClure & Pilgrim, 2022).

Technology integration: Effective implementation of educational technology to achieve intended learning outcomes (Davies & West, 2014).

Significance of the Study

This study is significant as it addressed the critical issue of understanding teacher experiences that lead to adaptations in instructional practices by teachers as they purposefully integrate technology in a 1:1 teaching and learning environment. Interest in 1:1 technology initiatives has gained momentum in school districts with heavy investments in technological resources to support student learning (McClure & Pilgrim, 2022; Ross, 2020). However, professional development to support the integration of these technologies is slower to materialize, according to research performed by Parks and Tortorelli (2021). The findings of this study revealed the resources teachers feel are necessary to support technology integration. Furthermore, additional professional development opportunities came to light to address identified challenges and how to differentiate that training for their various needs. Technology integration training could help teachers be more efficacious in their technology integration skills in a 1:1 teaching and learning environment. In that case, instructional practices could be augmented to support more personalized learning experiences (Gonzales, 2019).

If teachers begin implementing more technology at FSD, students will benefit from personalized learning experiences and the opportunity to obtain future-ready technology skills in a culture that will provide equity in access to technology (Gonzales, 2019). Karakose et al. (2021) concluded that within reach of their study, targeted professional development, grounded in the digital leadership vision, is essential for

empowering teachers during the implementation phase. Teachers can obtain practical skills, and the confidence required to purposefully implement technology if given opportunities for continuous, consistent, and refined professional development, ultimately improving students' learning experiences with technology.

Research Questions

The following questions serve to guide this research:

RQ1: What strategies do elementary school teachers use that lead to successes with technology integration in a 1:1 teaching and learning environment?

RQ2: What type of resources do elementary school teachers believe they need to overcome perceived challenges to technology integration?

Review of the Literature

Technology tools in the classroom have changed significantly over the past decade. While it may have been common to have a couple of desktop computers available for students to share previously, 1:1 computing devices are common in classrooms today (Hull & Duch, 2019). With this reality, teachers must be supported through pedagogical changes to instructional practice (Durff & Carter, 2019) to develop positive attitudes about ubiquitous technology integration (Peled et al., 2021). A synthesis of current research substantiates the need for more effective support and training for teachers in the broader scope of 1:1 technology integration.

Selected articles on technology integration in a 1:1 teaching and learning environment will be discussed in this section. The discussion areas included in this review are in-service teachers' perceptions and pedagogical beliefs of technology

integration, technology integration in a 1:1 teaching and learning environment, the technology leadership role in a 1:1 teaching and learning environment, and technology professional development. These themes/topics provide contextual information on the overarching issues surrounding 1:1 technology integration.

T3 Framework

This study is framed by Magana's (2017) translational, transformative, and transcendent (T3) framework for innovation in education, which describes actionable recommendations for teachers to integrate technologies for effective teaching and learning, and Bandura's (1977) theory of self-efficacy, which is described as an individual's belief or confidence in their ability to carry out a task effectively. Having technological devices in every classroom as a resource is moot if the teachers have no intention of incorporating the tool into the daily instructional lives of the students (Harrell & Bynum, 2018). It is necessary to understand teachers' perceptions and behaviors in their acceptance of technological innovations (Reddy et al., 2021).

Marzano (2017, in forward to Magana, 2017) stated that many school districts need help in the translational use of technology. At this phase, technology is used to automate a process using technology, but pedagogical classroom practices are unchanged. T3 was developed after examining the substitution, augmentation, modification, and redefinition (SAMR) model and the technological, pedagogical, and content knowledge (TPACK) framework for classroom use. It expanded these attributes to include actionable pathways of self-evaluation and reflection for educators. According to Wang (2018), the

T3 framework is an incremental process that encourages educational technology integration to advance agency in the learners.

T3 is a framework focused on student uses of technology that transcends the classroom walls. Merritt et al. (2022) stated that the T3 framework is a taxonomy of increasing cognitive processes for teachers and students using educational technologies. Podymov et al. (2019) argued that technological factors are redesigning the educational landscape, making the implementation of these technologies a priority to be truly transformative. Podymov et al. also found that the T3 framework is a current and useable tool for educators to transform their pedagogical practices through purposeful technology integration. According to Oon et al. (2023), technology integration that surpasses the translational phase and transforms a teacher's pedagogy into a more student-centered, inquiry-based design of real-world learning experiences can be achieved through the T3 framework.

Anyanwu (2019) evaluated new technology integration frameworks that could only be implemented with a paradigm shift in teacher education program content. His work addressed whether the education curriculum pre-service teachers interacted with created a foundation for teaching and learning that supported technological innovation. Many teacher education candidates are now born into a world with computers and the internet. However, there is an assumption that because of this, they will innately know how to bring innovative instructional practices into the classroom (Howell & Silva, 2022). This is an inaccurate assumption, given the structure of teaching training programs and existing course requirements mandated by accrediting agencies. This situation leaves

school districts at the forefront of training programs for in-field educators. Teacher education programs focus on low-level uses of technology by these individuals for productivity and teacher-centric uses as opposed to technology use for instruction, creativity, and student collaboration. Anyanwu addressed the need to understand how robotics, artificial intelligence, and augmented reality/virtual reality can be introduced into classroom routines so that students can experience the realities of today's world. This is the thinking and creativity necessary to solve today's problems. Anyanwu stated that inadequate preparation for technology integration in teacher preparation programs is the causative factor in low teacher confidence levels when confronted with technology integration. Janssen et al. (2019) supported this point as they discovered that students who were offered the ability to take more than one class in lesson design with the technology used by students were more efficacious in future lesson design. Students only exposed to one educational technology class in their preparation program will need more exposure to adequately prepare them to teach in a 1:1 teaching and learning environment. The researcher contends that the T3 framework was created to envision technology integration as a tool to solve problems. This is relevant to this study as many of the participants fall into this teacher category and have little formal training in their education to use innovative integrations in their classroom practices.

Magana (2017) is the culmination of years of research on actionable technology integration frameworks for education. The work takes the intent of the SAMR and TPACK models and adds action plans and growth goals for educator reflection. The three

stages of this process include transactional, transformational, and transcendent. Each stage has two steps, each being a precursor to growth in pedagogical practices.

The first stage of the T3 framework is translational technology use and refers to automation (T1.1) and consumption (T1.2). The first step, T1.1, is where teachers and students use technology to automate processes to improve efficiency, accuracy, and the quantity and quality of work (Magana, 2017). In other words, tasks are completed digitally instead of paper and pencil. T1.2 refers to the consumption of materials digitally, such as online textbooks and interactive resources, to improve efficiency. Digital resources are substituted for analog. These are necessary first steps but do not transform teaching and learning.

The second stage of the T3 framework is transformational technology use and refers to production (T2.1) and contribution (T2.2). The T2.1 stage represents a shift in teacher and student use of technologies to include student mastery of digital tools to create artifacts of their learning and teacher use for personalized assessment of student learning (Magana, 2017). T2.2 is centered around a student's use of technology to show their knowledge of content, to edify others, and to act as a teacher. Students explore and share content with the classroom teacher available to act as a guide.

The third and final stage of the T3 framework is transcendent technology use and refers to inquiry design (T3.1) and social entrepreneurship (T3.2). T3.1 begins with a “wicked” problem that captures students' interest and propels them to investigate and explore the whys and what-ifs of the situation with the desire to resolve, explain, or make meaningful changes to correct a problem (Magana, 2017). T3.2 is the culmination of all

framework stages resulting in original solutions to the “wicked” problems they have been investigating. This framework has actionable steps and examples to enable progression through each stage.

While new technologies are promising for the future of education, teachers benefit from guidance and examples of purposeful and transformational technology integration in everyday practice. This framework relies on teachers taking stock of who they are as educators and their beliefs about their competencies to leverage technological tools in their instructional practices. Because the purpose of this qualitative study was to explore the successes of elementary school teachers’ as well as the resources they need to overcome challenges when integrating 1:1 laptop technology in their instructional practices at FSD, the T3 framework provided a lens to interpret how the participants who were able to find successes in practice found effective integration strategies and discern resources they relied upon to address the challenges they encountered. This framework informed the codes used to analyze the data collected from participant interviews. Face-to-face and email interviews were structured around the three stages of T3 to analyze the expertise of teachers to help identify the strengths and needs of participants, identify resources, and facilitate coding and interpretation of the data.

Teacher Technology Self-Efficacy

Attitudes toward using technology in the classroom can be derived from teachers’ feelings about their competency in employing these tools as part of their daily rituals and routines (Hamutoglu & Basarmak, 2020). Bandura’s (1977) social learning theory contains the construct of self-efficacy, which focuses on how anticipated obstacles and

emotionally fearful situations can impact behaviors. This belief system is influenced by physiological reactions, actual and vivacious experiences, and verbal persuasions (Bandura, 1977). A more positive belief system about technology integration or experience from others serving as mentors raises an individual's perceived self-efficacy to support more risk-taking by implementing 1:1 technology in the classroom (Gomez et al., 2022). There is inherent value in exploring teacher technology self-efficacy to influence teachers' attitudes towards purposeful technology integration in a 1:1 computing environment. The T3 framework provides self-evaluation tools and indicators of technology integration to measure teacher and student technology usage (Magana, 2017). This framework supports the basic qualitative study and allowed for the usage of the T3 indicators to code the data received from the interviews.

Teacher Perceptions About 1:1 Technology Integration

The purposeful integration of technology into students' daily lives rests solely on the teacher of record for the classes the student is taking. Lawrence et al. (2018) conducted a mixed methods study with 26 teachers, school counselors, and school administrators to identify their perceived changes in the quality of student learning in a 1:1 teaching and learning environment. Lawrence et al. found that most participants felt that student learning had improved; however, they also found that the success of a 1:1 learning environment was based on something other than the technology used or the frequency of the usage. Lawrence et al. stated that integrating technology should prompt a substantive change in pedagogy that "transcends" traditional teaching methods. The researchers further said that teachers need exemplars of other teachers successfully

integrating technology into their daily classroom routines, which would evidence the shift in instructional practices (Lawrence et al., 2018). The issues of 1:1 teaching and learning environments and the call for focused teacher training and professional development are significant to a 1:1 teaching and learning environment.

Dogan et al. (2021) performed a quantitative multi-variate study to discern if there were differences reported by high school, middle school, and elementary school teachers in their perceptions of technology usage and integration. The researchers found that the teachers with more positive attitudes about technology and student-centered instructional methodologies used technology more meaningfully in the classroom. Dogan et al. also found that elementary school teachers had more positive beliefs than middle and high school teachers about engaging their students in meaningful learning processes. The researchers also found that school support and training were essential predictors of technology integration across all grade levels. Focused teacher training and professional development are warranted to support effective technology integration.

Cuhadar (2018) performed a quantitative study in which he surveyed 832 pre-service teachers to discern their perceptions about their readiness to integrate ICT in the classroom based on coursework in college. Cuhadar found that pre-service teachers needed adequate training and support in their coursework to prepare them for the demands of technology integration in a classroom environment. Additionally, Cuhadar found that pre-service teachers did not consider in-service teachers as exemplars or role models for technology integration. It is stated in the study that in-service teachers may need to gain the competence to adequately blend their content knowledge with pedagogy

and technology while mentoring a pre-service teacher. The novice teachers reported needing more training to integrate technology into their lesson planning. This situation will not improve once they become in-service teachers without meaningful professional development in technology integration in a 1:1 teaching and learning environment.

Dinc (2019) used descriptive analysis in a qualitative study to examine pre-service teachers' perceptions about technology integration and set out to understand their reported barriers to the integration process. The beginning of this report explores the various definitions of technology integration, including using technology to support teaching and learning or transforming instructional strategies and a shift in pedagogy using technology. Dinc found that technology use in the classroom can lead to more student-centered activities and increased student engagement in the lesson and content. The researcher also indicated that pre-service teachers perceived parental objection to technology usage and online security barriers to successful technology integration. Dinc reported that a robust technology plan and professional development opportunities are necessary for technology integration to be successful in the classroom. Professional development to support technology integration in a transformative way is an integral part of supporting teachers in innovative classrooms.

Unlike the previous studies, Aldosemani (2019) undertook qualitative research on the perceptions of 33 in-service teachers about a professional development program to support technology integration. This program aimed to transform instructional practices to make the classroom more student-centered and constructivist. This study was based on the SAMR model. This first phase of the study included 18 hours of professional

development based only on the substitution portion of the model. The researcher found that participants learned information about new technologies but needed more application strategies for successful implementation in the classroom. Utilizing a framework that supports reflection and growth goals provides a foundation for professional development in the context of in-service teachers and technology integration in students' daily lives.

Tondeur et al. (2017) reviewed qualitative evidence to understand the connection between teachers' use of educational technology and their pedagogical beliefs. The researchers used a meta-aggregative approach to analyze the results of 14 qualitative studies that contained data on teachers' pedagogical beliefs and data on how those beliefs translated to technology use in the classroom. This review aimed to synthesize the information to provide an understanding of the macro view of this topic. The researchers found a connection between constructivist beliefs and technology integration in the classroom. Additionally, they found that intentionally using technology in the classroom can lead to a teacher's belief system transformation. However, this can take a long time as their beliefs have formed over many years. This information is important because a teacher's conception of teaching and learning relates to the role they allow technology to play in their everyday routine.

Timotheou and Hennessy (2021) performed a qualitative, multi-case design study on teacher beliefs to predict classroom behaviors regarding technology integration. This study was conducted through a sociocultural lens and has contributed to understanding the conditions for successful technology implementation in the classroom. The researchers found that the structures in place in teacher preparation programs create

teachers who follow more traditional pedagogical methods. They further stated that a cultural shift is necessary for the roles of teachers and students to implement technology in the classroom effectively. Still, the examination-oriented society influenced teacher preparation programs, so technology integration is not disruptive. Finally, the researchers state that even the teachers in the model school in their study needed to learn how to use technology to improve their instruction or student learning. Teacher training and professional development are foundational to effective technology integration.

Durff and Carter (2019) undertook a qualitative multi-case study using social cognitive theory to discern how some teachers overcame barriers to technology integration positively. They explored first and second-order barriers and studied how the participant teams of administrators, teachers, and technology integration specialists successfully worked through the obstacles to using technology in their everyday teaching practices with students. The researchers found that pedagogical beliefs were ingrained in teachers from teacher preparation programs and their own school experiences. If teachers were educated in classrooms where their teachers maintained student-centric classrooms, they were more likely to have more positive attitudinal and pedagogical beliefs. They were more willing to embrace technology integration in the classroom.

Technology Integration in a 1:1 Teaching and Learning Environment

Implementing a 1:1 teaching and learning environment requires a significant monetary investment in the schools within a school district. This model means that students have a computing device (tablet, laptop, or devices from home) to use regularly throughout the day (Lawrence et al., 2018). Programs using devices that students bring

from home are commonly known as Bring Your Own Device (BYOD). Even if the program is based on a BYOD model, reducing the monetary investment, school districts must ensure they have the proper infrastructure and technical support to run the program successfully. Within a newly implemented 1:1 teaching and learning program, technical support and training are vital to its ongoing success and growth.

Kim et al. (2019) used focus group interviews of 37 teacher participants to conduct a qualitative study on the behaviors and perceptions of teachers beginning the technology integration process with tablets in a 1:1 computing program. The researchers found teacher readiness essential in practical implementation experiences in a 1:1 teaching and learning environment. Additionally, the participants in this study stressed the importance of practical, long-term support and professional development to transform their traditional pedagogical interactions using technology. Kim et al. reported that the key in a 1:1 computing environment is not necessarily the technology skillset a teacher has but the ability to use technology ubiquitously within the curriculum to create authentic learning experiences, promote increased student engagement, and more active learning experiences. Knowledge about the teachers' attitudes and perceptions of technology integration skills in a 1:1 computing program can help the success of the program.

Bixler (2019) performed a comparative quantitative study to discern how a 1:1 iPad program affected student achievement in middle school math and science classrooms. While this study did not find that the 1:1 iPad program had a significant effect on student achievement, the researcher found that participants in the study found

that the technology was helpful to their learning experiences. Additionally, Bixler found that the 1:1 technology, in conjunction with a constructivist learning environment, created a practical approach to instruction as it supported collaboration outside of the classroom. Bixler recommended that schools provide ongoing professional development to help teachers implement technology in a 1:1 computing program. A 1:1 teaching and learning environment requires professional development to support teaching staff.

Doron and Spektor-Levy (2019) conducted a 3-year longitudinal, qualitative, phenomenological case study with seven teachers to understand how teachers in 1:1 classrooms changed their views of technology integration over time. The researchers found that the school context influenced technology's ongoing, innovative integration into students' everyday lives. Doron and Spektor-Levy stated that school leaders should address the teaching staff's training and professional development concerns about 1:1 computing programs as the faculty are the individuals who are expected to shift their instructional practices. Like Cuhadar (2018), the Doron and Spektor-Levy study participants did not believe there were teacher practitioners who could serve as role models for the continuous innovation of technology tools. Doron and Spektor-Levy also found that the more reflective teachers were about their practices, the more likely they were to become change agents. Additionally, they contend that even veteran teachers are considered novices within a 1:1 teaching and learning environment. The recommendation for continuous professional development to support teachers in a 1:1 computing program is integral to the ongoing growth of the staff.

Hull and Duch (2019) conducted a quantitative study to discern whether a 1:1 technology program improved student outcomes. This study used data that provided an eight-year look back at student learning outcomes. The researchers found that a 1:1 technology program positively impacts student outcomes, but the results may take time to see. The researchers in this study did not consider the roles of parents and students in influencing student behaviors. Still, the data revealed that second-order changes are necessary for a profound transformation. Teachers need support to thoroughly understand how to leverage 1:1 technology to transform their pedagogical practices.

Frazier et al. (2019) conducted a mixed-method, two-year study on the perceptions of elementary teachers on 1:1 technology integration in the second year of implementation compared to first-year perceptions. The researchers stated that teaching practices are under enormous pressure to change because of the proliferation of technology available to teachers and students in today's classrooms. They found that teacher preparation programs and the ensuing licensure exams remain teacher-centric, a barrier to effective student-centric technology integration. This underscores the necessity for ongoing professional development to support teachers in this endeavor. The training can support strategies for technology integration into teaching practices, the management of students while using the devices, and effective ways to personalize student learning.

The qualitative 5-year longitudinal study performed by Peled et al. (2021) examined teachers' perceptions of the issues relevant to teaching and learning in a 1:1 classroom environment. The researchers triangulated data from classroom observations and semistructured interviews, with the results plotted based on the SAMR model for

discerning the depth of change in teaching and the Teacher Educational Use of Content Technologies/Teachers' Educational Use of Technologies scale to categorize pedagogical strategies. This work revealed that in a 1:1 teaching and learning environment, it can take up to three years to see evidence of change in pedagogical practices from teacher-centric to student-centric learning environments. The researchers highlighted the benefits of 1:1 technology programs and elucidated the challenges teachers encountered, and the strategies teachers use to succeed. The unique part of this study was that the teacher behavior data was cross-checked by classroom observations over these five years and found that building leadership, organizational support, and professional development are necessary for long-term success. The issues of 1:1 teaching and learning environments and the necessity of ongoing teacher training and professional development support the success of teachers in a 1:1 teaching and learning environment.

Technology Leadership Role in a 1:1 Teaching and Learning Environment

Akcil et al. (2019) performed this qualitative case study before the COVID-19 pandemic using a participant pool of all 20 school administrators working in secondary schools in Cyprus. They investigated the self-efficacy of school leaders as technology leaders in instructional practices under the umbrella of the technology acceptance model (TAM). Akcil et al. contend there is a need for a "human profile" (an individual instructional technologist or team) that stays current with new technologies, can organize and distribute information quickly and effectively, and uses technologies to carry out administrative processes. This requires that the school administration be individuals with high levels of expertise in using and modeling educational technologies for staff and

students. TAM examines the attitudes toward using emerging technologies in their institutions. Attitudes are broken down into the technology's perceived usefulness and ease of use. Akcil et al. stated that administrators should be instructional leaders in their schools. To do this effectively in this digital age, they must have expertise in integrating technology into instructional practices.

Gonzales (2019) conducted a peer-reviewed case study that provides valuable information on managing a 1:1 technology initiative from the school leadership perspective. The research was undertaken as a qualitative case study in an urban school district in the western United States. The study included 15 school and district administrators from schools participating in the 1:1 technology initiative. The data revealed that administrators were challenged to make financial decisions to sustain the program and to meet on common ground with teachers regarding technology integration expectations. Principals responded that the learning environments (inquiry and project-based learning) were enhanced using the 1:1 initiative. There have been studies on technology leadership, although only a few before the COVID-19 pandemic. Few related to a 1:1 technology initiative, the focus of this study.

Karakose et al. (2021) performed a qualitative case study conducted during/after the COVID-19 pandemic to understand the perspectives and experiences of teachers concerning their administrators' digital leadership capabilities, roles, and aptitudes. The study group consisted of 89 teachers holding a master's degree, and the researchers used maximum diversity sampling to determine the study group. Content analysis was used to analyze the data obtained from the research. The research sought to understand if teachers

perceived their administrators as capable technology leaders and if they made the teachers feel supported in the online learning environment of the COVID-19 pandemic. The researchers found that the study group felt supported by their principals, that the level of technology usage by principals was adequate, and that they contributed to the digital transformation of their schools. This study addressed the perceptions and experiences of teachers regarding their principals' support and technology competence, an essential element of a 1:1 technology-based teaching and learning environment.

Raman et al. (2019) performed a quantitative study using a participant pool of 47 school administrators and 375 teachers to identify the effect of principals' technology leadership skills on teacher technology integration. The researchers found no statistically significant relationship between the variables identified above. However, they did state that school leadership needs to be very proactive and assertive in supporting educators in integrating technology into their classrooms. Additionally, Raman et al. stated that for teachers to provide students with the necessary technical skill set to support a 21st-century classroom, they must learn to be innovative when integrating technology for teaching and learning. This work provides background in understanding the local schoolteachers' attitudes and beliefs about technology integration.

Technology Professional Development

The use of technology in the classroom requires a positive attitude on the part of the classroom teacher as well as training on how to manage the daily rituals and routines of its ubiquitous use to break through first-order barriers of technology integration (Francom, 2020; Henderson & Corry, 2021; Murphy & Groen, 2020). The local problem

in the study topic included understanding the attitudes and perceptions of the teaching staff about their technology integration skills to transform their teaching practices in a 1:1 teaching and learning environment. Doron and Spektor-Levy (2019) stated that even veteran teachers are novices in a 1:1 teaching and learning environment, and professional development is needed to support their integration efforts.

Liao et al. (2021) conducted a mixed-methods multiple case study of three teachers on the influence of technology coaching on the technology integration practices of the teachers. The researchers collected data from the personalized coaching provided to the teachers. They found that this professional development model was very effective for building the teachers' efficacy and creating positive experiences with the technology. Liao et al. stated that although the study participants had positive experiences with the technology coaching and its impact on their instructional practices, the focus on standardized testing in education was a barrier to ongoing technology integration because of the expectations placed on teachers to evidence high student achievement. The researchers contended that professional development is necessary to support technology integration and that the support should be "sustained, situated, and personalized" (Liao et al., 2021, p. 4). An ongoing professional development program should be available to support teachers in a 1:1 computing program.

Kaya and Adiguzel (2021) conducted an instrumental case study using eight participants in a mixed methods design based on the TPACK framework to address a 12-week technology professional development for in-service English language teachers. The researchers found that professional development is of great importance for in-service

instructors. Kaya and Adiguzel revealed that a multimodal reflective professional development program created positive technology integration changes in the participant teacher's classrooms. However, the researchers found that technology competence does not equate to effective integration.

In a qualitative interpretive case study, Sheffield et al. (2018) reported how much the modified reflective identity formation model (RIFM) supported teacher learning in a pilot study of 28 teachers to create compelling learning experiences using various technology tools integrated within the curriculum. The RIFM included hands-on learning experiences with reflective opportunities for discerning how to teach them in the classroom and then assess them. The participants also had opportunities to communicate and collaborate with other participants to discuss their experiences and offer support to each other. The researchers found that this long-term embedded professional development model improves teachers' effectiveness in integrating technology into their curriculum.

Implications

This study has potential implications for school district administrators and building leadership at FSD, who may be interested in the experiences of teachers who may be successful in transforming their instructional practices. The review of the literature indicated that teachers do not receive adequate training in pre-service coursework (Cuhadar, 2018; Dinc, 2019; Dogan et al., 2021; Durff & Carter, 2019; Timotheou & Hennessy, 2021), resulting in the responsibility for this training to be provided by the school district and at local school settings. Many studies on 1:1

computing initiatives are focused on student engagement and achievement (Durff & Carter, 2019; Hull & Duch, 2019; Ran et al., 2021). This study focused on improving 1:1 technology integration by the teachers at FSD. The intent was to gather information that helps understand how teachers met with success and overcame challenges and to create a dialogue about the resources needed for successful technology integration.

Findings from this study were gathered from the responses of a group of purposefully selected teachers from the local schools who were provided an opportunity to complete an email interview on their experiences with 1:1 technology implementation or schedule a semistructured interview. The responses to the email and semistructured individual interviews provided detailed strategies for addressing barriers to technology implementation and background on how they transformed their instructional practices into one that includes ubiquitous technology integration.

Summary

The purpose of this qualitative study was to explore the successes of elementary school teachers' as well as the resources they need to overcome challenges when integrating 1:1 laptop technology in their instructional practices at FSD. Section 1 provided the nature of the problem and an explanation of the purpose. A list of terms and corresponding definitions were provided to aid in understanding the nature of the study. The literature review described the T3 framework for innovation in education and the concept of self-efficacy that will be used to guide the study. Additionally, relevant and current literature related to the study topic was reviewed to provide an understanding of the issues of pre-service and in-service teachers' perceptions and pedagogical beliefs of

technology integration, technology integration in a 1:1 teaching and learning environment, the technology leadership role in a 1:1 teaching and learning environment, and professional development. This literature review provided context for the broader problem that currently exists outside of the local school. An explanation of the implications of completing this study at the local school concluded Section 1.

The next section addresses the methodology of the study. It includes a discussion of the benefits of conducting a qualitative case study, the participants, the data collection process, and the interview procedures of the study.

Section 2: The Methodology

The information contained in Section 2 includes detailed explanations of the procedures that were followed to provide answers to the research questions and the processes used to carry out the study. In addition, this section provides a thorough summation of how I obtained the data, the methodology used to analyze the data, and information on the tools and materials used for the research. The validity of my findings will be supported by the evidence found in this section.

Research Design and Approach

The research design is connected to the problem. The local problem is that elementary school teachers in kindergarten through fifth grade are struggling with adapting their teaching to the 1:1 technology-based approach at FSD. The purpose of this qualitative study was to explore the successes of elementary school teachers' as well as the resources they need to overcome challenges when integrating 1:1 laptop technology in their instructional practices at FSD. I used a basic qualitative design. Qualitative research can be described as a research model that takes place in a naturalistic setting and uses data collection techniques such as observations, interviews, and document analysis to discover perceptions and events (Ravitch & Carl, 2021). Merriam and Tisdell (2016) asserted that qualitative researchers are interested in understanding how individuals construe their lived experiences and what significance they ascribe to those experiences. Ravitch and Carl (2021) stated that it is essential that the qualitative researcher keep a fundamental truth at the center of the project: "Everyone is an expert in their own experiences" (p. 10). Basic qualitative studies are also known as generic qualitative

inquiry or interview studies (Percy et al., 2015). Basic qualitative design is used when the researcher seeks to understand the way participants personally interpret a process or phenomenon which reveals its unique significance from their point of view (Kennedy, 2016, p. 6). Basic qualitative design can rely on observations, interviews, documents, and audio and digital materials as data (Creswell & Creswell, 2018). To stimulate a discussion and obtain the perceptions of the study participants, semistructured interviews were used for this study. According to Ravitch and Carl, interviews are core to a basic qualitative approach as the emphasis is on how individuals construct meaning through their lived experiences within real world settings (p. 127). To accommodate participants in the study, interviews in a digital (email) format were an option. Email interviews are found to be useful in communicating with individuals who may be hard to reach or who may be uncomfortable in a face-to-face interview (Creswell & Creswell, 2018 p. 188; Rubin & Rubin, 2012, p. 30). The questions for both the face-to-face and email interviews were the same.

This design is a desirable choice for my study because I sought to discover the unique experiences of the 1:1 technology implementation initiative from the standpoint of the individual participants (Kennedy, 2016). This approach helped me better understand the participants' experiences with 1:1 technology integration in the classroom and their perceived successes and barriers to effective implementation. Undergirding this qualitative approach is the T3 technology integration framework which helped me understand how teachers were implementing 1:1 technology in their classrooms.

Other methodological designs were considered but rejected for specific reasons. First, I chose not to use phenomenology because I am most interested in the participants' "attitudes, opinions, and beliefs" about 1:1 technology integration (see Percy et al., 2015, p. 1), which focuses on experiences instead of what the participants are experiencing. Additionally, an ethnographic or narrative study are not good research designs for this type of study since the purpose was to understand the perspectives from two schools who may have different and distinct cultures but share in a common problem of 1:1 technology integration. Ethnography is focused on the study of a culture and its beliefs and attitudes, while narrative studies center on the story of the lived experiences and the history of the human experience (Merriam & Tisdell, 2016), which also does not fit the scope of this study.

Participant responses to the interview questions provided answers to my research questions. Those questions were:

RQ1: What strategies do elementary school teachers use that lead to successes with technology integration in a 1:1 teaching and learning environment?

RQ2: What type of resources do elementary school teachers believe they need to overcome perceived challenges to technology integration in a 1:1 teaching and learning environment?

Participants

As the purpose of this qualitative study was to explore the successes of elementary school teachers' as well as the resources they need to overcome challenges when integrating 1:1 laptop technology in their instructional practices at FSD, data were

gathered at two sites serving kindergarten through fifth grade. A purposeful sampling technique was used to collect data to achieve the research objectives. According to Black (2010), purposive sampling is a deliberate, non-random method where the researcher selects participants based on their knowledge and judgment, targeting those most likely to offer valuable insights. This approach often streamlines the research process in terms of time and cost (Black, 2010). According to Brink (1996), purposive sampling involves intentionally choosing participants because of their direct involvement and experience with the issue, providing them with specialized insight and understanding that is essential to the research. Creswell (2003) stated that purposive sampling entails identifying individuals that can significantly contribute to a deeper understanding of the problem and research questions, however, they must also be willing to thoughtfully share their experiences and insights. In addition to knowledge and experience, Bernard (2002) and Spradley (1979) stressed that beyond possessing relevant knowledge and experience, participants should also be accessible, willing to engage, and capable of conveying their thoughts and experiences clearly, expressively, and with thoughtful reflection. There were 20 teacher participants in this study with 16 choosing to complete the online version of the open-ended interview questions and four choosing face-to-face interviews. Data saturation was achieved within 16 participant responses to the online interviews and within the four face-to-face interviews. The open-ended questions allowed participants to thoughtfully share their individual experiences.

Criteria for Selecting Participants

I purposively sampled teachers who fit the following criteria for my study. Teachers all worked in a kindergarten through the fifth-grade learning environment and have used 1:1 technology for one full school year in FSD. Participants were recruited through email, asking if they would be interested in taking part in the study. The email articulated the inclusion criteria. An informed consent letter was given to the participants when the email invitation to participate was sent. The informed consent letter stated the purpose of the study, reviewed elements of informed consent, and stipulated that proceeding with the study would be interpreted as indicating understanding of, and agreement with those elements. They were given the option to participate in a face-to-face semistructured interview or through an email interview. A follow-up email was distributed after two weeks to those who chose to participate in the study to set dates and locations for the face-to-face interviews, and the email interview was sent to those who chose that medium.

Procedure for Gaining Access to Participants

Data collection did not begin until approval was received from the chief accountability officer (CAO) at FSD to conduct the study. The site locations for the recruitment were included in the FSD approval request. Once the approval was obtained from the CAO, a letter was provided for the principals at both locations to sign indicating their consent for the study to take place with teachers from their buildings. Upon receipt of this documentation from FSD, I was able to submit a request for and obtain IRB approval (03-26-24-1060157) which allowed me to begin recruiting teachers for the

study. I had previously worked at one of the site locations and currently work at the other but given my capacity as a peer and not a superior, teachers did not feel obligated to participate; however, those who did, responded openly and honestly about their experiences.

The principals at each site location were sent a copy of the email recruitment letter. My site principal told me to send the recruitment email to the staff and the other site principal sent it to the teachers there. Those teachers who decided to take part replied to me and I sent them an electronic letter of consent which detailed the confidentiality of the responses, that there would be no remuneration for participation, and that they could stop at any time during the process. Providing this information prior to consent allowed me to be accessible to, and transparent and respectful with the participants (Ravitch & Carl, 2021).

Participant Pool

There were 20 participants who contributed to this study: four from the Title 1 location and 16 from my school site. Included were 15 general education teachers, two gifted teachers and two STEM teachers, and one special education teacher. The teaching experience of the participants ranged from five years to 29 years and all grade levels were represented in the sample with the majority being third grade and multigrade teachers. The participants indicated that their classroom learning environments were characterized by friendly, supportive, and loving atmospheres. Daily schedules are structured to foster a strong sense of community with soft starts and numerous opportunities for cooperative learning. The teachers ensure a positive and safe space where students can learn, make

mistakes, and be themselves. Most indicated that their classrooms are inclusive, welcoming, and student-centered. Differentiated instruction and peer collaboration were emphasized in participant responses, promoting positive and engaging learning experiences.

Methods of Establishing a Researcher-Participant Relationship

Methods to establish a researcher-participant working relationship begin with the intention of committing fully to reflexive engagement with the participants (Ravitch & Carl, 2021, p. 194) and ensuring respectful and authentic interactions throughout the data collection process. Before data collection, everyone who was interested in participating in the study was provided with a consent form to sign to agree to participate. The consent form outlined the researcher-participant relationship, explaining the time commitment, risks, confidentiality, benefits, and how the data will be recorded. The consent form also explained the estimated disruption in their daily schedule and opportunities to schedule interviews before or after work hours.

As a school library media specialist, it is an integral part of the job to support technology integration within the school, which means there have been multiple opportunities for collaborative work with many of the participants. This collaboration often involved the school library media specialist as a technology coach and the teacher collaborator as a student. During the data collection process, I reminded participants that I was seeking their experiences with the 1:1 rollout in the hopes of gaining a better understanding of what the teachers felt they could do well with and what they needed to be successful. I had to be aware of my biases and be reflexive throughout the process.

Understanding that I may have more experience with technology integration required that responses be received non-judgmentally. As the interviewer, I had to be conscious of my verbal and non-verbal actions (Ravitch & Carl, 2021, p. 135) to avoid influencing the responses.

Additionally, probing questions and phrasing needed to be neutral. Maintaining a reflexive journal aided in documenting and examining any biases to ensure they did not interfere with the interpretation and analysis of the data. The informed consent process, the confidentiality of the collection results, and the purpose of the study were reviewed with participants to help them understand that their experiences would be aggregated to discern themes to help inform resources needed and any potential future professional development both at the school and for the district to support teacher success with technology integration.

Measures to Protect the Rights of the Participants

The confidentiality of the participants was protected by allowing anonymous responses to the email interview questions and by replacing the names of the face-to-face interview participants with pseudonyms. The informed consent received from each participant included a statement about uncomfortable moments that may arise when answering questions about their experiences with the 1:1 technology initiative and that participants could discontinue their involvement with the study without fear of negative consequences. Two sites were used for recruitment, so some of the participants are people I have never met personally or professionally. The question responses to the email interviews were automatically collected in an Excel spreadsheet and the identification

column was filled with alphabetical codes. The transcripts from the face-to-face interviews were added to the spreadsheet after ensuring school names were replaced with the word “school” and the district name was replaced with FSD for Fennario School District and were also assigned alphabetical codes.

Data Collection

Data collection did not begin until after the school district administration and Walden IRB approved the study. I sent the initial requests for study participants to the two site principals just prior to the school district’s spring break. One site principal asked that I be the one emailing the staff, and the other site principal asked that she be the one to disseminate the information to her staff as that is their local protocol. Any all-certified staff emails at that location are only sent by administration. After the break, reminders were sent to the two sites to encourage more people to take part. Those who chose the face-to-face interviews were scheduled for a time before or after school that worked with their schedule. During this same time, those who requested the email interview were provided with access to the questions. At the beginning of Week 4, a last email was sent to ensure all those who were interested had the opportunity to reply. The data collection instruments used as well as the sufficiency of the instruments to answer the research questions, systems for keeping track of the data and emerging understandings will be described in this section.

Instrumentation

The semistructured email interview questions, and face-to-face interview questions were the same, with 17 open-ended questions. The descriptive questions were

presented at the beginning of the interview to lay the foundation for the remaining detailed questions (see Merriam & Tisdell, 2016, p. 125) about the participants' experiences, successes, and challenges with implementing 1:1 technology in their classrooms. The interview questions were written to act as a guide and to lessen my anxiety as a novice researcher about the interview process (see Rubin & Rubin, 2012, p. 125). I was able to gather the true experiences of the participants about the issue without getting off-track. The qualitative research design using semistructured interviews allowed me to explore the complexities of today's classroom settings to gather the individual lived experiences of teachers as they detailed their day-to-day successes, challenges, and resources needed to continue successfully. The participants should feel that what they are experiencing is heard, relevant, and that the researcher has genuine interest in what they are saying (Ravitch & Carl, 2021, p. 126).

Procedures

Collection of the data began with the distribution of the recruitment email that detailed the particulars of the study and the inclusion criteria. The email also informed potential participants of the two interview options available to them. Attached to the email was an informed consent that was completed by interested individuals. Electronic signatures were acceptable forms of consent from those who would not be meeting face-to-face in the same space. Potential participants wrote down on the form if they wanted to complete the online version of the interview or a face-to-face interview. Once the consent form was received, the link to the online interview link was provided to the preferred

email address. Those who chose a face-to-face interview were contacted to schedule a time to conduct the interview.

The face-to-face interviews were scheduled quickly upon return from spring break. All interviews were recorded via Teams to have the transcription and recording available for review. Participants were reminded of their ability to stop the interview at any time and that their responses would be strictly confidential. The interviews lasted approximately 45 minutes each. Transcripts and recordings were assigned alphabetic pseudonyms after they were reviewed to prepare them for coding. The responses received from the email version of the interview allowed for anonymous responses and the data was collected in a secure Excel spreadsheet. These responses were also assigned an alphabetic pseudonym as they were received. The data were saved to a password protected file.

Data Analysis

The data gathered from the email interviews and the face-to-face interviews were combined in an Excel spreadsheet for analysis. The spreadsheet was organized by questions with only responses to that question included on that page. Research questions were also included on the spreadsheet to keep them at the forefront of the coding process. I read participants' responses many times before the coding process began to get a feel for the individual responses and then as a collective. Notes were made in a column on the spreadsheet if there was something that stood out in a response like a quote or content that I needed to think more about as recommended by Saldaña (2021, p. 31). Thematic analysis, which requires the synthesis of all the data to develop connections to the whole

topic (see Saldaña, 2021, p. 240), was used to develop codes from the data so I could identify patterns that would translate to categories, and then themes.

Coding Strategies

Upon completion of the data collection, review of the transcripts, and organization of the data set in the spreadsheet, I began open coding so the codes I was assigning were based on the participants' actual experiences as said in their own words because my intent was to "honor" the statements of the study participants (see Saldaña, 2021, p. 138). The initial codes were later reviewed in totality to see if there was consistency in the assigned codes, and to see if there were some that could be reworded to better capture the meaning of the participant's statement. As the codes were assigned, a codebook was created to support a thread through all the items with the same code. The codebook helped support uniformity in the coding process (Saldaña, 2021, p. 41). Once all questions that were not demographic in nature were coded, all codes were copied into one page in the spreadsheet to see occurrences of codes within all the questions.

When the coding was completed, the codes were reviewed to see relationships or categories that would encompass several codes. This process was iterative, and it was important that these categories help discern themes in responses that would allow me to answer my research questions. It was at this point that I organized the work in a visual format. Microsoft Word Smart Art graphics were used to organize the codes and categories so the themes could emerge. Once the themes were documented, the information was related back to the research questions they would answer.

Evidence of Quality and Procedures to Assure Accuracy and Credibility

To ensure accuracy and credibility, I supported focus on the purpose of the study to fully understand the teachers' lived experiences as they are all involved in 1:1 technology integration with children from ages five to eleven. I kept a reflexive journal so I could clarify my biases as I interacted with participants and processed their responses to the interview questions. To present the information in a straightforward manner, I must understand that my interpretation of the findings is shaped by my experiences and background (see Creswell & Creswell, 2018, p. 200). I created and maintained a codebook within my Excel spreadsheet to ensure I was using codes precisely throughout the data analysis. Semistructured interviews allowed me to clarify responses to ensure I was understanding what the participants meant in their responses. The email interview responses were straightforward and did not require clarification in their meaning. Finally, the data were organized in a visual map format to openly display the codes and categories leading to the development of the themes.

Procedures for Dealing With Discrepant Cases

The evidence of divergent viewpoints is addressed in the data analysis. The context of the responses will differ from participants who teach younger grades versus those who teach upper elementary students. Additionally, the participant pool is from two vastly different elementary settings. The school sites include one located in an affluent area of the district and the other is a Title 1 school located in a less affluent area. According to Ravitch and Carl (2021, p. 285), it is important to look for evidence that does not correspond to the identified themes. In doing so, it creates a challenge to take

away a new learning experience that tests “preconceived notions” (p. 285). In understanding the differences, the interpretations are more robust and authentic.

Data Analysis Results

When the data were organized, coded using in open coding, and arranged in a visual format to provide a conceptual presentation of data as desired when using thematic analysis (see Naeem et al., 2023), I was able to discern themes that were emerging in my data. Thematic analysis is an inductive process which “involves noting relationships, similarities, and differences in the data” (Ravitch & Carl, 2021, p. 239). After the open coding process and development of the codebook, codes were plotted to discern categories based on the “flow” of the data (Saldaña, 2021, p. 248) that when grouped together in a visual format revealed themes in the data (Creswell & Creswell, 2018, p. 195).

The following themes (see Table 1 and Table 2) evolved as answers to RQ1, what strategies do elementary school teachers use that lead to successes with technology integration in a 1:1 teaching and learning environment?

Theme 1: Positive Experiences Using Digital Tools for Personalized Learning and Assessment.

Participants were asked what their objectives were when they planned for the student use of technology and how they used the tools to engage students in inquiry and problem solving in their 1:1 classroom environment. Participants A, I, J, R, S, and T indicated that they used digital tools to provide student agency and autonomy, to personalize learning, and for instructional delivery and presentation (see Table 1).

Participant J stated, “I love to display images, sounds, gifs, puzzles, etc. and have the students discuss what they see, hear, or wonder.” According to Participant I,

One way I use technology to engage my students in inquiry is with our daily morning activity called Caption It. I pull up an interesting picture from the New York Times website for our morning routine. The students view the picture, ask themselves questions about it, make observations, then write their own caption for the picture.

These responses speak to the teachers engaging students with provocations which is a precursor to student inquiry and personalized learning. Magana (2017) has placed inquiry at the pinnacle of his T3 framework because it is a student-centered approach to learning that allows the teacher to act as a guide, supporting student exploration of real-world problems through the lens of their own questions. Providing students opportunities to share their voice and to have a choice in their learning experiences builds student agency (MacKenzie & Bathurst-Hunt, 2018). The use of technology to provide provocations of thinking and gather responses in real-time from students scaffolds the inquiry process.

Participants A, C, D, M, O, S, and T also indicated that they planned for and use digital tools to differentiate and personalize learning experiences for students in addition to elevating student engagement. Participant A commented, “My objectives when I use digital tools are to support differentiated learning. Also, I use technology to encourage collaborative work like researching and writing together.” “I am always looking to technology resources to further engage my students in whatever standards we're

covering,” stated Participant M. Additionally, participants responded that the use of the 1:1 technology for student progress monitoring was a big part of their planning process. For example, Participant C shared that “programs like DreamBox reading and math and typing club are used as early finisher options for students. They are helpful because they allow students to work at their own pace and level, and I can see their progress.” These remarks speak favorably about adaptive learning programs which allow teachers to collect real-time data and monitor learning progress so they can differentiate instruction to meet individual student needs.

The use of technology for student creation, collaboration, choice, and communication were among the positive experiences Participants A, G, H, K, L, O, P and R had when implementing 1:1 technology in their classrooms. Participant P indicated, “Typically, students are given a task and use technology as a tool to produce a product that helps them master the standard.” Participant L replied,

Nearpod [is used] to create interactive lessons that students can work on whole group or independently. Pear Deck transforms my daily slideshows into interactive pages for students to follow along with and apply understanding. With both apps I am able to go back and look at student contributions. I also upload graphic organizers on here so that if a student does way better with typing than with writing they have the option to turn in assignments this way.

While there were responses indicating that the teacher does not actively plan for the use of digital tools to engage students in inquiry and problem solving in their 1:1 classroom environment, there is evidence that they are seeking ways to utilize technology

in meaningful ways. “I look at the pen and paper products that students create in lesson plans and think of how we can do the same thing using technology tools,” wrote Participant N. This is the first step in the T3 Framework whereby technology tools are substituted for analog tools. According to Magana (2017), this is how teachers can use new tools to do old tasks and is a necessary first step in the technology integration continuum. There are concerns noted in participant responses about the integration of technology into their daily lessons with students. For example, participant F stated, “When I plan lessons that incorporate technology, I consider whether the use of it will enhance learning, or if it will just be a distraction. When planning, I also consider how much I will have to teach the students about using the digital tool(s) prior to them being able to use it.” This comment was noted several times within the data by participants C, N, Q, S, and T. Older students have more exposure to technology being a part of their daily routine in school making it less of a novelty and therefore less of a distraction. The teachers who serve younger grades, however, must commit more time to letting students explore the tool and learn how to use it before they can move forward with their lesson. Participant D wrote, “Honestly, I don’t. This is definitely something I need to become better at doing.” This is an indication of a willingness to plan for technology integration, but this teacher does not actively do so although all students have access to 1:1 devices. It is evident that even though these participants may not be intentional about their planning for technology integration, the data reflects substantiation that they are willing and interested in doing so.

Teachers use digital tools regularly to create visual presentations such as PowerPoint for mini-lessons, provocations to support inquiry, and to support their instruction. Participants D, F, I, and O reported that the use of visual presentations is helpful in supporting student understanding of content in whole group lessons, maintaining student engagement and active learning environments with the touchscreen panels. These uses fall under Magana's (2017) translational domain in the T3 framework. The use of these tools automates processes for teachers and students, improves productivity and supports the consumption of digital resources.

Table 1

Theme 1: Positive Experiences Using Digital Tools for Personalized Learning and Assessment

Category	Codes	Occurrences
Teachers use digital tools to provide student agency and autonomy	Student Choice	5
	Student Engagement	14
	Student Creation/Student Creation STEM	15
	Student Communication and Collaboration	4
Teachers use digital tools to personalize learning	Student Content	10
	Differentiation	
	Student Progress	16
Teachers use digital tools for instructional presentation and delivery	Lesson Visual Presentation	13
	Teacher Instructional Tools	19
	Teacher Provided	7
	Provocation	

Note. The codes and number of occurrences support each category contributing to Theme 1.

Theme 2: Teachers Utilize Digital Tools for Automation, Resources, Efficiency, and Communication

The participant responses (A, B, C, D, E, F, I) indicated that teachers use digital tools for student assessment, communication, collaboration, to design and plan for instruction, and for pre-instructional activities. The use of 1:1 technology in the classroom allows teachers to create ways for the students to review academic content. Participants E and D reported that they use digital tools such as Kahoot, Blooket, and practice sets to review content, play review games, and take assessments. Participants also indicated that the availability of the technology allows students to provide evidence of their learning by creating digital products displaying their understanding of the standards. Participant B elucidated how students use tools such as Book Creator and Minecraft to show evidence of their learning and to enhance tech skills. These responses fall in the transformational domain of Magana's (2017) T3 framework. In this domain, students are producing work that represents their understanding of content and use technology to contribute to others' learning. Within this domain, teachers allow students choice in how they will demonstrate mastery of content and will also leverage the technology use in the classroom so that students can lead others to understanding content. For example, Participant I wrote, "The students can come up to the board and use the annotation tools to highlight, underline, or circle important ideas." The school district has a proprietary LMS which allows teachers to push their assessments to their students. Participants F and P indicated that they often use the LMS to assess students as they can

observe the student input as they work. The ability to see student work in real time allows teachers to hasten the feedback loop to on error analysis.

Teachers use digital tools for pre-instructional activities including teacher planning, student resource creation, resource curation, and communication. The two schools used in this study both have a requirement that lesson plans be posted by Monday morning for administrators to view. Participants (A, I, J, L, P, Q, S, T) indicated the simplicity of lesson planning using digital tools so they can share easily with their teammates. Participants J and S wrote that daily lesson plans are written in a digital platform so that they are shared easily with team members who can then modify the plans to suit their students. Furthermore, Participants (A, B, E, F, K, O, P, S) indicated that digital tools are used to create student resources as well as curate resources for students. “When I have students go to centers, sometimes the lessons/activities are located in the LMS,” wrote Participant E and Participant O stated, “I use technology to provide access to grade-level text through digital books that read text to my students.” The ability to plan and add resources to the LMS for students to access is a timesaver for the teachers.

In addition to creating and sharing lesson plans, Participants (A, B, C, D, E, F, H, I, J, L, M, N, O, P, Q, R, S) detailed the ways they use digital tools to design and plan for instruction. Using teaching strategies such as cooperative learning and gradual release, teachers replied that they often use backward design in the planning process with technology integration to enhance the content standards. Some of the integration falls into the translational category of substituting a technology tool for an analog tool, but they are being intentional about integration when planning. “I look at what my end goal is and

then see if there is any technology they can use to meet that or show the end product,” commented Participant H, and Participant R wrote, “What's the standard? What am I trying to get them to learn? And then I kind of figure out the software.” The responses indicate a desire to be more deliberate with technology integration. Responses also revealed that participants tended towards tools they have experience with and are comfortable using.

Teachers are required to communicate with parents on a regular basis and to return emails within 24 hours. The LMS has an integrated messaging tool that teachers can easily access on their computers and phones. Participants C, F, I, M, P, and Q all responded that they use this tool along with Teams and Outlook to post class activities, schedule meetings, and communicate individually with parents. The messaging tool has features that allow teachers to create a sign-up tool for class activities, provide updates to weekly schedules, and add many file type attachments. The integration of this tool with Outlook also allows messages to be responded to via either mode. The more the teachers interface with the LMS, the more benefits they see. Participant M wrote, “.... (the LMS) is getting better and better, but I do love it for teacher communication and as a storehouse for information that students can access at home.”

Table 2

Theme 2: Teachers Utilize Digital Tools for Automation, Resources, Efficiency, and Communication

Category	Codes	Occurrences
Teachers use digital tools for student assessment	Student Content Review	9
	Student Evidence of learning	9
Teachers use digital tools for pre-instructional activities	Teacher Planning	18
	Student Resource Creation	8
	Teacher Comfort Tools	6
	Resource Creation for Student Use	6
Teachers use digital tools for communication and collaboration	Teacher Communication	8
Teachers design and plan for instruction	Backward Design	4
	Enhance Content Standards	6
	Substitution	5
	Teaching Methods	
	Gradual Release	3
Cooperative Learning	2	

Note. The codes and number of occurrences support each category contributing to Theme 2.

The following themes (see Table 3 and Table 4) evolved as answers to RQ2, what type of resources do elementary school teachers believe they need to overcome perceived challenges to technology integration in a 1:1 teaching and learning environment?

Theme 3: Teachers Feel Unprepared to Integrate Technology

Research question number two sought to understand what type of resources elementary school teachers believe they need to overcome perceived challenges to technology integration in a 1:1 teaching and learning environment. Technology integration at times was not successful because of barriers perceived in practices.

Participants (A – T) overwhelmingly responded that there was a lack of teacher training

before the 1:1 technology devices were distributed to the classrooms. Also, many (A, B, C, F, G, H, I, J, L, O, P, Q, S, T) commented that students do not come to the classroom with uniform skillsets. According to Participant K when asked about the training received prior to the devices being deployed, “I can’t think of anything specific. It’s been so long since I’ve had actual instruction on technology-now it’s only tutorials that you complete alone. (Not a fan of the tutorial only learning.)” Participant A wrote that there was no training provided to support technology integration in the classroom.

The lack of training that many participants commented on was often coupled with the concern of time available for the teacher to learn new technologies, the troubleshooting that must happen when district-wide updates are pushed to the students’ devices, and lack of clarity from school administration and the school district administrators on what the expectations are for the use of the 1:1 technology. The responses follow a continuum based on the grade level the participant teaches. In kindergarten, teachers appear to wait to get students on the devices given many students do not know their letters and numbers making logging into the devices and navigating particularly difficult. As the students move forward from grade to grade, the level of experience and comfort the students have on the devices can be correlated to the level of experience and comfort their previous teachers had with technology integration. Participant A wrote, “I would like to say that I feel there has been very little guidance given on the expectations of using the technology. I would like to know what the administration wants to see. Is there too much technology in a day or too little use?” There are over 100 schools in this school district. Without a district-wide guiding

document based on grade level standards and instructional integration ideas, each school will vary greatly based on the local administration’s priorities. Participant B stated, “I wish I could have more systematic support with it. A plan and gradual vertical alignment to see what needs to be taught and to be supported.” These barriers reported from respondents are negatively impacting successful technology integration in the classroom in the two schools involved in this study.

Table 3

Theme 3: Teachers Feel Unprepared to Integrate Technology

Category	Codes	Occurrences
Successful technology integration is negatively impacted by teacher’s’ perceived barriers	Lack of Teacher Training	21
	Tech Issues	9
	Time	8
	Student Skill Acquisition	22
	Unknown Expectations for Teacher Tech Use	3

Note. The codes and number of occurrences support each category contributing to Theme 3.

Theme 4: Teachers Believe 1:1 Technology Integration Would Be More Successful With Continuous Support and Coaching

All study participants were asked what resources they felt they needed to be more successful with technology integration in their 1:1 classrooms. Of the 20 participants, 12 (A, B, E, I, J, K, M, O, P, Q, S, T) responded that on-going teacher technology support in addition to on-demand technology coaching would be beneficial. This includes supporting grade level teams in their planning process and classroom management suggestions while students are using the devices. Looking back at the barriers mentioned above, most participants responded that they had no training prior to the deployment of

the student devices in their classrooms. Participant Q stated, "...it's like having people who are actually equipped to do the job, ... it takes a type of personality to be able to train and work with teachers." The same sentiment was stated by Participant T, "I'll show you. Then we'll do it together. Now do it by yourself, right?" Participant M wrote,

TRAINING!!! I do not have a plethora of background knowledge regarding technology, and I don't really have the time to explore everything that's out there, so I benefit most from specific training at the school level. And now that restrictions are so great, training at school would be awesome because we could be sure that the programs we're learning are county approved.

The overall feeling expressed by the study participants was that they wanted training, coaching, and mentoring on how to improve their planning and implementation of technology integration in their classrooms. The participants provided suggestions for how to meet their needs. Participant P said, "I would love to see a full-time technology integration coach that can stay with a classroom through an implementation process or a project or the roll out of a new piece of software to students." This suggestion would support the team planning process for technology integration. Participants B, Q, and T indicated that the ability to have someone available on-demand to support them in the classroom would ease their anxiety about trying something new alone. Collaboration with an experienced technology integration specialist to design learning experiences with purposeful integration of technology tools and then have that same person available in the classroom for implementation would build teacher efficacy. Additionally, Participant K wrote, "I think teachers need instruction on specific activities that align to their standards

that emphasize creativity-it's not enough just to train the teachers on products-but train them on specific products and lessons that lead to creative products and problem solving.”

The FSD has a strict vetting process for technology resources teachers can use with students in the classroom. There is a list of approved resources on the school district website, but it is not a document that has been openly articulated to staff. Media specialists know where to locate the document and try to keep their administration and staff aware of changes. Having the ability to collaborate with on-site staff to design instruction that uses vetted resources and supports the content standards would promote effective technology integration.

Table 4

Theme 4: Teachers Believe 1:1 Technology Integration Would Be More Successful With Continuous Support and Coaching

Category	Codes	Occurrences
Teachers feel they need support with technology integration	On-going Teacher Tech Support	13
	On-Demand Tech Coaching	4
	Team Planning for Integration	3
	Student Off-Task Behavior	3

Note. The codes and number of occurrences support each category contributing to Theme 4.

Results in Context of the Conceptual Framework

Magana’s (2017) T3 technology framework was the foundation on which this study was built. The data analysis addressed the research questions, and the teachers’ experiences with technology integration in a 1:1 teaching and learning environment. As

evidenced in the above discussions, teachers and students are using technology within the translational domain of the T3 framework. As explained by Magana, when something is translated, the original meaning is maintained, but the “language” is different. In terms of technology usage, this domain reflects the usage of technology to “translate” something from analog to digital.

In this domain, teachers and students use technology to automate and consume materials in a digital manner. Automation can be viewed to improve the efficiency, accuracy, quality, and quantity of the work (Magana, 2017). Teachers and students may use devices to save time (Office 365 products), minimize errors (calculations and spell check), and do tasks faster than can be done in an analog environment (digital gradebooks and research). Teachers will often curate and share resources for students to consume such as digital reading passages, e-textbooks, and online assessments. These uses do not necessarily add value to the learning experience, they just make the workflow improve. Participants addressed this in their responses when they stated that they used the LMS to distribute assessments, resources, and communication to students and parents.

There was also evidence in the data analysis that indicated some teachers are working within the transformational domain of the T3 framework. In this domain, students are using technology to produce substantiation of their learning experience in ways that would otherwise not be possible without the use of technology (Magana, 2017). The tools are used to create artifacts of their thinking in explicit ways. Examples of this evidenced in the data are students’ use of digital presentation tools such as Adobe, PowerPoint, iMovie, Book Creator, Minecraft, and various coding programs. Students are

given the opportunity to develop and share knowledge and ideas using multimodal means to make their understanding more vivid and personal (Magana, 2017). The second facet of this domain is students contributing to the learning of others. This was evidenced in one response where study Participant I indicated students explain their thinking at the interactive board at the front of the room for others to see. This is the start of contributing to another's learning. Deeper examples of this domain include student created tutorials for contributions to the learning community, which was not evidenced in the data analysis, but creates an opportunity for advancement.

The last domain of the T3 framework is transcendent technology use which includes inquiry design and social entrepreneurship (Magana, 2017). The data analysis did not present instances where this was a regular practice. Inquiry based learning is a scaffolded process for both teachers and students which requires time and commitment on the part of the teacher to allow students to follow their "wonderings" about things that matter to them (MacKenzie & Bathurst-Hunt, 2018). Keeping pace with mandated curriculum standards and allowing students to investigate issues that matter to them are divergent concepts. For teachers to move to this domain in the T3 framework, they would need to allow students to note problems that matter to them within their content standards and allow them the freedom to explore problem resolutions instead of investigating the problems teachers assign them. This is an area of growth for both schools involved in this study.

Project Deliverable

This study explored elementary school teachers in kindergarten through fifth grade adapting their teaching to the 1:1 technology-based approach. Twenty participants shared their experiences and perceptions about implementing 1:1 technology in their classrooms. The four themes that emerged from the data led to the project deliverable of an 18-hour professional development course carried out over three non-consecutive days throughout the school year. This plan to support planning for technology integration by teachers fills a gap that the teacher participants felt existed with the 1:1 technology deployment.

In Section 3, I will provide details of the project. The rationale for the project as well as a second literature review on the themes that emerged from the study data analysis will be presented. A description of the project, potential resources, roles and responsibilities, potential barriers, proposal for implementation, evaluation plan, and project implications will be provided.

Section 3: The Project

The results of this study have illuminated the need for on-going professional development for the teachers in the FSD to technology build efficacy in technology integration in a 1:1 learning environment. The study response data revealed that the staff at FSD felt they would be better able to purposefully integrate technology into their daily rituals and routines with support from a mentor or coach and ongoing personalized professional development. The objective of this 18-hour 3-day professional development program is to improve the level of comfort and efficacy teachers have planning for and implementing tools into their everyday rituals and routines. The information gained from my qualitative study has informed the creation of this project. The following addresses the project description and goals, rationale, review of the literature, project description, evaluation plan, and implications.

Rationale

Professional development in technology integration is what the participants in my study felt would best help them to enhance their teaching practices and prepare students for necessary future skills. The SAMR model (Puentedura, 2006, 2014) serves as the guiding framework for this project to support teachers to progressively integrate technology, from basic tool substitution to creating transformative learning experiences (Orak & Alagözlü, 2025). This model is particularly suited for an elementary school environment, where technology integration can begin at basic levels in the primary grades and expand to support diverse learners, foster collaboration, and make abstract concepts more accessible in the upper elementary grades. By promoting collaboration

among teachers, mentors, and coaches, schools can build a strong support system for technology integration, enhancing learning outcomes and equipping students for success (Ajani, 2024).

This 3-day professional development program is designed to provide teachers with a structured, hands-on approach to SAMR integration, taking into consideration that teachers specifically wanted hands-on training. Day 1 focuses on foundational knowledge through Substitution and Augmentation, supporting teachers in gaining confidence by introducing user-friendly and straightforward technology tools. Day 2 elevates the level of technology integration in the Modification phase, where educators redesign lessons to promote creativity and collaboration. Finally, Day 3 explores Redefinition, encouraging teachers to create innovative activities that were previously not possible with analog tools such as virtual field trips or global classroom connections.

This professional development program aligns with best practices in professional development, emphasizing active participation, reflection, and collaboration among educators (Baser et al., 2021; Bowman et al., 2022; Caneva et al., 2023; Giles et al., 2024; Godfrey, 2024). The training will be face-to-face with online resources for participants to reference. By supporting teachers with both the understanding of the SAMR model and tools to purposefully integrate technology, the program can build the confidence of teachers to improve student engagement, differentiate learning experiences, and develop critical skills.

Review of the Literature

An additional review of the literature was conducted to examine the most recent research on technology integration in the 1:1 classroom. The review of the literature concentrates on the following themes: the SAMR model; professional development for teachers, technology and instructional coaches, and communities of practice (CoP). I searched for recent peer-reviewed papers and conference reports through Walden University's online research database and Google Scholar using the search phrases *professional development or training AND 1:1 technology or one to one technology or one-to-one technology; instructional technology coaches AND teacher professional development or professional growth or professional learning; substitution augmentation modification and redefinition model; SAMR, communities of practice; and teacher professional development best practices.*

SAMR Model

According to Puentedura (2006, 2014), the SAMR model can help teachers as they think about how and why they use technology in their teaching practices. SAMR is an approach for educators to select, evaluate, and use technology in their teaching practices by following the hierarchical framework for technology usage (Ajani, 2024; Hamilton et al., 2016) and lays out the skills teachers need to guide their students through the dynamic educational technology arena (Ajani, 2024). The model has four stages of implementation which can easily translate to a professional development project to support teachers in planning for technology integration.

With a focus on the learning goal as opposed to the technology tool (McGuinness & Fulton, 2019), teachers have an opportunity to transform student learning experiences to something more meaningful. SAMR's structure, organized into four levels, provides a clear progression—substitution, augmentation, modification, and redefinition—and allows educators to gradually adopt new practices, making technology integration within reach for those with varying levels of technological proficiency (Heatherton & Trespalacios, 2021). The progression of SAMR helps teachers build confidence and competence as they move from substituting analog tools to creating transformative learning experiences. However, the SAMR model is not strictly hierarchical. Teachers can move between levels based on the context and goals of their lessons. It serves as a guide to evaluate and enhance the use of technology in the classroom, ensuring it adds meaningful value to the learning. The four level taxonomy of SAMR aligns to Bloom's taxonomy, which can help guide teachers in designing effective learning experiences while developing critical thinking skills in their students (Taylor et al., 2020).

The hierarchy of SAMR aligned with Bloom's taxonomy allows teachers to see if the lessons they are designing will support students' critical thinking skills (Bicalho et al., 2023). Puentedura (2006, 2014) originated his SAMR model with Bloom's taxonomy and later Anderson and Krathwohl's (2001) revision of Bloom's in mind. Substitution is at the base, where the technology replaces an analog tool or a digital tool that is not as robust (Orak & Alagözlü, 2025), and the Bloom's alignment is recall. The next level is augmentation where the technology tool is a direct substitute but does add functional improvement to support application of the material with the Bloom's alignment falling

into the categories of understand and apply (McClain & North, 2021). The modification level enters the transformative use of technology and is purported to increase learning value by allowing for a significant task redesign and facilitates analysis and evaluation of the material (McClain & North, 2021). Finally, redefinition utilizes technology to create new tasks that were previously unimaginable supporting evaluation and creation (synthesis). It is at this level that students achieve high levels of engagement as active learners and creators of information to display their understanding of content in a manner that is meaningful to them (Fathurohman & Rahmawan, 2021).

The SAMR model is an adaptable framework for professional development, as it applies across various subjects and grade levels, enabling teachers to integrate technology into their specific curriculum goals (Bicalho et al., 2022; Taylor et al., 2020).

Professional learning for teachers can include hands-on activities, like applying the SAMR model to lesson planning, which makes the abstract concept of technology integration more concrete and encourages experimentation. SAMR also requires reflection by the teachers, helping educators to assess whether their use of technology merely replaces analog tools or redefines tasks to achieve new learning outcomes (Puentedura (2006, 2014). This reflective piece aligns with adult learning principles, emphasizing autonomy and relevance. Additionally, SAMR promotes collaboration through group discussions and peer feedback, creating a supportive community where educators can share experiences and thoughts.

Professional Development for Teachers

The underlying theme in the SAMR model is to support teacher growth and progress towards purposeful technology integration which translates to purposeful technology use by their students. The growing imperative for teachers to integrate technology reflects a broader shift to enhancing instructional practices and student learning as conceptualized within the SAMR model (Bowman et al., 2022). Professional development for educators should be centered on enriching student learning and be powerful and continuous to be effective (Bowman et al., 2022; Giles et al., 2024; Hilaire & Gallagher, 2020). The professional development approaches taken can vary but the integration of technology, especially in a 1:1 teaching and learning environment, is more than just how to use the devices (Donohue & Aladé, 2024). The use of technology in purposeful contexts requires instructional practices to evolve whereby the teachers find value in the technology itself (Donohue & Aladé, 2024) and the participants must be self-motivated to embrace the challenge of potential changes to their teaching practices (Hartman et al., 2019).

The self-assessment and reflection that exists in the SAMR model is a precursor to effective professional development for teachers because it adds a level of personalization. Just as there is no “one size fits all” approach to student learning, effective professional development for teachers should meet the participants where they are to ensure their needs will be met. This can be accomplished by involving teachers in the planning process and ensuring the focus and instructional level are consistent with their needs (Godfrey, 2024; Hartman et al., 2019). Additionally, the professional

development offered must be longitudinal, contextual (Baser et al., 2021) and situated (Liao et al., 2021). Liao et al. (2021) found that goal setting is a crucial step in addressing the personalized needs of the teachers, as every teacher's classroom is quite different.

According to Greene and Jones (2020), teachers' professional growth hinges on their awareness of themselves, their students, the curriculum, and the learning environment (p. 114). This statement underscores the importance of understanding what drives some teachers to intentionally plan for purposeful technology integration and what deters others. The ubiquitous nature of technology in today's classrooms is a disruption to traditional teaching practices and requires that teachers be given the opportunity to move at their own pace towards successful technology integration in their daily classroom routines. Educators must design high-quality, technology-enhanced learning experiences that foster the development of students' cognitive abilities across both lower and higher-order thinking skills (Bowman et al., 2022). Teachers who are given agency and the opportunity for active participation in establishing instructional practices while deciding how technology can be integrated with content standards will help better understand themselves, their pedagogy, and their practices (Greene & Jones, 2020). The practice of offering professional development that is a combination of interaction with colleagues, individualized support, and ongoing coaching, and regular assessment of stated goals works within the SAMR model and addresses the data collected in my study.

Technology and Instructional Coaches

The data collected in my study revealed that participants desired coaching / mentoring to support their efforts to purposefully integrate technology into their daily

rituals and routines. It is my contention that this coaching/mentoring should support instruction as well as technology integration strategies. My project idea incorporates this concept by meeting teachers where they are and to provide scaffolding that results in shifting instructional strategies while purposefully integrating technology. Baser et al. (2021) studied this concept and found that the one-to-one relationship was positively received because the process supported each teacher individually in a non-threatening way at point of need, leading to a comprehensive professional development program. Teachers are seen as the conduits whose roles will determine successful technology integration practices (Ifinedo & Kankaanranta, 2021). The reflection and collaboration suggested by the SAMR model provides benchmarks to document growth and progress.

This approach, as elucidated by Huang (2023), requires that the interactions and training provided by the coach/mentor and the teacher participants have the support of administration (Bakhshaei et al., 2020; Bon & Inpin, 2024; Godfrey, 2024; Peled & Perzon, 2022) and provide opportunities for reflective feedback to ensure the participants needs are met. Bakhshaei et al. (2020) go further stating that the coaching be sustained, job embedded, and voluntary. The support needs to come in the form of technological competence and content expertise (Giles et al., 2024). Ratnayake et al. (2020) documented that support includes examining possible misconceptions and confusion students may have to ensure preparedness on the part of the teacher in both their content and technological knowledge. Professional development that focuses on innovative integration strategies, as opposed to a specific technology tool, is found to be more effective (Liao et al., 2017). The relationship between the coach/mentor and the teacher is

crucial to the success of the professional development program (Gallagher et al., 2024; Ottenbreit-Leftwich et al., 2020; Paulus et al., 2020) and the investment in task development as opposed to usage of premade resources increases teacher efficacy (Ratnayake et al., 2020).

The support and expertise of a coach/mentor will alleviate some fears teachers have about “going live” with students. Having the opportunity to work within the content with a coach/mentor to develop learning tasks will build content knowledge and confidence in the material. The partnership can then decide on the technology to use for the students to engage in the learning tasks, thereby improving efficacy in technology integration. Teachers who work with skilled and capable coaches not only meet the needs of that teacher, but also the students they serve (Gallagher et al., 2024). This experience can be elevated by also having a CoP organized by grade level so that teachers can share experiences and participants in the coaching/mentoring program can in turn support their grade level teams.

Communities of Practice

At the local school district site, all teaching professionals are required to participate in regular professional learning communities (PLCs) within their content area specialties. In an elementary school setting, this means grade level teams meet face-to-face, and specialists meet virtually with others in their geographic area at least on a bi-monthly basis (scheduled days set by the group) outside of regular planning meetings. The county also provides district wide meetings four times a year organized by content specialties. PLCs tend to be mandatory (Sadik, 2021) but CoP can support SAMR given

the volunteer nature of these groups. Peuntedera's (2006, 2014) SAMR model can be used to enable a structure teachers can use to reflection to constantly assess themselves and monitor progress as they move their students through the hierarchy to be effective creators and users of educational technology. The teachers, however, must also move themselves throughout the hierarchy to develop agency and efficacy. The SAMR model supports teacher collaboration in professional development endeavors while learning how to effectively integrate technologies into their teaching practices (Ajani, 2024).

CoP provide peer mentoring where the individuals bring their individual expertise to the table to learn from each other, share ideas, and create a supportive learning environment (Giles et al., 2024; Smith & Becker, 2021). Additionally, the act of reflection by teachers involved in CoP on the changes in their practices, their thinking, and their actions regarding technology integration is valuable in ensuring they can take further actionable steps (Smith & Becker, 2021) which is the underlying premise of the SAMR model. The use of sustained CoP and longitudinal evaluation by the group will allow for the determination of the impacts as opposed to short term programs (Smith & Becker, 2021). The hands-on practices of coaching/mentoring in connection with a CoP can positively impact professional development for teachers (Jita & Dhliwayo, 2024).

The foundation of a CoP is that the community has a shared goal and the members themselves define the roles and responsibilities of the members to work meaningfully towards the goal they have established (Sadik, 2021). A CoP in this instance would be comprised of teachers who share the common goal of improving their technology integration skills to better support the technology usage skills of their

students. The SAMR model outlines the hierarchy of steps for participants to take. As previously mentioned, the participants will likely be individuals who are at different stages in their journey. The knowledge of the collective will be shared through their interactions and is found to be an effective way for teachers to acquire technology integrations skills (Chun & Williams, 2021; Sadik, 2021). As stated by Wenger et al. (2002), the ever changing nature of communities is fundamental to how they grow and develop over time (p. 53). The ever-increasing demands on teachers to be innovative in an arena that measures that innovation with standardized tests is paradoxical, but bringing teachers together voluntarily to meet those demands can transform instructional practices. Grácio et al. (2024) found this to be the case in their two-year study of primary teachers and their use of digital tools in the primary classroom. Noted in this study is the intention to deliver technologies that equip employees with the tools and opportunities to develop new skills and create innovative approaches to instruction (Grácio et al., 2024).

Purposeful technology integration requires that teachers are provided with training and support regarding planning for the integration and the implementation of the learning experiences including those for students with learning differences (Akram et al., 2022; Anderson & Putman, 2023). Technology integration and the impact on instructional practices not only enhances the quality of instruction but also enables students to develop their skills, boost their motivation, and enhance their knowledge and information efficiently (Magana, 2017, p. 106). This is corroborated by Ghory and Ghafory's (2021) findings that students are far more engaged and interested when instruction is supported by the integration of technology. Professional learning is

successful when teachers are self-directed and embrace the professional learning to be more creative and resourceful, which can in turn, have a deep effect on their students' learning (Yu & Chao, 2023).

Project Description

Potential Resources

This project is a face-to-face, voluntary, collaborative professional development plan with three sessions focused on specific technology tools that can be used in content areas ascending the SAMR hierarchy. The sessions will take place during digital learning days once a quarter for three quarters. Resources created by me (Appendix A) and lessons created by the participants during the sessions will be housed in the district's LMS which is restricted to district employees. Each face-to-face session will allow teacher participants to investigate lesson planning to optimize technology integration with their peers. The teacher participants will be organized by grade levels during the hands-on work in the afternoon of each session. During the time between face-to-face sessions, teacher participants will be able to refer to materials, post questions to the discussion board, and schedule coaching sessions for the lessons they have created.

Roles and Responsibilities

I developed the professional development plan as the researcher seeking to meet the needs evidenced by my study participants in their responses. Teachers will be the students in this program and will be responsible for engaging with the material during the sessions and working with their peers to explore and execute lesson planning for technology integration. I will act as the facilitator for the professional development

sessions. Participants will take a brief self-assessment to provide a benchmark for where they may fall in the SAMR hierarchy with their current teaching practices. They will reflect throughout the training so they will be able to monitor their growth and progress. Teacher participants will also be responsible for soliciting support when they plan to implement the lessons in the classroom and will provide feedback throughout the program to improve the work for future participants.

Potential Barriers and Solutions

This professional development opportunity is strictly voluntary with participants having the common aspiration of improving their technology integration skills to support student success. The study data revealed that many teachers were interested in being more intentional about lesson planning for technology integration but were not sure how to approach the process. The face-to-face training with the opportunity to collaborate with peers on the same journey should support the common feeling of purpose.

This program is not meant to be a one size fits all approach. The self-assessment the participants take allows them to see where they need support and offers opportunities to share ideas with their colleagues which will support engagement in the learning process. I will be facilitating the sessions, so I will be cognizant of frustration and be available to guide the participants through simple steps to their lesson planning.

Proposal for Implementation

Before the first digital learning day, the professional development program would be presented to both building principals so they would be aware of what would be presented to their respective staff during a faculty meeting at each school. The emphasis

of the presentation would be identified as its voluntary nature, accenting that the training is designed to align with the responses provided by teacher participants in their interviews conducted for this project. The outline of the schedule is in Appendix (A) with the details of each training day.

Day 1 will be an introduction to the SAMR model and an exploration of why it is important in the context of teaching and learning today. The day will begin with an agenda for the flow of the day and general issues such as breaks, lunch, etc. We will then dive into what substitution and augmentation mean. Participants will be provided examples of each level and several technology applications that can be used as substitution and augmentation tools, such as Microsoft 365, Book Creator, Nearpod, and Padlet. They will then be given an opportunity to brainstorm ways to use the tools within their content standards. The afternoon will be a time for teachers organized by grade level CoP to work within their standards to plan for technology integration and share ideas. The participants will be shown where the training module is housed in the LMS and where they can upload their lessons and ideas for safe keeping. There will also be a class discussion where participants can ask clarifying questions. They will be guided to the evaluation tool for the session and will have the opportunity to suggest ideas for the next training session.

Day 2 will include a discussion of any questions posed in the LMS and a review of substitution and augmentation. The remainder of the session will focus exclusively on modification. Following the same format, participants will be provided an explanation of what modification means. Participants will be provided examples of this level and several

technology applications that can be used as modification tools, including the tools used for substitution and augmentation. They will then be given an opportunity to brainstorm ways to use the tools within their content standards. Again, the afternoon will be a time for teachers organized by grade level CoP to work within their standards to plan for technology integration for modification and share ideas. Participants will be reminded to complete the session evaluation tool and to upload any lessons they completed during the afternoon work session.

Finally, Day 3 will begin with a review of the previous sessions. Participants will then be provided examples of redefinition and several technology applications that can be used as tools to support redefinition. They will then be given an opportunity to brainstorm ways to use the tools within their content standards. The afternoon will be a time for teachers organized by grade level or content CoP to work within the standards to plan for technology integration for redefinition and share ideas. This session will also include a discussion of how many tools can be used to support any level of SAMR, and that this is not necessarily a linear process. They will need to understand that there are appropriate times to only substitute a tool and there are times where they will be seeking to redefine a task. It will be important for them to understand that the technology tools provided as examples could potentially be used in any level of SAMR. Participants will be reminded to complete the session evaluation tool and to upload any lessons they completed during the afternoon work session. Participants will also be provided a link to an online scheduling form to request coaching and planning for technology integration in their classrooms. The objective of this project is to provide the support the study

participants requested which includes working with them in their classrooms with students.

Project Evaluation Plan

The purpose of this project is to support teachers in planning for and implementing technology integration in their classrooms. Professional development to support teacher development in technology integration needs to provide opportunities to understand the why and how of the process; to practice planning purposefully for the technology integration; collaborate with peers; and seek support when needed (Grácio et al., 2024; Greene & Jones, 2020; Hartman et al., 2019; Huang, 2023). This professional development program will be evaluated using surveys at the end of each session, feedback gathered through the LMS discussion posts, a self-reflection form, and through anecdotal information gathered throughout each session.

Overall Evaluation Goals

The evaluation tools will seek formative feedback after each session, teacher reflections on their professional growth, and a summative evaluation of the entire program. This project addresses the needs that study participants expressed in the semistructured interviews. The initial goal is to support individual teacher growth and self-efficacy in planning and implementing technology integration in their classrooms. The secondary goal is to establish CoP so that teachers begin to work together in planning for technology integration and to share ideas. The final goal is to establish a space in the LMS for teachers to house lesson ideas and communicate about successes and challenges.

The feedback requested after each session will provide me insight into the teachers' learning experiences and allow for adjustments to future sessions in order to support the teachers where they are. There are self-reflection questions posed at the end of each session to prod participants to evaluate their growth and approaches to technology integration. These questions may also trigger questions the participants may have about approaches to planning and implementation in the classroom.

Description of Key Stakeholders

There are several categories of key stakeholders involved in this project. The kindergarten through fifth grade teaching staff, support personnel, building administration, and other school library media specialists who may be interested in training their respective staff members. After a preview of the professional development resources, the building leadership will make the decision whether the professional development will be presented to the teaching staff.

Project Implications

Social Change

The potential implications for positive social change from the project may include an improvement in purposeful technology integration in the FSD. The professional development provided to the teaching staff at both study locations could have a positive impact on the intentional planning for technology integration across content areas given the voluntary nature of the project and the collaborative aspect of the planning process. The feedback from this program could serve as a model for others in the school district to use in supporting their teachers' growth and comfort in purposefully planning for

technology integration in a way that allows students to collaborate, create and communicate their thinking. The noted gap between the deployment of the 1:1 devices and teacher training as evidenced by the participant responses will be addressed through this initiative and may support a critical need for teachers.

Project Importance in a Larger Context

This implementation of this project could benefit all schools within the district and support the development of digital efficacy of all staff members and students. Providing support through CoP, coaching, and mentoring could translate to meeting the needs of more students and therefore improved engagement and classroom success. Allowing teachers the time to explore their technology integration practices as a community that is safe and nonjudgemental will support teacher growth. Hilaire and Gallagher (2020) pointed out that just as students require differentiated support in the learning process, teachers require the same. Professional development should not be approached in a one size fits all mindset. Liao et al. (2021) found that coaching will provide more personalized approaches to professional development, but this may not necessarily lead to a change in teaching practices. Open and honest communication between the coach and teacher can; however, support a change in practice. This coupled with communication within the CoP supports the growth of the teachers in their instructional practices which benefits the students.

Section 4: Reflections and Conclusions

Project Strengths and Limitations

The strengths evident in this project are the collaborative time teachers have to spend creating purposeful technology integration lessons and the voluntary nature of the professional development. Additionally, the teachers have an avenue to schedule time for support when implementing a lesson in their classrooms. Given the voluntary nature of the training, teachers are there because of an innate desire to learn. According to Paulus et al. (2020), when teachers collaborate, creating opportunities for idea and resource sharing, they are open to constructive criticism, setting the stage for peer mentoring opportunities. The trust that is built in these situations goes a long way to building capacity within the community for continual support (Liao et al., 2021).

This project has the potential to reshape the future of teacher professional development for technology integration. Although this project was limited to two elementary schools in a large district, the findings could apply to other elementary schools who are experiencing the similar challenges with 1:1 implementation. The ability to replicate this process for middle and high school teachers is unknown.

Recommendations for Alternative Approaches

This project was framed using the SAMR model (Puentedura, 2006, 2014) and was designed to take place face-to-face to encourage collaboration, build trust among the participants, and create opportunities to arrange for support for implementation in the classroom. There are alternative approaches that could have been used to solve the local

problem of elementary school teachers in kindergarten through fifth grade struggling with adapting their teaching to the 1:1 technology-based approach at FSD.

The project could have been designed as an online curriculum that would rely on teachers being comfortable with the online learning process and collaborating in an online environment. I did not choose this approach as there is value in addressing questions and concerns as they arise in real time. The ability to provide visuals with real-time answers and suggestions during question-and-answer sessions helps move the participants forward in the learning process. Additionally, in trying to build capacity for purposeful technology integration, it is important for participants to be able to share ideas and discuss how they can differentiate lessons given their respective student needs. Also, it would have been difficult to modify the content immediately based on feedback from surveys if participants were working at their own pace.

This project could have been presented as a curriculum plan for the participants to follow over a 9-week period. This approach felt more compulsory and would lack the ongoing support and collaboration with a like-minded CoP. The face-to-face training with the hands-on collaboration work in the afternoon during contracted hours seemed to be more valuable given the teachers would be creating lessons they plan to implement with my support and the support of other teachers. The goal of this teacher professional development is to build teacher efficacy and support them as they transform their instructional practices. It is hoped they will move past the substitution phase of technology integration and see they can redefine learning tasks for their students which

has the potential to increase student engagement and improve student efficacy in technology use.

Scholarship, Project Development and Evaluation, and Leadership and Change

I have been an educator for 20 years and was in corporate finance for 16 years before working in education. My corporate background prepared me to see outside of my classroom and understand the big picture decisions that are made by school administration on a daily basis. In a district with over 105,000 students, there are many times when the flow of information to the classroom teachers is inconsistent or nonexistent. While the teachers were thrilled to receive 1:1 technology in their classrooms, they were not sufficiently prepared prior to the rollout of the devices to purposefully integrate technology into their daily rituals and routines.

Even in my corporate career, I was the one training lenders and credit administrators on how to use spreadsheet programs to analyze a company's cash flow and follow trends in their respective industries. Any time a new tool is introduced in a work environment, there is a certain disruption that takes place which has the tendency to put people on the defensive if they are not early adopters of the tool. I have seen this same situation in public education.

I have always embraced new technology early on, first in my classroom and now in my library. Most of my learning came through independent research, experimentation, and hands-on trial and error. However, it wasn't until I began pursuing advanced degrees that I engaged in formal training. There is an abundance of literature on teacher professional development, technology in schools, and 1:1 devices. I was compelled to

bring everything together by conducting a qualitative study, allowing me to understand the problem from the perspective of others who were different from myself.

The study itself and the subsequent development of this project have provided me so much insight into andragogy, teachers' fears and concerns, and empathy for those who struggle with the pedagogical shift that is expected of them when they are given 1:1 devices in their classrooms. The trust that developed through conducting interviews has increased collaboration with the teaching staff at my school and me. Prior to my work on this study and project, I often "felt" I was doing what was right for myself and my students with a vague recollection of research-based evidence from previous coursework. The completion of this work has now armed me with scholarly knowledge and resources to support my interaction with teachers in my school and hopefully others throughout the school district. I now embrace the fact that my colleagues need to be met where they are on their technology integration journeys and move each forward from that point. The goal of public education is to do what is best for each child. Providing teachers with the support necessary to develop their instructional skills to meet the students' individual needs is a fulfilling experience.

Reflection on the Importance of the Work

This work is important to me as a scholar, the teachers I serve as a school library media specialist, and potentially all teachers in my school district. Identifying the issue of teachers struggling to purposefully integrate 1:1 technology into their teaching and learning practices, researching ways to address this problem, and finally, the design of a meaningful, non-threatening way to address the issue has been edifying. Providing

educators with access to 1:1 technology is just one part of the process. Teachers cannot be criticized for lack of technology use when they have not been provided access to meaningful opportunities to plan for its integration.

The study itself allowed for teachers to safely speak about their successes and challenges in technology integration and express their needs to feel better supported in this undertaking. Authentically listening to their concerns helped me understand that while many want to make use of the devices in transformative ways, they lack the background knowledge to plan for the integration. This understanding helped create a body of work that will arm teachers with the knowledge to keep pace with the ever-changing technology landscape in education. The CoP and reflection on current teaching practices that evolve from the professional development sessions will create a safe space for ongoing creativity and innovation by the teaching staff as they become more efficacious.

Implications, Applications, and Directions for Future Research

This work has the potential to impact positive social change at the individual and organizational levels. The voluntary, collaborative, non-threatening approach to the professional development project, which was designed in response to teachers' stated concerns, has the potential to increase student engagement and critical thinking skills in the classroom through more effective use of 1:1 technologies. The students' experiences may become more personalized as teachers gain confidence in the planning process and understanding of tools that can truly transform and expand the walls of the traditional classroom. As teachers take the steps to truly transform their teaching practices, students

will directly benefit from more opportunities to practice inquiry within grade-level standards and embark on their own journey towards technological self-efficacy.

Increased engagement in the classroom environment has the ability to affect change in the school/organizational culture as well. As the CoP expands and teachers become mentors to others as they improve their skill sets, the potential exists for transformational approaches to teaching and learning. Technology integration does not mean that students are using computers all day, every day, for every classroom experience. It means that technology has been purposefully planned so that teachers are scaffolding an understanding of what tools can be used when and for what purposes. Students have the potential to mentor other students as they grow in their technology efficacy.

Theoretically, the project will substantiate the effectiveness of the SAMR model as a framework for teacher professional development to support purposeful technology integration. This model is adaptable to any content area, and as teachers grow in their efficacy, they will see how simple technology tools can be suitable for all SAMR domains. Combining this model with self-reflection on the desired outcomes and actual outcomes after implementation will help the teachers hone their planning skills and support ongoing growth. Future research could build from this program to include behavior management and digital citizenship incorporated in the planning process to support positive and responsible uses of technology by students and how teachers manage issues as they arise. Additionally, professional development that details how to address differentiation and inquiry for all students would support teachers and students in

transforming the traditional classroom environment to one where content standards are addressed in a manner that engages all students in the learning process as they are given choice in their approach to learning the content.

Conclusion

As more K–12 school districts and state standards mandate the integration of educational technology into the curriculum, teachers are increasingly challenged by effective technology integration practices. Short-term professional development initiatives have proven insufficient for addressing these challenges (Heatherton & Trespalacios, 2021). Instead, educators require sustained, comprehensive professional development that offers ongoing support, coupled with practical tools designed to foster a deeper, more meaningful understanding of technology integration.

In the current landscape of technology-embedded education, teachers experience both distinct advantages and notable challenges, with the most significant hurdle being the lack of effective professional development to support technology integration in the classroom. This project study systematically identified the primary concerns, successes, and needs, as self-reported by educators, in incorporating new technological resources into classroom instruction. Based on the data analyzed, a professional development program has been constructed to specifically mitigate the issues identified. Employing the SAMR model (Puentedura, 2006, 2014), the professional development program is designed with a teacher-centered framework that fosters collaboration and reflective practice, with the primary aim of bolstering educators' positive attitudes toward and confidence in technology integration.

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Appendix A: The Project

Professional Development Plan for FSD

Title: Purposeful Technology Integration in the Elementary 1:1 Classroom

Description: This program is designed to support teachers in integrating technology purposefully in their elementary classrooms. This training is framed around the SAMR technology integration model, and teachers will meet in face-to-face learning sessions coupled with collaborative communities of practice to create lesson plans that specifically integrate technology. Teachers will have the option of scheduling coaching and mentoring sessions through the LMS repository.

Training Design and Frequency: The professional development will take place over the course of the school year on three digital learning days when teachers are required to be on campus and local school professional development is expected. Those days are August 18, 2025, December 2, 2025, and March 2, 2026.

Learning Outcomes:

- Participants will apply d the four levels of the SAMR model.
- Participants will interact with digital applications and purposefully integrate their use in their classroom lessons.
- Participants will take apply SAMR to create lesson plans in various content areas with technology integration at one or more of the SAMR levels.
- Participants will collaborate with grade level or content area colleagues to create lesson plans that support purposeful technology integration to redefine the lessons.

Professional Development Schedule:

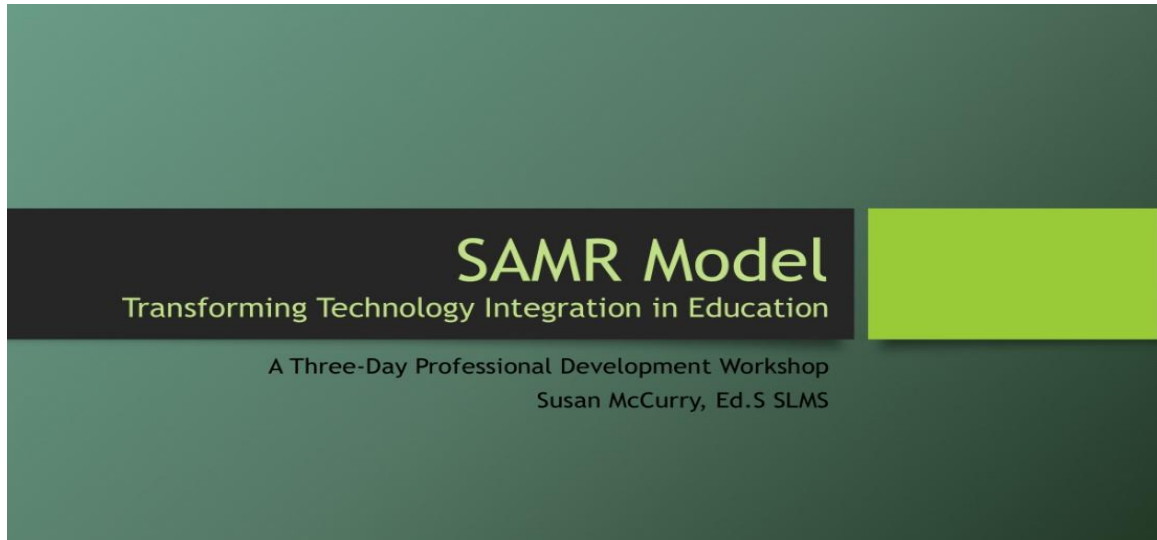
August 18, 2025	Time
Welcome, Workshop Overview and Objectives Introductions Sign-in The daily agenda Pre-Assessment	8:30-9:30
Introduction Understanding SAMR What is technology integration?	9:30-10:00
Break	10:00-10:15
Substitution Definition Examples Benefits and Limitations Implementation Strategies	10:15-11:00
Augmentation Definition Examples Benefits and Limitations Implementation Strategies	11:00-11:45
Lunch	11:45-12:45
Substitution and Augmentation Lesson Planning Tips Start with familiar tools Identify direct digital alternatives Considerations (1:1 benefit, student efficacy, learning curve, time management) Seamless transitions	12:50-12:40
Reflections on Substitution and Augmentation	12:40-1:00
Workshop Lesson Planning and Collaboration	1:00-3:00
Wrap-Up LMS Resources Discussion Area Session Evaluation/Collaboration/Coaching/Mentoring Sign-up	3:00-3:30

December 2, 2025	Time
Welcome Back and Review of SAMR	8:30-9:00
Review of Day 1 Content Today's agenda	9:00-10:00
Break	10:00-10:15
Modification Definition Examples Benefits and Limitations Implementation Strategies	10:15-11:00
Modification Lesson Planning Tips Start with familiar tools Identify direct digital alternatives Considerations (1:1 benefit, student efficacy, learning curve, time management) Seamless transitions	11:00-12:00
Lunch	12:00-1:00
Reflections on Modification	1:00-1:10
Workshop Lesson Planning and Collaboration	1:10-3:10
Wrap-Up LMS Resources Discussion Area Session Evaluation/Collaboration/Coaching/Mentoring Sign-up	3:10-3:30

March 2, 2026	Time
Welcome Back and Review of Objectives and SAMR	8:30-9:00
Review of Day 2 Content Today's agenda	9:00-10:00
Break	10:00-10:15
Redefinition Definition Examples Benefits and Limitations Implementation Strategies	10:15-11:00
Redefinition Lesson Planning Tips Start with familiar tools Identify direct digital alternatives Considerations (1:1 benefit, student efficacy, learning curve, time management) Seamless transitions	11:00-12:00
Lunch	12:00-1:00
Reflections on Redefinition	1:00-1:10
Workshop Lesson Planning and Collaboration	1:10-3:10
Wrap-Up LMS Resources Discussion Area PD Evaluation/Collaboration/Coaching/Mentoring Sign-up	3:10-3:30

Training Presentation and Resources:

Day 1 Presentation:



Workshop Overview and Objectives



- Three-day intensive exploration of the SAMR Model
- Day 1: Substitution and Augmentation
- Day 2: Modification
- Day 3: Redefinition
- Daily schedule: Theory (morning), Hands-on Workshop (afternoon)
- Interactive activities and reflection opportunities
- Practical lesson planning strategies

Understanding SAMR - The Basics



SAMR = Substitution, Augmentation, Modification, Redefinition



Developed by [Dr. Ruben Puentedura](#)



Framework for integrating technology in education



Progressive levels of technology implementation



From enhancement to transformation



Focus on student learning outcomes

What do we mean by technology integration?

Using Technology	Technology Integration
Technology usage is random, arbitrary & often an afterthought	Technology usage is planned & purposeful
Technology is rare or sporadically used in the classroom	Technology is a routine part of the classroom environment
Technology is used purely for the sake of using technology	Technology is used to support curricular goals & learning objectives
Technology is used to instruct students on content	Technology is used to engage students with content
Technology is mostly being used by the instructor(s)	Technology is mostly being used by the student(s)
Focus on simply using technologies	Focus on using technologies to create and develop new thinking processes
More instructional time is spent learning how to use the technology	More instructional time is spent using the technology to learn
Technology is used to complete lower-order thinking tasks	Technology is used to encourage higher-order thinking skills
Technology is used solely by individuals working alone	Technology is used to facilitate collaboration in & out of the classroom
Technology is used to facilitate activities that are feasible or easier without technology	Technology is used to facilitate activities that would otherwise be difficult or impossible
Technology is used to deliver information	Technology is used to construct & build knowledge
Technology is peripheral to the learning activity	Technology is essential to the learning activity

© Teach4Yes 2013

Day 1 Morning: Substitution Deep Dive

Definition: Technology acts as a direct substitute, with no functional change

Examples:

- Using O365 Word instead of paper/pencil
- Digital worksheets replacing printed ones
- E-books instead of physical textbooks

Benefits and limitations

Implementation strategies

Discussion

Substitution: Lesson Planning Tips

Start with familiar tools

Identify direct digital alternatives

Consider:

- Access to technology - We are 1:1
- Student comfort level
- Learning curve
- Time management

Focus on seamless transitions

Substitution

Replace an analog tool with a digital one

Using Digital textbooks - all district content at the elementary level is digital.

Online Productivity Tools (O365) - Word

Presentation Software - Canva, PowerPoint, Adobe, Book Creator

Online calculators

Virtual manipulatives

Substitution strategies DO NOT change the learning process or outcome. Ask yourself what you and your students will *gain* from the technology before implementing it. If it adds nothing but hassle, stick to pen and paper.

Day 1 : Augmentation Exploration

Definition: Technology substitute with functional improvement

Examples:

- Using spell-check and grammar tools
- Adding comments in shared documents
- Interactive digital flashcards

Key differences from substitution

Value-added features

Augmentation

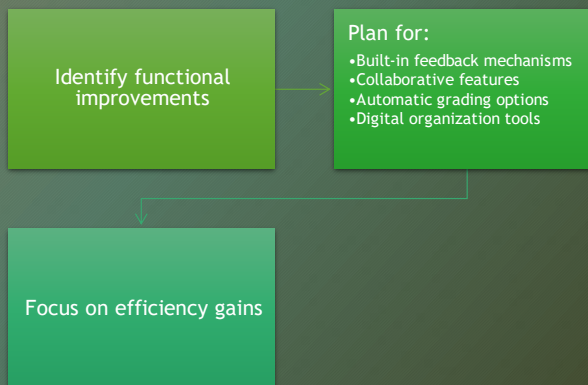
At the augmentation stage, technology goes beyond mere efficiency—it actively enriches the learning experience. It can provide students with a deeper grasp of complex concepts and present material in engaging ways that traditional methods might not achieve.

Additionally, it fosters more independent, student-driven learning. By leveraging technology as an information source, students can take an active role in their education without relying solely on teacher-led instruction.

Examples:

- Students give more informative and engaging oral presentations accompanied by a PowerPoint or Canva containing multimedia elements.
- Students use the district's digital library databases or Search Coach in Teams to independently research a topic, as opposed to relying on teacher input.
- Students use a program that gamifies curriculum content for student engagement and allows students to track progress in an accessible way.
- Teacher instruction is supplemented with a video that clarifies a particularly hard to explain concept.

Augmentation: Lesson Planning Tips



Day 1 Workshop Activities



Tool exploration session



Lesson plan conversion exercise



Peer review and feedback



Implementation strategy
development



Group sharing and discussion

Tools



ENHANCEMENT



TRANSFORMATION

BLOOM'S CORRELATION

REMEMBERING/UNDERSTANDING - APPLYING/CREATING - EVALUATING/ANALYZING

Lesson Planning

Why?

- Simply adding technology to outdated tasks won't enhance learning.
- Deliberately reshaping these tasks to align with the skills students need now, and in the future can make a meaningful impact.
- By adapting the content and the approach, technology can serve as a powerful tool for fostering relevant, future-ready learning experiences.

Remember

- SAMR is a spectrum.
- Sometimes Substitution is the best
- Sometimes Modification is what is needed
- Sometimes Redefinition is what will make the learning unforgettable.

Intentionality

- Create novel learning experiences through use of the technology because it would not be possible without it.
- Throwing tech into a lesson without considerable forethought adds no value to the learning experience as you need to know ahead of time what outcomes you are looking for.

Day 1 Reflection Questions



How can simple technology substitution enhance your current teaching practices?

What barriers might you encounter when implementing augmentation, and how can you overcome them?

Which of your existing lessons could benefit most from enhancement through technology?

Self-Assessment Form:

Teacher Self-Assessment - SAMR Model for Technology Integration

Instructions:

This self-assessment is designed to help you reflect on your use of technology in the classroom using the SAMR framework. Please take time to answer Section 1 and the three General Technology Use questions before we begin. After the end of the third session, please reflect on the questions in Sections 2 and 3. This reflection can be compared to your initial answers to evaluate your personal growth with technology integration.

Section 1: Self-Assessment Checklist

Substitution – Technology replaces traditional methods without functional improvement.

- I use digital tools to replace traditional tasks (e.g., typed assignments instead of handwritten work, online quizzes instead of paper tests).
 Never I tried it once Daily Weekly Monthly
- My students complete assignments using technology, but the nature of the learning task remains unchanged.
 Never I tried it once Daily Weekly Monthly

Augmentation – Technology enhances traditional tasks with functional improvements.

- I use technology to improve engagement and efficiency (e.g., multimedia explanations, interactive quizzes with instant feedback).
 Never I tried it once Daily Weekly Monthly
- My students benefit from digital tools that streamline accessibility, collaboration, and real-time feedback.
 Never I tried it once Daily Weekly Monthly

Modification – Technology significantly redesigns tasks for improved learning experiences.

- I integrate collaborative digital tools (e.g., shared documents, virtual discussions) to enhance student interaction and critical thinking.
 Never I tried it once Daily Weekly Monthly
- My students use technology to modify learning experiences (e.g., creating multimedia presentations, simulations, or interactive projects).
 Never I tried it once Daily Weekly Monthly

Redefinition – Technology enables tasks previously inconceivable in a traditional classroom.

- I design learning experiences that utilize technology in innovative ways (e.g., podcasts, coding, virtual reality explorations).
 Never I tried it once Daily Weekly Monthly
- My students engage in technology-driven activities that connect them with global audiences or experts.
 Never I tried it once Daily Weekly Monthly

General Technology Use

1. How confident do you feel in integrating technology into your lessons? What factors influence this confidence?
2. What professional development opportunities or support would help you enhance technology integration?
3. How do students respond to technology-enhanced activities? Do they improve engagement or learning outcomes?

Section 2: Reflective Questions to be completed after day 3.

Substitution & Augmentation

4. Are your digital tools improving student learning, or are they simply replacing traditional methods?
5. What challenges do you face when transitioning from basic substitution to meaningful augmentation?
6. How can you further enhance efficiency or engagement through technology?

Modification & Redefinition

7. Have you modified lesson plans using technology? If so, how has it influenced student learning?
8. Can you recall a time when technology enabled an activity that wouldn't be possible in a traditional classroom?
9. How do you encourage students to use technology in creative and innovative ways?
10. What barriers prevent you from implementing technology at the **Modification and Redefinition** levels?

Student-Centered Technology Integration

11. How do you ensure technology enhances learning rather than becoming a distraction?
12. How do you assess whether technology is improving student engagement or achievement?
13. How do you personalize technology integration for diverse learners?

Future Goals & Growth

14. Where would you like to see your technology integration practices in the next year?
15. What steps can you take to explore new digital tools that align with the **Modification and Redefinition** levels?
16. How can collaboration with colleagues strengthen technology integration practices?

Section 3: Action Plan

Based on your reflections, outline three steps you can take to improve your technology integration:

1. _____
2. _____
3. _____

Day 1 Reflection Questions in Padlet:

Susan McCurry, 5/12/2025 ↻

:Padlet

Day 1 Reflection Questions

How can simple technology substitution enhance your current teaching practices?

What barriers might you encounter when implementing augmentation and how can you overcome them?

Which of your existing lessons could benefit most from enhancement through technology?



Evaluation/Survey in Microsoft Forms (This will be provided after sessions 1 & 2):

SAMR Professional Development Evaluation Day 1

Please answer the following questions honestly so I can adjust instruction to meet your needs.

* Required

1. How satisfied are you with the knowledge you gained from the course?

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very dissatisfied

2. Do you feel you achieved your desired learning outcome?

- Yes
- No
- Not sure

3. How would you rate the instructor's overall teaching performance?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Poor

Excellent

4. How do you agree with the following statements? *

	Extremely disagree	Somewhat disagree	Neutral	Somewhat agree	Extremely agree
The instructor prepared well at the start of each class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor communicated clearly on course expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor delivered course in a clear and easy-to-understand approach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor encouraged participants in-class participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor maintained my interest throughout the whole course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor thoroughly answered questions from participants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor had good time management during class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor communicated clearly on course assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. How likely are you to recommend this course to a friend or classmate?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Not at all likely

Extremely likely

10. What comments or concerns do you have about today's session? *

11. What comments or concerns do you have about future sessions? *

12. Is there something you hoped would be addressed in more detail? If so, please explain. *

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

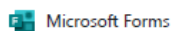


Last page of the Evaluation after day 3:

⋮
12. What suggestions do you have for future professional development sessions on technology integration? *

13. Is there any additional feedback you did not address elsewhere in this document? *

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.



Lesson Plan Document for SAMR:

Subject:	Grade:	Date:
Unit:		
Lesson Title:		
Objectives:	Outcomes:	
Content Standards Addressed:		
Instructional Strategies:	Technology Needed:	
How Does the Technology Support the Outcome:	What is the SAMR Level:	
	Is the Tech for: Engagement or Enhancement	

Learning Activities:	
Differentiation:	Extension:
Reflection Notes:	

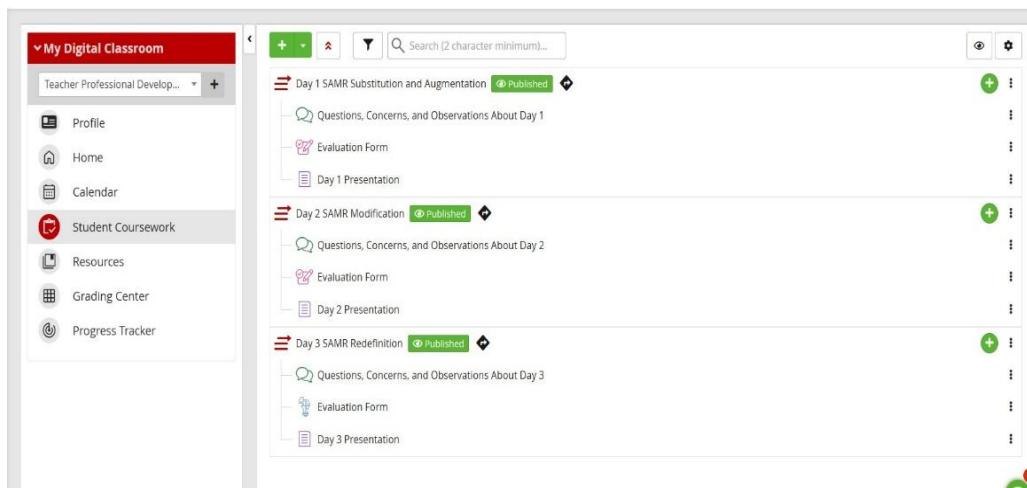
Learning Management System Homepage:

The screenshot shows a Learning Management System (LMS) interface. On the left is a sidebar titled "My Digital Classroom" with a "Teacher Professional Development" dropdown menu and navigation links: Profile, Home, Calendar, Student Coursework, Resources, Grading Center, and Progress Tracker. The main content area is titled "Teacher Professional Development for Technology Integration" and includes three panels: "Instructor(s)" showing Susan McCurry, "Roster" showing Susan McCurry, and a "Class Board" featuring a "Tech & Lesson Menu" for "Ms. McCurry's".

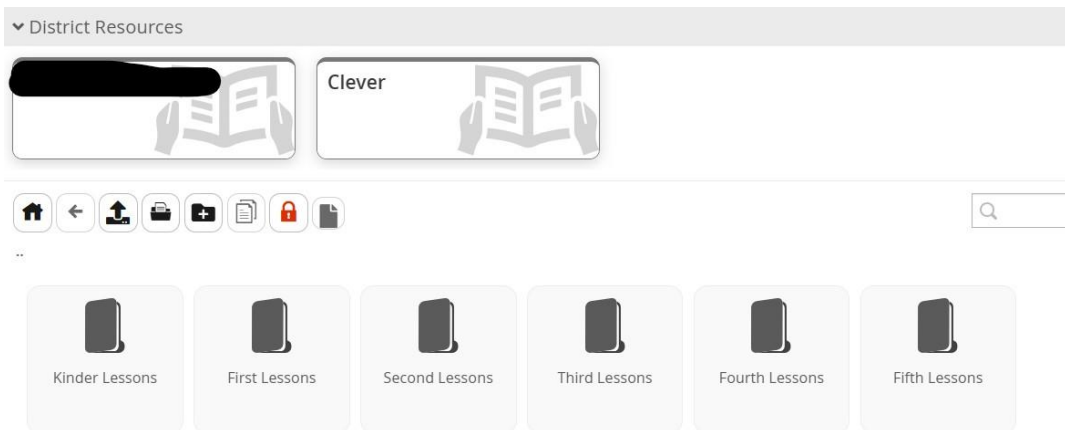
The "Tech & Lesson Menu" is a blue-themed graphic with the instruction "CLICK ON THE CIRCLE (NOT THE WORDS) TO SCHEDULE!". It is organized into three sections:

- APPETIZERS**
 - TROUBLESHOOTING** (75 MINUTES): Tech tool help whenever it is convenient for you!
 - LESSON PLAN SPICE UP!** (15 MINUTES): Send me your lesson and I'll suggest some tech!
 - GOAL SETTING** (15 MINUTES): Set a goal for tech integration! What do you want to become great at?
- MAIN COURSE**
 - COLLABORATION** (40 MINUTES): 1:1 or whole team; let's plan tech integration! I can provide you or your team with ideas on how to support your content.
 - LESSON MODELING** (50 MINUTES): Tell me the tool and content and I'll model a lesson using it!
 - LESSON CO-TEACHING** (30 MINUTES): I'll support tech integration or research with you.
- DESSERT**
 - STUDENT TECH TRAINING** (45 MINUTES): I will train your students how to use a tech tool.
 - MC EDU ASSISTANCE** (50 MINUTES): I will assist you with Minecraft.
 - R2G TECH ACTIVITY**: I will create a tech activity or assessment for you.

Learning Management System Participant Classroom:



Learning Management System Lesson Repository



Day 2 Presentation:

Day 2: Modification Introduction



Definition: Technology allows for significant task redesign



Moving beyond enhancement to transformation



Focus on:

Student collaboration
Creative expression
Interactive learning
Real-time feedback

Modification: Practical Applications

Examples:

- Collaborative digital storytelling
- Interactive presentations
- Online peer review systems
- Virtual lab simulations

Tool recommendations

Best practices

Modification: Lesson Planning Tips

Redesign traditional assignments

Incorporate:

- Multimedia elements
- Real-time collaboration
- Dynamic assessment
- Interactive feedback

Focus on student engagement

Tools



ENHANCEMENT



TRANSFORMATION

BLOOM'S CORRELATION

REMEMBERING/UNDERSTANDING - APPLYING/CREATING - EVALUATING/ANALYZING

Day 2 Workshop Activities

Lesson
transformation
exercise

Digital tool
integration
practice

Assessment
redesign
workshop

Collaborative
project
development

Implementation
planning

Day 2 Reflection Questions

How can
modification
change the
nature of
student learning
in your classroom?

What new
assessment
opportunities
arise through
task redesign?

How can you ensure
technology
enhances rather
than complicates
learning?



Day 2 Reflection Questions Padlet:

:Padlet

Susan McCurry 5/12/2025 ↻

Day 2 Reflection Questions

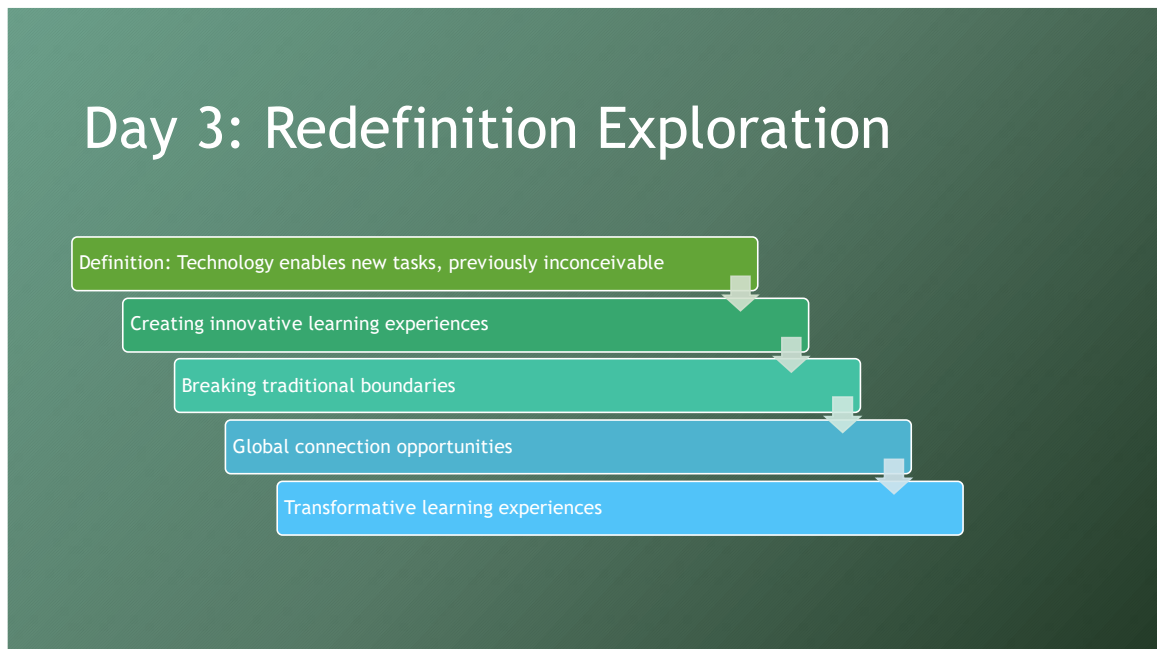
How can modification change the nature of student learning in your classroom?

What new assessment opportunities arise through task redesign?

How can you ensure technology enhances rather than complicates learning?



Day 3 Presentation:



Redefinition: Revolutionary Examples



VIRTUAL FIELD
TRIPS WITH
EXPERT
INTERACTION



GLOBAL
COLLABORATIVE
PROJECTS



STUDENT-
CREATED
DIGITAL
CONTENT



REAL-WORLD
PROBLEM-
SOLVING USING
BIG DATA

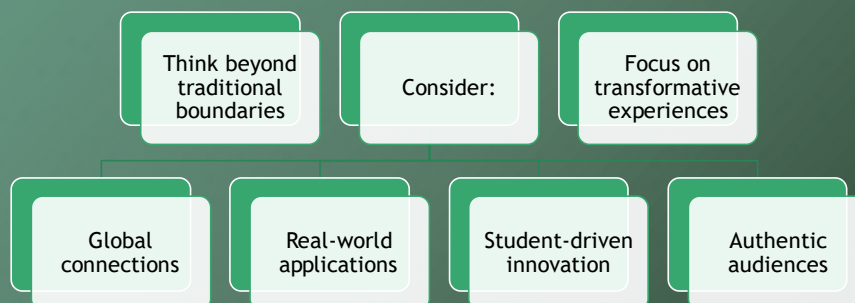


AUGMENTED
REALITY
EXPERIENCES



CROSS-
CULTURAL
EXCHANGE
PROGRAMS

Redefinition: Lesson Planning Tips



Day 3 Workshop Activities



Innovative lesson design



Technology integration planning



Global connection project development

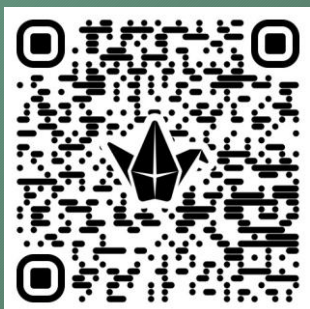


Implementation strategy creation



Presentation of transformed lessons

Day 3 Reflection Questions



How can redefinition create learning experiences that were previously impossible?

What new opportunities for student creativity and innovation can you identify?

How will you continue to evolve your technology integration practices?

Day 3 Reflection Questions in Padlet:

:Padlet

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Day 3 Reflection Questions

How can redefinition create learning experiences that were previously impossible?

What new opportunities for student creativity and innovation can you identify?

How will you continue to evolve your technology integration practices?



Moving Forward: Implementation Plan



Set realistic goals



Start small and build gradually



Create support networks



Schedule regular reflection time



Plan for continuous improvement



Share successes and challenges



Maintain focus on student learning outcomes

Note Document for Tools Presented:

Padlet

Substitution - students answer a question on a Padlet rather than by using paper and pen.

Augmentation - students create Padlet responses that include adding drawings, images, links to websites, or videos.

Modification - students comment on each other's Padlet comments and/or offer feedback on their work.

Redefinition - create timelines, maps, and other virtual bulletin boards to share with other students and teachers using the provided URL (or QR code). Additional students can post stickies on the Padlet and comment to collaborate.

Ideas for Padlet: (<https://teachersfirst.com/blog/2023/03/tech-tool-of-the-month-padlet-part-1/>)

General lesson ideas for any subject:

- Use Padlet to color-code shared resources for differentiation and then tell students which color to explore.
- Create an introduction Padlet where students can say hello, tell a bit about themselves and share a photo of something important to them.
- Create a class Padlet with "Class Happenings and Highlights." Share the link with families and students. Visitors can post their own items and add comments to your stickies. (We suggest taking advantage of the moderate content option in this situation).

- Create a Padlet as an exit ticket related to any lesson's content. You could also save time by creating one Padlet for the entire week (or even month) in a Shelf layout putting each daily question in a separate column.
- Share a Padlet to use for collaboration during remote learning lessons.
- Create a Padlet for student reflection after a lesson in any subject.
- Create a timeline Padlet sharing the order of steps in an assignment. Students can ask questions about each step by adding comments to those specific stickies.
- Use the Shelf layout for group work. Each group can have a shelf to collaborate on, share questions, or learn information.
- Use Padlet to organize information by units (in any content area). Use whatever layout works best for you to share links to websites, games for practice, project options, videos to learn additional information, and more.
- Use Padlet as a brainstorming board for any new topic that is introduced. See what your students already know about the subject. Add additional stickies throughout the unit as more information is learned.
- Use Padlet as a Q&A board in your class. Rather than stopping mid-lesson or sending an email from home, students can post any questions to the Padlet, and you can address the questions with the entire class or individual students.

Social Studies:

- Sequence historical events from the Battle at Gettysburg (use the timeline layout).

- Identify various countries using the map layout (add images, videos, and text).
- Sequence events during the Holocaust (using the Timeline layout).
- A stream layout to highlight the life of a famous person.
- The three branches of the US government (use the Shelf layout and create three columns for the information).
- Sequence how a bill becomes a law (use the Timeline layout).

Science:

- The butterfly's lifecycle (use the Timeline layout).
- The food chain (Timeline layout).
- The results of a science experiment.
- Sequence the phases of the moon (Timeline layout).
- Causes and effects of hurricanes on a Grid layout (be sure to have students label if it is a cause or effect).
- Sequence the steps of the Scientific Method (Timeline layout).
- Use the Shelf layout to share various types of animals. Students can list animals in the appropriate columns (such as reptiles, amphibians, or mammals).

Math:

- Have students create math problems for the class to answer and have the questions shared on a Wall layout. Students can use the comment features to answer math problems.
- Share sites for math learning groups to use for practice. Use the Shelf columns to differentiate for each math group.
- Assign students different types of shapes and have them find images representing them and explain the shape during a unit in geometry.
- Add vocabulary words for algebra (or another math course) and assign students to fill in the definition for 1-2 of the terms for homework (be sure they include their names!).
- Create a Math Help Board where students can post questions about nightly homework and help one another.
- Have students use the Draw option to respond to math problems you post on a Padlet.

Language Arts:

- Sequence events of a story (Timeline layout).
- Have students identify the difference between the homophones hear and here by writing original sentences using the words and drawing images.

- Demonstrate an understanding of an oxymoron by finding an image and writing a post on your Grid layout.
- Use the Shelf layout to create columns to discuss novels. For example, add a column related to the characters, settings, themes, and other literary concepts you teach.
- During a media literacy lesson, challenge students to use background colors to add facts, fiction, and media bias examples.
- Review vocabulary words.
- Use the Shelf layout with young students to sort beginning sounds and add easy words. Do a column for a few letters each week and have students add a word to every column.

Book Creator

Substitution – Students summarize a concept or book, illustrating it with photos or diagrams.

Augmentation – Students document their learning journey in a particular subject, embedding videos of themselves explaining concepts or reflecting on challenges.

Modification – Students interview community members about a local issue and create a multimedia book to share their findings and raise awareness.

Redefinition - Students collaborate in real-time on a Book Creator project with peers from different schools or countries to create a multilingual, multimedia eBook on a global

issue, incorporating contributions from all group members, and publishing it online for a global audience.

Ideas for Book Creator (<https://alicekeeler.com/2024/05/29/beyond-substitution-elevating-learning-with-book-creator/>)

Collaborative Literary Journals

In language arts, students can work together to compile a literary journal. Groups can discuss, select, and review literature, sharing responsibilities to create a comprehensive analysis. This collaborative approach enhances their critical thinking and communication skills as they debate themes, characters, and narratives.

Team Science Explorations

Encourage students to form teams for their science projects, using Book Creator to document their experiments and results collaboratively. By combining their findings into one well-rounded documentary-style book, students learn from each other and practice effective communication and teamwork.

Multilingual Storybooks

Encourage language learners to create multilingual storybooks. This project can help students apply their language skills in a creative context, allowing them to write and narrate stories in multiple languages, which supports linguistic and cultural learning.

<https://edtechbooks.org/onlinetools/book-creator>

Historical Time Capsules

In social studies, students can collaborate to create a digital time capsule for a historical period they are studying. Each student can contribute different elements like interviews

with historical figures, analyses of events, and multimedia presentations, culminating in a rich, collaborative project that offers diverse perspectives on history.

Math Problem Solving Teams

Math classes can use Book Creator for students to solve complex problems together. By documenting their problem-solving process, students can reflect on their strategies and explain their thinking, sharing insights and learning collaboratively. Students can enhance their problem-solving strategies with videos and audio.

Science Fair Project Documentaries

Transform the traditional science fair project by having students create a documentary in Book Creator. They can document their hypothesis, experimental process, and results through a mix of text, images, and videos. This digital approach not only supports scientific inquiry but also enhances students' ability to communicate complex information effectively.

Nearpod (<https://nearpod.com/blog/samr/>)

Substitution – Nearpod can be integrated at the substitution stage by replacing physical handouts or printed worksheets with digital versions. Teachers upload PDFs or documents to Nearpod, which students access through their devices. This substitution saves time, reduces paper usage, and provides a convenient way for students to access learning materials.

Augmentation – Nearpod supports augmentation by offering interactive activities and assessments like Polls, Quizzes, Time to Climb, and more. Teachers create interactive presentations with embedded questions and multimedia elements, making lesson plans

more engaging and interactive. Students then actively participate in learning by responding to questions, sharing their thoughts, and receiving real-time feedback.

Modification – Nearpod facilitates modification by enabling collaborative activities and dynamic discussions among students. Interactive activities and features, such as Collaborate Board, Time to Climb, Draw It, and more, promote group work, encourage peer feedback, and foster collaborative problem-solving. Students actively engage with their peers in real-time, enhancing their communication and critical-thinking skills.

Redefinition - Educators can apply the redefinition to Nearpod using its collaborative features, such as Collaborate Board, Immersive Reader, and more, to create engaging and interactive learning experiences in their existing projects. Nearpod's Virtual Reality (VR) Field Trips and 3D models take students on virtual field trips and simulations, providing immersive and hands-on learning opportunities through real-world examples. By integrating these features, teachers redefine traditional classroom practices, foster collaboration, and enable students to explore content in innovative ways.

Students redefine how they express their learning by creating interactive presentations that go beyond traditional slideshows. Dynamic and interactive lessons highlight students' creativity, collaboration, and communication skills as they incorporate videos, audio recordings, interactive quizzes, and VR Field Trips. Tools like Nearpod cultivate students' confidence in sharing their work with peers and teachers, preparing them for future platforms and interactions. These projects can be shared within the classroom and beyond, so students can display their abilities and build essential skills for the digital era.

Canva (<https://edtechbooks.org/onlinetools/canva>)

Original assignment: Learning about air pollution

- **Substitution:** Each student creates a poster about air pollution (rather than drawing it on paper).
- **Augmentation:** Students share their air pollution posters with each other and provide feedback online through the Canva team feature.
- **Modification:** Each student works with a classmate to collaborate on the creation of a team poster about air pollution.
- **Redefinition:** Student teams share their posters with the public via social media, solicit feedback, and invite people to collaborate on their posters.

Learning Activities

Biology

In Canva, have your students use infographic templates and create infographics about animals.

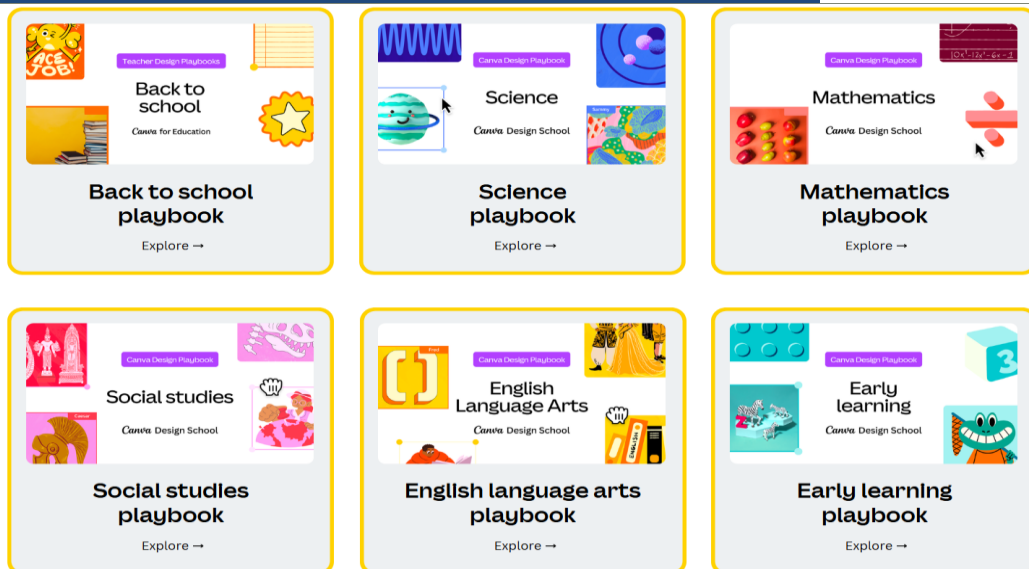
Science

Encourage students to design climate change posters to raise public awareness about an important environmental issue.

History

Have students use the “Infographic timeline” template to visually map a specific time in history.

<https://resourcepage.my.canva.site/teacher-design-playbooks>



Appendix B: Interview Protocol and Questions

Participant: _____

Date: _____ Time: _____

Introduction: Thank you for giving me your time today. This interview will take approximately 45 min to one hour. The purpose of the interview is to collect your thoughts about strategies, challenges, and resources needed to integrate technology successfully into a 1:1 teaching and learning environment. I will be using the audio record function within Microsoft Teams while the interview takes place, and the audio file will be downloaded at the end of the interview along with the file transcript. I will also take notes while you respond. You will not be identified in the study as a participant, and all responses are kept confidential. You may choose to end the interview at any time and not answer any question(s) of your choice. Before we begin, do you have any questions concerning the interview protocol I just explained?

[Start Recording]

Before we begin the interview, I would like to ask a few general questions about you before delving into your thoughts on strategies, challenges, and resources needed to integrate technology successfully into a 1:1 teaching and learning environment. Do you have any questions?

Demographic Questions

1. Please tell me a little about yourself.
2. What is your role at school?
3. How many years have you been teaching?
4. What grade students do you serve?

Teacher Interview Questions

1. How would you describe your classroom learning environment?
2. Please tell me what you understand technology integration to be.
3. Describe the digital tools/technology you use personally for your work and how you use them.
4. Describe the digital tools/technology you use when teaching and how you use them.
5. How do you go about planning to incorporate digital tools/technology into your lessons for student use?
6. What are your objectives when you plan for the use of digital tools/technology for student use?
7. Explain how you use the digital tools to engage your students in inquiry and problem solving.

8. Describe instructional strategies you use that incorporate digital tools with inquiry and problem solving.
9. Please share some challenges you experienced integrating technology for student use into your daily classroom rituals and routines.
10. Describe specific ways your students use technology in the classroom throughout the day.
11. What technology integration training did you receive prior to the implementation of the 1:1 technology?
12. What resources do you feel are necessary to integrate technology in the classroom for student use successfully?

Thank you so very much for the time you have given to me today. The next steps are finishing my interviews and organizing the participants' responses. If I have clarifying questions once I review the transcript, is it ok if I reach out to you to ensure I have the correct understanding of your experiences?

Thank you!

Appendix C: Email Interview Questions

Introduction: Thank you for agreeing to participate in this study. This email interview will take approximately 45 min to one hour to complete. The purpose of the interview is to collect your thoughts about strategies, challenges, and resources needed to integrate technology successfully into a 1:1 teaching and learning environment. You will not be identified in the study as a participant, and all responses are kept confidential. You may choose to end the interview at any time and not answer any question(s) of your choice. If you have any questions before you begin, please email me. I will respond as quickly as possible to provide you an answer.

Before you answer the interview questions about the topic, I would like you to answer a few general questions about you before delving into your thoughts on strategies, challenges, and resources needed to integrate technology successfully into a 1:1 teaching and learning environment.

Demographic Questions

1. Please tell me a little about yourself.
2. What is your role at school?
3. How many years have you been teaching?
4. What grade students do you serve?

Teacher Interview Questions

1. How would you describe your classroom learning environment?
2. Please tell me what you understand technology integration to be.
3. Describe the digital tools/technology you use personally for your work and how you use them.
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6. What are your objectives when you plan for the use of digital tools/technology for student use?
7. Explain how you use the digital tools to engage your students in inquiry and problem solving.
8. Describe instructional strategies you use that incorporate digital tools with inquiry and problem solving.
9. Please share some challenges you experienced integrating technology for student use into your daily classroom rituals and routines.
10. Describe specific ways your students use technology in the classroom throughout the day.

11. What technology integration training did you receive prior to the implementation of the 1:1 technology?
13. What resources do you feel are necessary to integrate technology in the classroom for student use successfully?

Thank you so very much for the time you have taken to answer these questions. The next steps are finishing my interviews and organizing the participants' responses. If I have clarifying questions once I review the transcript, is it ok if I reach out to you to ensure I have the correct understanding of your experiences? Yes _____ No _____

Thank you!