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Elementary School Teachers' Implementation of the Substitution, Augmentation, Modification, and Redefinition Model in Their Instruction

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Walden University

College of Education

This is to certify that the doctoral study by

Carlos Jenkins

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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Dr. Karen Hunt, University Reviewer, Education Faculty

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Walden University
2021

Abstract

Elementary School Teachers' Implementation of the Substitution, Augmentation, Modification, and Redefinition Model in Their Instruction

by

Carlos Jenkins

MS. ED, Kaplan University, 2014

BA, Coastal Carolina University, 2011

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

August 2021

Abstract

Teachers in a rural southeastern state school district are not integrating technology in ways that provide students with engaging technology-based learning experiences. The purpose of this study was to explore teachers' current technology-based instructional practices based on the substitution, augmentation, modification, and redefinition (SAMR) model. This project study was guided by three research questions focusing on how elementary teachers integrate technology in their instructional practices, the levels of SAMR being implemented by elementary teachers, and the SAMR levels of students' technology related assignments. The study was conducted using an instrumental case study design, and data were collected through interviews, observations, and lesson plans for 12 elementary teachers. Data analysis was conducted using a priori and inductive coding to generate themes. The findings revealed that though teachers are integrating technology, integration is typically more teacher-centered or at the substitution and augmentation levels when student-centered. Based on the findings, a 3-day professional development workshop was created for teachers with a review of the SAMR model and methods to shift their instructional practices to higher levels of the SAMR model. This study promotes positive social change by providing technology-based professional development opportunities for teachers in the local district that encourage them to use technology resources to increase student engagement and transform student learning.

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Dedication

This work represents a long and demanding journey that could not be possible if not for my many close friends and family members. Many of you have played a key role in my achievement of this endeavor. For all of the “You got this, man!” and “Just get it done!” messages, I am eternally grateful for them all. You all will never know the importance you have played in me continuing this process. I would not have made it this far, if it were not for your continuous encouragement.

I am also grateful for the angles watching over me daily and I pray that I have made you proud. I love and miss you both dearly: Gussie Mae Clark (Momma) and Johnny Davis (Granddaddy Johnny).

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Table of Contents

List of Tables

Section 1: The Problem

The Local Problem

The problem addressed in this study is a need to explore how teachers in a rural southeastern state school district use technology and how this use aligns to the four levels of a student-centered technology integration model. Even though the rural teachers have various classroom technologies and the district's technology department documented the use of technology devices during instruction through classroom observations, the results from a survey and interviews conducted by the district's technology department revealed that teachers were not engaging student in technology use. Moreover, the district research indicated that technology is being primarily used by teachers with students being secondary users.

This study addressed an existing gap in practice at the study site where it is unknown how teachers were using technology in their everyday instructional practices and unknown how their current instructional practices align with the district's implemented substitution, augmentation, modification, and redefinition (SAMR) model (Puentedura, 2014). Teachers use technology in the classroom for different reasons and to different degrees to engage with students (Sarkar et al., 2015). Teachers may use technology to assess student learning, deliver instruction, or to foster peer collaboration. However, teachers may be the sole users of the technology devices in the classroom (Henrie et al., 2015). Shifting technology use to students is one way to provide students with opportunities for learning in and out of the classroom and transform their learning (Yarbro et al., 2016). Effectively integrating technology as a learning tool rather than a

delivery tool can enhance student learning (Yarbro et al., 2016). But many teachers are not utilizing technology to engage students in the learning process by having students use the technology (Herold, 2016).

Because the school district was concerned about the level at which teachers are utilizing technology and allowing student use, in 2016, the district implemented the SAMR (Puentedura, 2014). The goals of this implementation of SAMR were to ensure that teachers are integrating technology in the classroom in ways that transform student learning and to have 60% of teachers using technology to teach state standards. However, to date, there has been no systematic investigation into how teachers are using technology and how their uses align with the SAMR.

Rationale

The purpose of this study was to explore how teachers are using technology in their everyday instructional practices and how their current instructional practices align with the district's implemented SAMR model (Puentedura, 2014). The SAMR model consists of four levels, which may be used to define the levels of classroom technology integration. Exploring how teachers use technology will provide invaluable information for the school district, such as providing data that could lead to the creation of a new professional development focusing on classroom technology integration. Furthermore, using the SAMR model to analyze how teachers are using technology adds to the literature by supporting the use of SAMR as a data analysis tool for analyzing classroom instruction. Based on results from this study, professional learning opportunities were designed to move teachers to the higher levels of the SAMR model.

The Problem at National Level

Technology integration has been emphasized by an increasing number of school districts (McKnight et al., 2016). However, as technologies continue to grow and change teachers and school leaders must adapt to those changes (Langford et al., 2016). Based on a survey of 1,000 principals regarding technology integration, one of the barriers to using technology in the classroom is professional development (National Association for Elementary School Principals, 2015). Only two-thirds of the principals reported having the infrastructure to support adequate technology integration, and only half reported that their teachers were adequate users in technologies such as the interactive whiteboards (IWBs). Furthermore, only half of the respondents reported that technology use contributed to student learning outcomes and teacher instructional effectiveness. These findings indicate that the effective use of technology is an issue nationally, at least from the perspective of school administrators.

The perspectives of teacher educators within the United States regarding technology integration have suggested that educators' use of technology is impacted by the subject content they teach (Nelson et al., 2018). For example, mathematics teachers have indicated lower levels of technology knowledge, and they received little support from technology staff (Nelson et al., 2018). Conversely, educational technology teachers have reported higher levels of technological pedagogical and content knowledge because of a higher level of technology knowledge. English teachers, much like the mathematics teachers, reported lower levels of technology knowledge and therefore reported a lower self-rating of technological pedagogical and content knowledge. Thus, institutional

support, including providing professional development along with support from the technology department, is a factor that influences teacher educators' technological, pedagogical, and content knowledge (Nelson et al., 2018). Institutional support also influences teacher educators' implementation of technology standards. Technological support and professional development affect teacher comfort level with technology integration and, consequently, their plans on how and who will use the technology.

The Problem at State Level

The issue of technology integration has been observed on a state level as well. A state technology plan was developed after the state's Department of Education conducted telephone and face-to-face interviews and surveys of school administrators, teachers, parents, and students. From the data analysis, a number of categories and themes were identified. One category was classroom technology, which included the use of the IWBs, projectors, computers, and tablets. One limitation of the research was the strength of the infrastructure found at several schools. The availability of new technology devices and technology services is not consistent across the state schools. Professional development was also a category that included training and instructional practices.

The Problem at Local Level

On a local level, effective technology integration became an instructional focus of the school district in which the research was conducted. The technology department of the district conducted a survey with all employed teachers and other personnel to determine the needs and barriers of current technology within the district. Data collection methods included surveys and interviews. Findings showed that more than half of the

personnel in the district used technology throughout their daily routines. More specifically, 87% of teachers noted that they include technology in their instructional practices. However, many of those teachers stated that they are the primary users of any technology integrated rather than having students use technology for learning. According to the technology director, another factor contributing to teacher technology integration was the technology support availability. The technology department researchers also found that the years of teaching experience impacted use of technology and that teacher comfort level greatly impacted integration of technology. Additionally, the research showed that professional development contributed to how and why teachers integrated technology. Based on the findings from the survey and observations, the technology department recommended the use of the SAMR model as a means of improving teachers' effective use of technology.

In addition, the proposed site's leadership team developed a plan regarding teacher instructional practices in 2017. Based on observations conducted by the school's leadership team, teachers integrated technology during their instruction. However, teachers were not providing students with opportunities to use technology (School Principal, personal communication, April 9, 2019).

Definition of Terms

Technology integration: The use of digital technology in subject areas as a means of delivering instruction and monitoring and assessing student learning (Kim et al., 2013; Sarkar et al., 2015).

Substitution, augmentation, modification, and redefinition (SAMR) model: Technology integration model used to assist teachers in improve the use of digital technology in their daily lessons (Hilton, 2015).

Technology, Pedagogy, and Content Knowledge (TPACK): Technology integration model designed merging digital technology, content, and pedagogy to teachers to develop and implement effective technology-infused instruction (Hilton, 2015).

Traditional learning: Teacher-centered instruction to students who are receivers of information. The teacher delivers information, and students receive information (Chisega-Negrila et al., 2013).

Transformed learning: Student-centered instruction in which students use technology in ways that allows for interaction and collaboration with peers (Chisega-Negrila et al., 2013).

Anytime teaching and learning: The use of technology in such a way that creates a learning environment that allows students and teachers to complete the learning process anywhere and at any time (Chisega-Negrila et al., 2013).

Significance of the Study

Conducting my study was significant to the local district and the overall field of education. The findings of this study could lead to professional development for teachers, districts implementing technology integration models that will influence student learning, and teachers integrating student-centered technology. This study adds value to the school district and the field of education by providing data into how teachers and students use

technology. Technology is a necessity for instruction as classrooms are becoming more dependent on technology (Yarbro et al., 2016). The instructional technology department may use the findings of this study to provide professional development opportunities for teachers. Professional development will allow teachers to move from the substitution and augmentation levels of the SAMR model to the modification and redefinition levels. Enhancing teachers' utilization of technology in their instruction can improve student learning by providing students with engaging and highly motivating learning experiences (Tsybulsky & Levin, 2014).

This study was also significant to the field of education. Due to the emphasis on integration of technology in the classroom, this study provides insight into how teachers use technology in their instructional practices, which can add to the current knowledge regarding teacher use of technology. The findings could also provide direction for education leaders to train teachers to use the available technology in a way that is interactive and engaging for all learners, thus transforming their learning. The results from this study could also help other school districts select technology integration models such as SAMR when implementing professional development. These professional development efforts can further result in teachers integrating technology in ways that increase interaction and engagement among students. Furthermore, teachers may take a more student-centered approach when integrating technology.

Research Questions

To guide this research study two research questions (RQs) were used**.**

RQ1: How are elementary teachers integrating technology based on the SAMR model in their instructional practices?

RQ2: Which levels of the SAMR are being implemented by elementary teachers?

The first question served as the central question for this study. The question allowed for exploration of the central phenomenon of how teachers are integrating technology based on the SAMR model. More importantly, the question addressed who was the user of technology, whether teacher or student. This correlated to the SAMR integration model, which is student centered. The second question focused on the levels of SAMR and teachers' integration of technology. This question was intended to help investigate the levels of the SAMR model at which teachers integrate technology.

Review of the Literature

As teachers integrate technology in their instructional practices, the goal is to transform the way students are learning (Polly, 2014). Despite technology's potential for transforming student learning, the use of technology has tended to vary from teacher to teacher (Kim et al., 2013). Researchers have conducted studies on the influence of technology on student achievement (Sarkar et al., 2015), the relationship between technology use and student engagement (Sarkar et al., 2015), and how teachers are using technology in the classroom (Aldama & Pozo, 2015). Additionally, research was conducted to determine the barriers and benefits of teachers integrating technology in their instructional practices (Motshegwe & Batane, 2015). Technology integration can influence student achievement and prepare students for a "digital society" (Spaulding, 2016, p. 67). For some teachers, there may be also predetermined intentions for

technology integration including communicating with others, interacting with peers, or researching and exploring (Spaulding, 2016).

The literature review begins with a discussion of the conceptual frameworks used to explore technology integration and an in-depth explanation of the model used to frame the study. I then provide a synthesis of the research focused on the study problem related to technology integration and its influence on student engagement and achievement. Next, I include a review of the barriers in technology integration, which explains why teachers are often reluctant to integrate technology in their instructional practices. Finally, I provide an examination of research into how technology is integrated in various content areas. The literature review ends with an evaluation of research in how the SAMR model has been used student learning and motivation.

Conceptual Framework

Two technology integration models conceptualize how teachers integrate technology: SAMR and TPACK. In this section, I discuss both models with a focus on the SAMR model, which was the conceptual framework of this study and is the model used by the research site. I discuss the TPACK model briefly because this model is commonly used in technology integration scholarship. Developing an understanding of the TPACK model allowed for interpretation of data that may not fit into the SAMR model.

The SAMR model was established to assist teachers in developing more meaningful and purposeful student-centered uses for technology in their instruction. Integrating technology using first two levels of the SAMR model, substitution and

augmentation, serves to enhance student learning. Integrating technology using modification and redefinition result in transforming the learning experience of the students (Puentedura, 2014). The result of integrating technology at the redefinition level is student-centered learning with students as the users of the technology. Consequently, students are more engaged and motivated to learn (Harris & Al-Bataineh, 2015). Like the SAMR model, the TPACK model serves as a guide for purposeful technology integration. However, the SAMR model focuses on student use of technology and how that use of technology results in student engagement and learning, whereas the TPACK model focuses on the foundation of teacher knowledge of technology, content, and pedagogical practices.

The SAMR Model

The first level of the SAMR model is substitution. At this level, teachers use technology to replace traditional tools (Puentedura, 2006). One example of technology use at the substitution level would be students using note-taking software to take class notes (Theisen, 2013). At the augmentation level, the technology serves as a tool, but there are functional changes. For example, after using a word processing program to write a story, the students use technology to make improvements by using spell check and changing the fonts of the text (Theisen, 2013). These two levels of technology integration result in student learning being enhanced, but the basic instructional activity remains unchanged from its nontechnological antecedent.

The third level of the SAMR model is modification. At this level, the technology begins to alter how tasks are completed; this level begins to transform the learning. An

example of technology being used at the modification level would be students sharing a PowerPoint presentation and working collaboratively with peers to give and receive feedback (Puentedura, 2014). The final level of SAMR, redefinition, uses technology in such way that was "previously inconceivable" (Puentedura, 2014, p. 13). For example, in the development of a story, students might use a publicly accessible online site to work collaborative with peers and individuals from other states or even countries to share work and add to the progress of the story including the various story elements (Puentedura, 2014). At the redefinition level, technology integration has resulted in a type of learning that looks different from its paper and ink predecessors and has shifted the locus of control from the teacher to the students.

As teachers develop lessons that require technology use, substitution and augmentation tend to be the levels at which they integrate technology; however, these levels effect little change in the student learning (Puentedura, 2014). When teachers begin to engage students with technology at the modification and redefinition levels, the technology begins to transform student learning (Theisen, 2013). The students, while participating in the learning process, become responsible for their learning as independent thinkers and doers (Theisen, 2013). As teachers begin to better understand how to think about technology integration using SAMR, they are able to use technology more effectively as a tool in the learning process (Puentedura, 2014).

The SAMR model can assist in determining the use of technology and how the technology can be implemented, but a limitation of the SAMR model is that the model does not address pedagogical practices (Lin, 2016). There is no connection between the

technology-driven task and pedagogy (Lin, 2016). However, although the SAMR model does not address pedagogical practices, teachers are still able to adapt more student-centered instructional practices with technology (Minshew et al., 2014).

The limitations of the SAMR model are addressed by the TPACK technology integration model, which explicitly addresses pedagogy (Mishra & Koehler, 2006). This model focuses on the interaction between the framework's three main components: teacher's knowledge of pedagogy, content, and technology. As teachers integrate technology, each of the components interact. As these components interact, the integration of technology correlates to the purpose and functionality of the technology. The most effective instruction occurs at the intersection of all three components. One example of TPACK is a study on the use of IWBs in math instruction (Muir et al., 2016). The researchers found that the teacher utilized technology in such a way that showed her comfort level in technology integration. In the teacher's use of the IWB and the device's features, the authors suggested that the technology teachers use, based on how the technology is used, can enhance the students' learning of a concept.

Teachers' reflections have indicated that SAMR was seen more as the student-centered integration model, and TPACK seen as the teacher-centered integration model (Hilton, 2014). Thus, the model used to guide a study affects what will be focused on: student learning or teacher pedagogy. For this study, the SAMR model was used as the primary framework because of its focus on student-centered use of technology. Within the SAMR model, technology becomes a vital tool for student engagement. Technology is first used as a substitute for traditional practices, and as teachers integrate the

technology using the SAMR continuum, students' learning experiences "transform" (Puentedura, 2014). This ultimately results in a redefinition of a learning task brought about by technology use. The TPACK model was used to understand data and themes that emerged that did not fit the SAMR model. But the SAMR model connected to my RQs in that each RQ focused on the SAMR model and how technology use aligns to those levels. I examined how teachers and students integrate technology based on the levels of the SAMR model. Analysis of data coincides with the conceptual framework based on the a priori codes developed from the SAMR model levels.

Review of the Broader Problem

The literature review addressed the study problem focusing on the integration of technology in teachers' instructional practices. During the literature search process, terms used related to the overall conceptual framework upon which the research study was based. The literature review search was conducted through research databases provided through Walden University library. Research databases included Education Source, ERIC, SAGE Journals and LearnTechLib—The Learning and Technology Library. Google Scholar also was used to search for peer reviewed research articles focusing on technology integration and the SAMR model.

A number of Boolean phrases were used in search of current literature. The first search was *technology* AND *student engagement* AND *achievement*. This resulting list of literature provided a collection of literature into the reasons that teachers integrate technology and the potential benefits on student achievement. The next Boolean search was *barriers* AND *technology integration*. This search was used to find current literature

investigating reasons why teachers hesitated or chose not to integrate technology in their instruction. Following the research in barriers in technology in technology integration, the next Boolean search was *technology integration* AND *content areas*. A search was also conducted to find literature about teachers integrating within math instruction, reading instruction, as well as social studies instruction. Because of the conceptual framework of the study, a search was also conducted using the Boolean string *SAMR technology integration model* AND *student learning and SAMR technology* AND *student achievement*.

A total of 97 peer-reviewed articles were reviewed for the literature review. Research articles excluded from the literature review included those taking place outside of the United States. Research studies were also excluded if the article reflected a discussion of technologies used in teaching practices rather than a study on their impact in student learning. Studies conducted earlier than 2013 were also excluded from the literature review.

Technology, Student Engagement, and Student Achievement

The SAMR model focuses on transformed learning; therefore, a review of the literature on technology and how its use can increase student engagement and student motivation is important. Technology can be a motivator for student engagement and have an impact on student achievement (Ciampa, 2014; Ciampa & Gallagher, 2013; Harris et al., 2016; Thomas et al., 2013). Student motivation is necessary for learning because as students' motivation increases, their level of engagement and participation in the classroom instruction increases (Ciampa, 2014). Student achievement is what success, or

outcome, students encounter throughout their learning experiences. What and how effectively students learn or achieve, may rely on their level of motivation (Ciampa, 2014).

Technology has the potential to motivate students and increase their engagement and learning (Ciampa & Gallagher, 2013; Harris et al., 2016; Thomas et al., 2013). However, technology use alone does not bring about greater student engagement and achievement. When a teacher uses technology at the modification and redefinition levels, technology has greater potential to transform student learning and impact student engagement and achievement. Technology has the potential to reverse the traditional teacher-student role by having students be the sole users of technology and technology devices (Ciampa & Gallagher, 2013). In this reversal, students use the technology devices to complete tasks designated by the teacher rather than passively receiving instruction delivered by the teacher who is using the technology (Ciampa & Gallagher, 2013). This moves instruction toward being more student-centered and with greater student engagement. Thus, students are engaged in completing tasks involving technology and taking ownership of the learning rather than the traditional teacher-centered environment (Ciampa, 2014). Therefore, the modification and redefinition levels of SAMR are important for using technology in a way that is more student-centered. As teachers purposefully and intentionally integrate technology at higher levels of the SAMR model, they can impact student motivation, leading to greater student engagement. Using the SAMR model to investigate how teachers are integrating technology may lead to an

understanding of why some use of technology increases motivation and engagement and others do not.

Barriers to Technology Integration

Despite the many uses and benefits of technology, teachers often encounter barriers that influence how and why they integrate technology (Ruggiero & Mong, 2015). Barriers include the lack of professional development relating to technology, the lack of availability of technology, teachers' attitudes toward technology (Pittman & Gaines, 2015), and teachers' self-efficacy (Motshegwe & Batane, 2015). Four similar barriers include student lack of technology skills, teacher lack of training in technology, teacher lack of time to integrate technology-infused lessons and the lack of technical support for teachers (Hsu, 2016).

Self-Efficacy

Self-efficacy, or teachers' self-awareness of their technology use, the ease of use, and the actual usefulness of the technology are barriers for teachers integrating technology (Motshegwe & Batane, 2015). The researchers employed a survey to collect data from participants in regard to self-efficacy and its influence on teacher attitude toward technology use. Based on the analysis of the survey responses, the researchers found that self-efficacy is not a sole determinant for a teacher's attitude toward technology usefulness. Furthermore, they found that self-efficacy cannot be seen as a sole predicter in teacher use of technology. A limitation of the study is the self-report of self-efficacy. Motshegwe and Botane (2015) suggested that the participants may have reported what they were believed was expected of them rather than their actual self-

perception of technology use. Despite this limitation, the barriers identified by Motshegwe and Batane were consistent with those of Ruggiero & Mong (2015), Hsu (2016), and Pittman and Gaines (2015). Understanding the role of self-efficacy in teacher use of technology at the proposed site may reveal why teachers are not using technology at the modification and redefinition levels of the SAMR model.

Teacher Attitude

Teacher personal attitude about technology is also a barrier for teachers integrating technology (Spaulding, 2016; Rehmat & Bailey, 2014). Based on a survey of 230 preservice and in-service teachers on their perceptions toward the benefits of technology integration, teachers who were more skilled in technology use responded more positively in how useful they perceived technology to be and indicated they were more likely to integrate technology (Spaulding, 2016). Other research on preservice teachers has also showed a more positive attitude toward technology integration as they used more technology in their instruction (Rehmat & Bailey, 2014). This suggests that experience with technology, rather than training or teaching experience may be an important aspect to examine when analyzing for the SAMR level at which the teachers at the research site are integrating technology. Technology use will then result in instruction that is more student-centered and will provide transformative learning experiences for students. By overcoming the barriers of teacher attitudes toward technology, teachers can provide students with learning experiences that use technology effectively and impact student engagement and influence learning.

Technology in Content Areas

Technology can be used in content areas in order to transform student learning. The specific content area is often a factor for what software and device is used and the purpose for which it is being used. Additionally, it is the content area that often determines whether the user of the technology is the teacher or the student (Polly, 2014). Therefore, when planning to use technology within a lesson, teachers must consider the purpose of the technology being used and the technology must support the intended goals of the content instruction (Kersaint et al., 2014). Through the effective use of technology, teachers can provide more opportunities for multimodal activities that transform student learning and build collaborative skills (Puentedura, 2014). In this section on technology in content areas, I first review research into how technology can be integrated into mathematics and science instruction. I then review the research into technology and literacy instruction. I conclude this part of my literature review section by providing research into how technology supports learning in social studies.

Mathematics and Science

Muhanna and Nejem (2014) and Polly (2014) conducted studies investigating the use of technology in mathematics instruction. Results from both studies showed the potential benefits of technology integration. The researchers of both studies found that the teachers' use of technology was largely based on the purpose of the technology being used. For example, Muhanna and Nejem (2014) interviewed 74 middle school teachers with varying levels of experience and qualifications to understand how they used IWBs in mathematics instruction. The participants indicated that one benefit of technology use

in mathematics instruction is the ability to manipulate information. For example, allowing students to come to the whiteboards and physically interact with the instructional content was a benefit. The teacher participants in Muhanna and Nejem's study also stated that with technology, they were able to decide what students were able to see and focus solely on the content being taught. According to the teachers, using the IWBs resulted in students being more engaged in the classroom instruction. The authors found there are varying uses of devices such as an IWB in the classroom, but one limitation was that the IWBs cannot be provided for individual students. Therefore, seeing how teachers' use of technology within the SAMR progression on the SAMR model may be more difficult when using such a device. In fact, what the researchers described was technology use at the substitution and augmentation level, rather than the higher levels of the SAMR. This suggests that if teachers are to use technology in transformational ways through modification and redefinition of tasks, they need to be able to determine what technology will be used and how that technology will be used by students.

Student-centered pedagogies are instructional models that require students to be active participants in their learning while the teacher acts as facilitator (Polly, 2014). Student-centered practices are also the aim of technology integration based on the SAMR model. Polly found that the teachers used technology for varying reasons and shifted from using the technology devices to present instruction to having students use technology independently. In the study, teachers indicated they were eager to learn of

other technologies that would allow for math specific instruction, however the resources were not necessarily available to them.

Kersaint, Ritzhaupt, and Liu (2014) studied technology integration among mathematics and science teachers participating in a year-long professional development initiative. Kersaint, et al. found that teachers' comfort level in technology use changed when using generic technology tools but did not change in regard to use of content-specific technology. The researchers also found that the teachers felt that they were not provided with technology support even though they were expected to integrate content-specific technology. The work of these researchers suggests that when analyzing the SAMR level teachers are using when integrating technology, observers should consider whether the teachers are using generic technology tools or content-specific tools. Content-specific tools may be easier for teachers to determine the purpose for which the tool will be used.

As teachers develop a better understanding of the purposes of technology for instruction, they must determine the best tool that will support the learning goals and the teacher's instructional practices (Kersaint et al., 2014). They must also determine its potential to transform student learning in math and science instruction. Muhanna and Nejem (2014) discovered that teachers do tend to integrate technology when necessary. However, the level of integration remains on the lower levels of the SAMR model. Teachers integrate technology based on their level of comfort in using the technology (Polly, 2014). If teachers are to effectively integrate both generic and content-specific technology tools in their instruction and at higher SAMR levels, Kersaint et al (2014)

argued teachers need support and professional development. Together, these studies suggest that as teachers develop math and science specific instruction, professional development and technology support is a necessity if the goal is for technology integration that will transform student learning.

Literacy Instruction

Burke (2016) investigated technology integration in literacy instruction. The author suggested that teacher training programs should begin incorporating technology integration in their teacher preparation courses. This may, in turn, result in teachers who are comfortable in using technology for not only literacy but in other content areas. Furthermore, guiding teachers toward using technology at the modification and redefinition levels of technology integration could result in transformed learning. The work of Hutchison and Beschorner, the researchers found evidence of the benefits in the integration of technology into literacy instruction. In the study, a benefit of technology use was an increase in student engagement and as well as varying purposes for which the technology could be used (Hutchinson & Beschornere, 2015). Students used the technology to communicate and respond to readings using multimodal methods, which is an example of teachers implementing technology at the modification level. That is, the use of the iPads transformed student learning by allowing them to respond using multi-modal forms. These findings connect student use of technology to positive student outcomes, which is a goal of the modification and redefinition levels of the SAMR model.

Social Studies

Teachers integrating technology into social studies content (Curry & Cherner, 2016). The researchers found that participating teachers' philosophy of teaching, gave insight into how the teachers used technology in their instructional practices. Those teachers who saw that technology as having a place in their instructional practices saw technology integration as beneficial to student learning and engagement. Teachers were also using technology for several reasons (Curry & Cherner, 2016). The teachers had students use technology to collaborate, research topics of their choosing, and develop content related products. The researchers discovered that while technology was integrated in both social studies classes, each teacher was integrating technology at different levels of SAMR and but for similar reasons. One teacher implementation the lower levels of SAMR while the other implemented technology at a transformative level.

The SAMR Model and Students

As teachers use SAMR to guide their instructional decision making in order to move from the substitution and augmentation levels to that of modification and redefinition, student learning begins to transform (Puentedura, 2014). When teachers are aware of the SAMR model and integrate technology with that knowledge, they can help students develop 21st century skills and build toward success (Hilton, 2015). The SAMR model enables teachers to reflect on how they are integrating technology and how students can be involved in that integration process (Puentedura, 2014). As students begin to be more involved in the learning process how they learn changes.

SAMR can be implemented in every level of school (Hilton, 2015). The researcher found that as the teachers integrated technology, they typically stayed at the substitution and augmentation levels. When the teachers moved students toward the modification and redefinition levels, the use of technology continued to correlate with the intended goals of the learning experiences. The findings suggest that using the SAMR model for guiding technology integration decisions is useful (Hilton, 2015). When teachers view technology as a way to engage students in their own learning, the technology tends to be used for student-centered learning experiences (McKnight et al., 2016). The researchers documented teachers' perceptions that incorporating technology in their practice increased technology access for students. Due to researchers possibly not seeing the whole picture, conclusions about technology use may be limited.

Because the SAMR model leads teachers to consider how the technology meets their instructional purpose, understanding and using the SAMR model may help address barriers to technology use by helping teachers determine the type of technology to be used (Tsybulsky & Levin, 2014). As teachers plan and integrate technology at the as guided by the SAMR model, they can determine what devices will be used as well as for what the devices will be used. Tsybulsky and Levin (2014) argued that considering o how devices are to be used and by whom can shift teachers to higher levels on the SAMR model. Furthermore, determining the purpose for the technology may help address teachers' attitudes about technology usefulness and student skills in technology use. Teachers would have an environment that is supported by technology and is engaging and motivating for students. As teachers have students use technology to effectively

communicate with others, extend their learning audience, and create authentic student work, teachers begin to shift levels of the SAMR model (Tsybulsky & Levin (2014).

Implications

Implications for this research study included providing teachers and school administrators with insight into what gaps exist in instructional practice at the study site. The findings from this research were used to develop a professional development program about the SAMR model to help teachers better identify the purposes for using technology. The research also provided insight into teachers' purposes for using technology and professional development could assist teachers in clarifying those goals. The findings were also used to develop a professional development that would assist the district's technology department and administration to make decisions for supporting teacher development in technology use that could increase student engagement and achievement.

Summary

The literature review covered the conceptual framework, technology, student engagement and student achievement, barriers to technology integration, technology in content areas, and the SAMR model and students. The SAMR model is a technology integration model that focuses on student use of technology and the TPACK model focuses of teachers' knowledge of technology integration. Through the SAMR model, teachers are able to involve students in learning experiences that can potentially impact their achievement and engagement.

In this literature review, I used previously conducted studies to show how technology influences student learning, engagement, and motivation. Teachers perceived those influences as benefits to technology integration. I also used research to demonstrate that as teachers integrate technology, there are barriers that exist. These barriers cause teachers to hesitate in integrating technology. Furthermore, I reviewed research to show that barriers in technology integration led many teachers to not integrate technology in their instruction. Resulting in teachers not transforming student learning using technology. Those teachers who do integrate technology often utilize technology in various subject areas, but how technology is integrated is dependent on what teachers want students to accomplish. Technology integration is also dependent upon who the user of the technology will be during instruction. In the literature review, I also discussed research studies that indicated a positive impact of technology on student learning. Teachers integrated technology in transformative ways that resulted in positive effects on student engagement and learning.

Based on the literature review, a study of how teachers are integrating technology in their classroom instruction is needed to help close the gap in understanding how teachers utilize technology, at the proposed research site. Review of previous studies indicate that the use of the SAMR model has the potential to help teachers integrate technology in ways that transform student engagement in learning. Using the SAMR model to explore how teachers at the proposed site are integrating technology may show areas that need further developing. The proposed study could provide data that may result in districts developing plans to improve teachers' integration of technology.

Section 2 is a review of the qualitative design and methodology that was employed to investigate teacher use of technology based on the SAMR model. In this section I discussed the overall research design and approach. Then I provided a description of the setting and participants of the study. Then I discussed the sources that I used to collect data. Then I explained the data analysis process that I followed after collecting my data. This is followed by descriptions of the approaches I took to ensure my study is ethical. Finally, I provided a description of my processes for analyzing each source of data.

Section 2: The Methodology

Research Design and Approach

The research methodology for this study was a qualitative instrumental case study. A case study is an in-depth examination of an activity, event, process or individuals (Creswell, 2012). Instrumental case studies involve examining specific cases for insight into an issue (Lodico et al., 2010, p. 158). In the current study, the case was the process of using SAMR in one elementary school. By employing an instrumental case study design, I gained an in-depth look into how teachers are using the four levels of the district mandated SAMR model to integrate technology into their classroom instruction as well as their intended goals for their technology choices. I chose an instrumental case study rather than an intrinsic case study because an instrumental case study is used to gain a broader understanding of a phenomenon, whereas an intrinsic case study focuses on a unique situation (Lodico et al., 2010). Employing an instrumental case study allowed me to gain insight into the situation of technology integration on a broader scale, rather just within one setting. Although this research can be used to identify how teachers are using SAMR to guide technology integration at the study site, the knowledge developed from the study can be used in understanding and adding to the literature of teacher technology integration in general.

A case study was chosen over other qualitative research approaches including grounded theory, phenomenological research, ethnography, and narrative research. Grounded theory is an approach in which the goal is to develop a theory that is developed from substantive data (Creswell, 2012). This research approach is grounded in

researchers constantly comparing data with emerging categories to generate and support emerging theories. The purpose of the study was not to develop a theory but to examine an issue in-depth using individuals' firsthand experiences; therefore, grounded theory was not an appropriate methodology. Phenomenological research is designed to examine firsthand experiences of individuals over a period. From data collected, researchers search for patterns and relationships in the data to learn of the experience. Although I was interested in the experiences of the participants, phenomenology was not the best approach for this study, because there was no intent to explore the affective or deep feeling of the human experience (Merriam, 2009).

Further, ethnography research relies on the study of human experiences in participants' culture in their native environment (Lodico et al., 2010). This research approach did not fit the study because the intent was not to understand the culture of the participants. Additionally, ethnographic researchers must become familiar with those being studied by becoming part of the group and doing so was outside the bounds of the study intent. Lastly, narrative research is an approach by which stories are used as a means of data. Participants provide stories of their lived experiences and researchers use this as data (Creswell, 2010). The intent of the study was not to explore individuals' individual experiences in the form of stories but their perceptions of their teaching practice.

Setting

The school at which the study took place is a rural Title I school in the southeast. The research site is one of six schools in the district, which consists of four elementary

schools, two middle schools, and one high school. The research site contains students in child development through fifth grade. There are 34 teachers at the research site, including teachers in general education as well as special education teachers, all of whom are considered highly qualified by the state's department of education definition. The site does not specialize in technology, nor does it contain special technology-driven programs.

The school serves a population of 500 of students, 87% of whom are African American, 11% are Caucasian, and 2% identified as Other. Of the total student population, over 90% live in poverty as measured by being eligible for free or reduced lunch. Currently at the research site, 1.4% of students are English speakers of other languages and receive services of based on their individual needs. The school also provides early childhood intervention services as well as special education services of varying degrees to 21% of students. Special education services include resource services as well as students served in the gifted and talented program.

Participants

The participants for study were chosen using typical purposeful sampling. Typical purposeful sampling occurs when participants selected are individuals who reflect the average person operating within the phenomenon being studied (Merriam, 2009). A set of criteria were established to structure the purposeful sampling. Participants must currently be intermediate classroom teachers (second through fifth grade). These grade levels are more content focused, which means development of technology-driven, student-centered tasks is expected. Moreover, teaching content at these levels affords teachers with more

opportunities to use technology for more content learning. The participants must have been teaching 5 or more years in the district and have attended district-provided professional development on the SAMR model. These criteria ensured that participants had learned the foundation of the SAMR model. Furthermore, by having taught a minimum of 5 years, the participants have witnessed and contributed to the plan developed by the district's technology department.

Although participants knew me informally, access to participants was gained formally through the school administrators. I requested a list of all teachers from the building administration. In speaking with the site's principal, the list was given when I prepared to collect data. Using the list of teachers provided, I sent an email summary of the study's purpose and a link to a screening questionnaire (Appendix B) to all teachers in the building. The teachers who met the criteria for inclusion were sent an email containing an invitation to participate in the study along with the informed consent form. They were asked to return the signed consent form to my personal email within 1 week. They were invited to meet with me individually in person or on the phone if they had questions. If they did not respond, I sent a follow-up email. If they did not respond to the second email within 1 week, I determined that they were not interested and did not include them as a participant.

Out of a total population of 20 teachers, 12 teachers were selected to participate in the study. In purposeful sampling, the goal is to reach saturation of data (Merriam, 2009). By involving 12 participants, I was able to achieve data saturation through in-depth observations, collection of lesson plans, and interviews, which provided insight into

teacher integration of technology. All eligible teachers were invited to participate. The first 12 who responded positively were included in the study.

Data Collection

For this study, data were collected through interviews, lesson plans, and observations of the 24 participants. As a result of using these sources of data, I gained insights into how teachers were using SAMR levels of the mandated SAMR model to integrate technology within their classroom instruction.

Interviews

One means of data collection was through semi structured interviews. Interviews are necessary when conducting case studies of a few selected individuals (Merriam, 2009). In semi structured interviews, the researcher begins with one open-ended question and leads to another based on responses given by each interviewee (Merriam, 2009). Each participant was asked to participate in two interviews to ensure data saturation. One interview took place before the observation and one after the observation. The questions in the interview guide for Interview 1 (Appendix C) and Interview 2 (Appendix D) were both flexible and structured (see Merriam, 2009). Specifically, the participants were asked all the same questions, but the order of the questions varied, and different follow-up and probing questions were asked depending on original responses from participants. The intent of open-ended questions is to gain descriptive data and participants' experiences with the phenomenon (Merriam, 2009).

Each set of interview questions was based on levels found in the SAMR model. The questions focused on participants' current practices and their reasons for integrating

technology into instruction. The interview guides were produced by me and were reviewed by the school district's technology department chairperson to ensure clarity and validity. Interviews took place during a time chosen by the teacher and lasted at a maximum of 60 minutes. Furthermore, the interviews took place in an informal environment, off campus at the neighboring town's coffee shop to ensure privacy. The second round of interviews were held via telephone. Participants determined the best time and date for their interview. Table 1 shows the alignment of the interview questions from the first phase of interviews to the SAMR model. Table 2 presents the alignment of the questions in the second phase of interviews to the SAMR model. The transcription of each interview was recorded using Otter, a voice transcription program, on a passcode encoded phone. The phone was stored in a passcode encoded safe.

Table 1

Interview 1 Protocol Alignment

Interview questions	Research questions alignment	Conceptual framework alignment
Tell me about how you are using technology in your classroom.	RQ1: How are elementary teachers integrating technology in their instructional practices?	Substitution Augmentation
Tell me about a time that your used technology and it worked well. Tell me about a time when you struggled with technology.	RQ2: Which levels of SAMR are being implemented by elementary teachers?	Modification Redefinition
Tell me about how you have used SAMR to design your lessons.	RQ2	Substitution Augmentation
What does your students' learning and engagement look like now that you are using SAMR?	RQ1	Substitution Augmentation

Table 2

Interview 2 Protocol Alignment

Interview questions	Research question alignment	Conceptual framework alignment
How do you decide when to design lessons that include student-centered technology-driven practices?	RQ1: How are elementary teachers integrating technology in their instructional practices? RQ2: Which levels of SAMR are being implemented by elementary teachers?	Modification Redefinition
Tell me about any changes you would make to your instructional practices that would include students as the primary users of technology?	RQ1 RQ2	Modification Redefinition
Tell me about a time you planned to use technology one way and it turned out differently.	RQ2	Substitution Augmentation
Having integrated technology in your lessons, what successes did students experience due to the use of technology?	RQ1	Modification Redefinition
Describe your process for designing student-centered technology-based instruction.	RQ1 RQ2	Substitution Augmentation Modification Redefinition

Lesson Plans

The district-created lesson plan template (Appendix E) indicates the SAMR levels of daily instruction. The lesson plans were teachers' outlines of the observed lessons. These lesson plans, provided by the teachers to me prior to the observations, were coded for the teachers' intent to incorporate technology in classroom instruction. Furthermore, as outlined by the lesson plan, the level of the SAMR model in which the lesson falls were coded. Every third lesson from each teacher's lesson plans were chosen for analysis. Each teacher was asked to send me a copy of their lesson plans to me twice over a 3-month collection period. Two lesson plans were collected from each participating teacher, resulting in 24 lesson plans total. The lesson plans reviewed were for the lessons that I observed. This source of data provided evidence of how technology was intended to be utilized by students and the SAMR level of assignments that are consistently being used.

Observation Protocol

Observations were conducted twice for each of the 12 participating teachers. This resulted in a total of 24 lessons being observed. Each observation was conducted to see how consistently the teachers were using the SAMR model to integrate technology in their instruction as outlined in their lesson plans. The observations were conducted over a 3-month period. The SAMR observation protocol used was one published by Eduro Learning (Appendix F), which helped to investigate how teachers are using the four levels of the district mandated SAMR model to integrate technology within their

classroom instruction. Consistent with the SAMR model, the observation protocol focused on student use of technology more than on teacher use. The observation was used to see the actual implementation and outcome of technology use in instruction as well as indicate what SAMR level the teachers used to engage the students. The observation data were triangulated with the lesson plans and the interview data. The observations were limited to 60 minutes, which allowed enough time to see how the teacher was using technology. Field notes were included in the observation protocol to add descriptive data (Merriam, 2009).

Field Notes

Field notes are described as ideas and concepts researchers develop when conducting observations. Field notes should be highly descriptive of what is being observed (Merriam, 2009). Thus, the field notes included descriptive information regarding the participants and the setting of the observation. I used the field notes to include direct statements from participants during the observations. Furthermore, the notes contained my comments about what was being observed. This included my thoughts and feelings about the teacher's use of technology and the activities students were participating in and the activities' alignment to the levels of the SAMR model.

Reflective Journaling and Memoing

As I analyzed the data, I kept reflective journals and memos. The memos allowed me to create comments about the teachers' intended plans of technology integration in the lesson. The reflective journal was used to capture my thoughts about what I heard during

interviews and observations. The reflective journal also helped prevent bias by providing a place for bracketing or the identification of assumptions (Tufford & Newman, 2010)

Data Security

All data were stored as hard copy and electronic copy (Lin, 2009). Data from interviews were recorded with an audio recorder. Data were kept on a password encrypted computer, which is only known to me and kept in a personal safe at my home. Hard copies of all data were kept in a personal safe at my home. Data from research will be kept for 5 years (Lin, 2009).

Ethical Considerations

The *Belmont Report* (1979) establishes three principles that researchers uphold to protect human subjects in research. Those principles include (a) respect for persons, (b) beneficence, and (c) justice. The study design followed the principles set forth in the *Belmont Report*.

Respect for Persons

As the researcher, I acknowledged each participant's autonomy. When participants were provided with a summary of the study, they were also provided with a consent form, which could be returned to me by emailing e-signed copies to my personal email. Participants were asked to return their consent forms within 1 week of receipt. After receiving signed consent forms, I met with each participant to answer any additional questions about the study and about participating in the study.

During the meeting, I stressed that participation was voluntary and ensured that their decision to participate was made with a full understanding of the study. All

decisions of participants were accepted. There was no coercion from me, nor did I ask for a hasty decision. Each participant was free to drop out of the study without any negative impact on their job. Participants' confidentiality was held at the utmost importance. Names of participants were known only by me and kept separately from the raw data. Pseudonyms were used when referring to participants.

Beneficence

In research, participants are protected in that researchers must not harm human subjects and benefits are maximize while risks are minimized. In this study, risks, included the discovery of participation by school and district administration. This risk was disclosed prior to participants' volunteering. The risk of discovery was minimized by communicating via my personal email and meeting off campus for interviews. Observations were conducted with minimal intrusion into the school environment. There were no direct benefits to the participants other than the possible increased awareness of the SAMR model and how they used it in their instruction.

Justice

The third principle in the Belmont Report is justice for all human subjects in research. This principle implies that all participants are treated equally. It also means that there is an equal distribution of benefits and of burdens. In the study, each participant carried any risk equally. Furthermore, the benefits were equally shared among the participants.

Role of the Researcher

I have been employed at the proposed research site for six years as a classroom teacher. The participants and I have been coworkers since my employment and the relationship between the participants and me is professional and cordial. I did not have any supervisory positions of the participants. I held no position that could harm any participants' employment. My position as a faculty member at the research site provided me with insider knowledge. Insider knowledge is the concept in which the researcher has a direct connection to the proposed research site (Robson, 2002). To ensure this insider knowledge did not bias data analysis I kept a reflective journal and used bracketing. Bracketing is a system in which the researcher sets aside any assumptions or biases that may negatively affect the research process (Tufford & Newman, 2010).

I contacted the Walden Institutional Review Board to determine the ethical concerns for me conducting research at my place of employment (approval #01-08-20-0533429). The institutional review board representative agreed that conducting the study there was permissible for the following reasons: Currently, the study site is a school in which the teachers are currently implementing the SAMR model. The research site also held a greater pool of potential participants than the other schools within the district because of the high number of participants who participated in the professional development for the SAMR model, which was offered four years ago. Additionally, other sites within the district had higher teacher turnover rates than the proposed study site. Thus, there were very few teachers who were eligible for the study who were still employed at the alternative sites.

I worked to ensure my colleagues did not feel coerced to participate in the study by assuring them that their relationship with me would be unaffected by their participation in the study. Furthermore, I did not discuss the study with teachers or other individuals at the research site outside the bounds of prearranged interviews and observations.

Data Analysis

In this section, I provided a description of how each source of data was analyzed. I also discussed my plan on establishing the trustworthiness, credibility, transferability, and even confirmability of my data. All data collected for the case study were coded and analyzed using Microsoft Word. In using this word processing program, the data were managed as it was collected. Interviews were transferred from Otter into MS Word and the field and reflective notes were typed as well.

The analysis of the data was performed using a priori (predetermined) codes as well as inductive coding. The a priori codes derived from the levels of the SAMR model (Appendix G). A priori codes are beneficial in that they allow the researcher to have pre-established codes in which to fit data (Miles, Huberman & Saldana, 2014). Using a priori codes allowed me to immediately align what was observed or what was noticed in lesson plans and interviews, directly to the substitution, augmentation, modification, and redefinition levels of the SAMR model. Inductive codes are those that arise as data is being analyzed from each data source. According to Miles, Huberman and Saldana (2014) inductive coding causes the researcher to not force-fit data into pre-existing codes. Using this process allowed me to look at data that did not fit into codes that had already

been established. Following this process ensured that I did not miss unexpected findings or discrepant data.

I first coded the participants' initial lesson plans followed by data from observations. Data from participants' first interview were then coded. Codes from each data source and from each participant were compared, then compared across participants. These comparisons were used to develop categories. The resulting categories informed the next round of data collection and analysis. Following the second round of data collection, inductive coding and a priori coding were both repeated for each participant and for each source of data. Ongoing analysis and comparisons of the codes and categories result in the construction of new themes and subthemes.

Lesson Plan Analysis

During analysis and coding process of participants' lesson plans, codes were drawn from the SAMR model. These codes included the substitution, augmentation, modification, and redefinition levels. Inductive codes were then applied to capture those aspects of the lesson plans that were not captured by a priori codes. The codes were tabulated to document occurrences of technology-driven practices and activities each participant planned to carry out during their instruction.

Observation Analysis

Observations were coded using the a priori codes and inductive codes derived from the lesson plan analysis as well as the creation of new codes as needed. Codes were also tabulated to document the occurrence of technology-driven events during each

participant's classroom instruction. The codes that were tabulated, were based on the substitution, augmentation, modification, and redefinition levels of the SAMR model.

Interview Analysis

Transcripts of each of the interviews were coded using a priori and inductive codes derived from the lesson plan and observation analysis as well as the creation of new codes as needed. The transcripts were created after transferring interviews from Otter to MS Word. Codes, both a priori and inductive codes, were then tabulated to capture the frequency of occurrence. After coding, each observation was compared to teacher interviews as well as lesson plans. After comparison, categories were created to inform the second round of observations of each participant. The categories and the supporting evidence from the interviews were placed in a matrix. The matrix served as an organization method for the categories and the evidence from the data. Once the initial categories were developed, the second interviews were conducted, and the coding and analysis processes were repeated.

Reflective Journal and Memos Analysis

Analysis of my reflective journal and memos was done separately from the interview, observation and lesson plan analyses. The analysis of the memos was an examination of comments made throughout the analysis of lesson plans. Analyzing the journal notes entailed reviewing immediate notes written during interviews and observations.

Trustworthiness

According to Lincoln and Guba (1985) trust in research is needed in order to establish its worth. Lincoln and Guba (1985) stated that trustworthiness of research involves establishing credibility, transferability, dependability, and confirmability. In order to establish credibility of the research, Lincoln and Guba (1985) provide various strategies. For the proposed research study, I established credibility through triangulation, peer debriefing and member checking.

Credibility

Triangulation. Lincoln and Guba (1985) write that triangulation is a means of using different data sources to deepen understanding. Triangulation is a means of using multiple sources to provide robust and well-developed accounts of research (Lincoln & Guba, 1985). I triangulated data from interviews, observations, and lesson plans to develop understanding of teacher integration of technology.

Peer Debriefing. Lincoln and Guba (1985) also state that peer debriefing is a means of establishing credibility of research. This method was also used in my research. Using an impartial peer allowed for feedback regarding any unwarranted biases, as well a constructive feedback of transcripts and methodology. My peer debriefer was a colleague with a PhD, who was unassociated with the proposed research site. I shared up to 10% of deidentified data, my coding scheme, and emerging findings with the peer debriefer. We met virtually to discuss my analysis in order to identify any biases I was not aware of and to discuss differences of opinion in the coding process.

Member Checking. Another technique that was used to ensure credibility was member checking. Lincoln and Guba (1985) write that the use of member checking allows participants to check for errors in the data and to correct any misinterpretations of data. I conducted member checking by emailing each participant a summary of my emerging findings along with relevant, deidentified quotes from their interviews. I asked them to review the emerging findings and relevant quotes and inform me of whether my interpretation of the data reflected their perspective. They had one week to respond. They were told that responses were not required. As a result, I interpreted a nonresponse as an acceptance of my interpretation of the data.

Transferability

Lincoln and Guba (1985) discuss that transferability is achievable by thick description. Thick description is achieved by describing the phenomenon using a high level of detail. As a result of a thick description, the reader can begin to see how the conclusions drawn from the data can be applicable to another site. As the researcher, I included detailed description of the research site to ensure that the conclusions that were drawn could be transferred to other settings, other times, and other people.

Dependability

Lincoln and Guba (1985) define dependability as the showing of research findings that are consistent and findings that could be repeated. To establish dependability, I sought the assistance of an external audit. Lincoln and Guba (1985) state that an external audit involves an outside researcher closely examining the researcher's findings, interpretations and conclusions are in fact, supported by the data. Having this external

audit allowed me to gain feedback into the accuracy and validity of my research. This was done through the use of peer debriefing.

Confirmability

The final step in seeking trustworthiness in my research will be establishing confirmability (Lincoln & Guba, 1985). According to Lincoln & Guba (1985), confirmability is the degree to which the findings of the study are more in line to the participants' rather than the researchers' biases and interests. Confirmability was established through the use of a reflexive journal and an audit trail.

Reflexivity. Lincoln and Guba (1985) write that reflexivity is the development of knowledge construction through every step of the research process. To foster reflexivity, I kept a reflexive journal in which my notes from observations and interviews were written throughout the research process. These reflexive notes captured my thoughts about what I saw and learned as I collected and analyzed the data. Through the reflexive writing, I was able to identify the biases which might have limited my interpretation of the data. This assisted in limiting bias.

Audit Trail. I provided a description of the research steps taken throughout the research process from the start of the design process to the reporting of findings (Lincoln & Guba, 1985). I reported the collection of the raw data, which included all field notes taken from observations and interviews and lesson plans, which will serve as documents. I provided a detailed description of the analytic steps taken as well as the understandings that emerge during each step of the analysis process. Doing so provided transparency into my data analysis process thus contributing to the credibility of the work.

Discrepant Cases. Discrepant cases did arise when contradictions were viewed in the data analysis process. By encountering such cases, I had the opportunity for further analysis and cross-analysis among data sources. In this case, I sought out clarification and elaboration from participants. This required me to ask a participant to clarify or elaborate on a response from the first interview. Furthermore, I had to ask participants to provide relationships between their self-report or interview and the observational data.

Limitations

Although the study was prepared very carefully, limitations and shortcomings still existed. One limitation that existed was the size of the participant sample. The population being studied, although considered typical, could have presented findings that were not generalizable. However, by using thick description, the findings could be transferable. Another limitation that existed was that participants may provide interview responses they felt were wanted or desired by me. Data triangulation minimized this limitation. Trustworthiness was addressed through members check. Member checking occurred by asking participants to review the findings and provide written feedback which I collected and analyzed to ensure that I accurately interpreted their data.

Data Analysis Results

For this qualitative study, I collected, transcribed, and analyzed data from 24 interviews. I reviewed technology-driven actions by students and teachers from 24 observations. Lastly, I analyzed 24 lesson plans provided by participants. Each of the interviews, observations, and lesson plans were data sources to investigate how elementary teachers integrated technology based on the SAMR model. I transcribed the

interviews before analyzing the data. Observation notes were typed and reviewed before analysis and coding. Lastly, lesson plans from each participant were reviewed prior to analysis and coding process.

During the analysis phase, I employed two processes of coding: deductive and inductive coding. During the open deductive process, I developed a priori codes based on the SAMR technology integration model. The a priori codes were student centered, teacher centered, substitution, augmentation, modification, redefinition, student engagement, motivation/motivating, technology-driven, and barrier of technology. The inductive coding process developed as new codes were defined to categorize data that did not fit into the a priori codes. Each interview transcript and observation description were read before the coding process, to allow me to "obtain a general sense of the data" (Creswell, 2012, p. 243). After analyzing the data, I compared the lesson plans with my observation notes.

Deductive Coding

Open coding is defined as the process of assigning codes to words and phrases that may be relevant to the overall study (Merriam, 2009). To analyze the data, I used deductive coding (Fereday & Muir-Cochrane, 2006) by developing a priori codes based on the SAMR model. By using a deductive coding process during the first analysis, I was able to apply the a priori codes to the data collected. This is resulted in all interview transcriptions, observation notes, and lesson plans reviews being initially analyzed using deductive coding.

From the SAMR model, I used the overarching themes: substitution, augmentation, modification and redefinition in the development of my codes. Instead of using one specific level of the model, I developed themes and codes based on the technology integration model framework. The SAMR framework, which focuses on the integration of technology in instructional practices, contained technology-based concepts from which I took to develop my a priori codes. Below, I describe the codes for the SAMR themes, and the technology integration themes.

The SAMR model is a technology integration model consisting of four levels. The levels suggest how technology should be integrated within a teacher's instructional practice and used by students. I focused on the SAMR model as themes and developed codes for which I looked during analysis (Appendix H). The first level being substitution is the level at which technology is used merely as a substitute with no additional function (Puentedura, 2014). During analysis of all data, for any activities, whether described by participants or observed, I used the following codes as representative of the substitution level: word processing, basic facts, PowerPoint show, and research. The next level, which is augmentation, allows technology to enhance or make better what has already been done (Puentedura, 2014). During analysis of the interviews, observations, and lesson plans, I coded data based on augmentation: peer-editing, online videos, and shared instant feedback. The third level of the SAMR model is modification. Technology integrated at this level changes the design of lesson and possibly the learning outcome (Tsybulsky & Levin, 2014). The following codes were used as representative of the modification level: collaborating online, student videos, student presentations, and online feedback to peers.

SAMR's final level is redefinition; transformation of the learning takes place. Puentedura (2014) stated that tasks at the redefinition stage often solicit collaboration from learners outside of the classroom. During analysis, codes representative of the redefinition level included: real-world audience, academic discourse, and outside the classroom. The a priori codes used deductively based on the SAMR model are identified in Table 3.

Table 3

SAMR A Priori Codes

Code	Word or phrase
Substitution	Word processing Basic facts PowerPoint show Research
Augmentation	Peer-editing Online videos Shared instant feedback
Modification	Collaborating online Student videos Student presentations Online feedback to peers
Redefinition	Real-world audience Academic discourse Outside the classroom

Because the SAMR could not answer all of the RQs, I identified three additional themes based on SAMR's framework: student-centered, technology-driven and collaboration. All themes and codes used during my data analysis process can be located in Appendix I. The SAMR integration model focuses specifically on student-centered technology-based instructional practices (Puentedura, 2014). Students become the primary users of technology throughout the learning process. Therefore, student-centered became a theme based on the SAMR. Due to the model's focus on technology

integration, the theme of technology-driven was developed as well. The SAMR model emphasizes collaboration between classmates. Furthermore, the technology integration model enables interaction with the world beyond the classroom--a real world audience (Romrell et al., 2014). Learning is seen as occurring in the class and throughout the world around the student. Throughout the analysis, the codes used that were representative of student-centered included the following: students complete [tasks], students working, and students use technology. During analysis, codes used for technology-driven included: daily technology use, students use [technology device or program], and teacher use [technology device or program]. As I analyzed data, I used codes that were representative of collaboration which included the following: working together, partners, groups, peers, and classmates. Throughout the analysis, for the interviews, observations, and lesson plans, I looked for indications in participants' responses that corresponded to the substitution, augmentation, modification, and redefinition codes. Secondly, I looked for words or phrases that could be coded as student-centered, technology-driven, or collaboration, which were established a priori. The words and phrases coded using student-centered, technology-driven and collaboration are identified in Table 4.

Table 4

SAMR Model Concept Emphasis and Codes

Codes	Word or Phrase
Student-centered	Students complete [tasks] Students working Students use technology
Technology-driven	Daily technology use Students use [technology device or program] Teacher use [technology device or program]

Collaboration	Working together Partners Groups Peers Classmates

Other a priori codes were created based on general technology integration found in the literature: student engagement, motivation, barriers of technology integration, and teacher-centered instruction (Appendix G). Previously conducted studies have focused on technology integration and the impact on students, some of those influences being student engagement and student motivation (Sarkar, Ford, & Manzo, 2015). During my analysis, I coded using words that were indicative of student engagement and motivation including: student participation, excitement, and desire to learn. Secondly, with technology integration, there are often challenges that teachers and students face on a daily basis (Motshegwe & Batane, 2015). By using barriers as a theme, I wanted to capture any challenges that would potentially affect the integration of technology. During analysis, I used the following a priori codes as representative of barriers and challenges: technology not working, not enough devices, slow internet connection, students' technology skills, and teacher self-efficacy. Teachers often integrate technology in different methods for different purposes (Kersaint et al., 2014). To identify teacher-centered technology integration, I used the following codes as representative of this theme: teacher use, while teaching, and teacher model. As I read through and coded the interview transcripts and observation notes, I looked for the words or phrases that would best fit into the categories of student engagement, student motivation, barriers of technology, and teacher centered.

Table 5

Literature Based on A Priori Codes

Codes	Words or Phrases
Student Engagement and Motivation	Student participation Excitement Desire to learn
Barriers of Technology	Technology not working Not enough devices Slow internet connection Students' technology skills Teacher self-efficacy
Teacher-centered	Teacher use While teaching Teacher model

Inductive Coding

An inductive process was used to develop new codes as data were being analyzed. While rereading each data source, for any data that did not fit into any a priori code, new codes were developed. New codes that were developed included reflection on current practice, critical thinking, creative thinking, technology device, teacher planning, benefit of technology integration, and teacher knowledge of students. The inductive codes are provided in Table 6.

Table 6

Inductive Coding

Codes	Words or Phrases
Reflection on Current Practice	Right now I… I'm at this level of SAMR
Creative Thinking	Think creatively
Critical Thinking	Critical thinking skills Think creatively
Technology Device	Computer desktops Laptop computers iPads

Teacher Planning	Planning Research
Teacher Knowledge of Students	Small groups What they are interested in Likes

Although these codes were developed inductively, many did fit into preexisting themes. For example, reflection on current practice and teacher knowledge of students fit into the theme of teacher centered. The codes benefit of technology integration, creative and critical thinking created a new theme: benefits of technology integration. Teacher planning of technology integration remained a theme. These particular codes were used when words or phrases did not fit into any of the predetermined codes. For example, the participants discussed their integration of technology in their instruction of various content areas. For that, a new code of content specific application was created. For example, Participant H explained that she often includes videos focusing on the science content she is teaching. Participant I described her use of technology as the means to "model writing strategies and to edit."

Interviews

I read each interview transcript several times for a deeper understanding of the data. Transcripts for each participant's interview were read and the response for each question was coded using the a priori codes. After using the a priori codes to analyze transcripts, interviews were reread to determine any newly developed codes. Both deductive and inductive coding processes were utilized during the analysis of interview transcripts. All interview transcripts were coded using a deductive and inductive analysis process. Table 7 includes coding of the interview data.

Table 7

Interview Coding

Codes	# of participants (N = 12)	Phrases from participants
Engagement	12	I try to design lessons that require my students to be the users and gets them engaged in the learning.
Motivation	12	There is an increase in motivation and they are willing to collaborate with and help their classmates.
Planning	12	Thinking of what students will do, thinking of the right devices to get them done, takes a lot of planning.
Teacher use	12	For one of my math lessons, using the smartboard to teach measurement was very beneficial.
Substitution	10	Students were able to see increments of measurements on a ruler that were not able to see in the textbook.
Modification	7	Even I was excited to allow them the time for peer critiquing.
Teacher model	6	I use my promethean board to model during direct Instruction.
Collaboration	5	They get to collaborate with peers.
Augmentation	5	Then they took it a step further and published their work with images from websites.
Participating	5	They all want to participate because they get a chance to use technology.
Slow connection	5	A time in which technology did not work so well was when the laptops kept disconnecting from the Wi-Fi and the students couldn't complete their work.
PowerPoint show	4	Students were provided the opportunity to create PowerPoints.
Research	4	When designing student-centered technology-based instruction, I do lots of research first.
Independence	4	Independence
While teaching	4	I find videos that would not only be instructional but easy to understand.
Paying attention	4	Students are more tuned-in because they are waiting to see what we'll be doing for the day.
Research	3	My students are able to use technology for topic research.
Critical thinking	3	Students become engaged independent and critical learners.
Peer feedback	3	After the PowerPoint was done, students shared their slides with their peers for constructive criticism.
Excited	3	For my babies, they're always into what I'm teaching if it involves me turning on my promethean board.
Not working	3	It is a big struggle when you plan and then all of a sudden links aren't working.
Teacher self-efficacy	3	I struggle often with the technology part of my teaching career.

(table continues)

Codes	# of participants (N = 12)	Phrases from participants
Online assessment	2	I do have them to complete online assessments and practice skills on web-based programs.
Word processing	2	They were able to type their drafts.
Creative thinking	2	Creative thinking
Wanting to learn	2	Fortunately, my students tend to be pretty motivated on a daily basis.
Not enough devices	2	We do not have access to laptops at this grade level
Students technology skills	2	I would have students use devices they are comfortable with.
Collaborative peer editing	2	Even I was excited to allow them the opportunity for peer editing – all with less to no use of several sheets of notebook paper.
Presentations	2	I design lesson that have opportunities for students to complete and present those projects using technology.
Kahoot	2	I was able to have students do a Kahoot game on the different types of precipitation and told them what they scored.
Math facts	1	I also have them play math games which helps them practice their math facts.
Peer editing	1	Then students used did some peer using the editing marks on google docs.
Video recording	1	During one of the assignments that I had students to do a recording of explaining one of their chosen animal habitats.
Online feedback	1	Then students can view and provide some informative feedback.
Responding to peers	1	Blogging their answer to an exit slip question.
Redefinition	1	Blogging their answer to an exit slip question.
Focused	1	I have to think about using technology overall, and my students tend to be more engaged.

For each question, a participant's response was read and then highlighted. Then a specific a priori code was assigned to that highlighted word or phrase based on its correlation to that specific response. The a priori codes derived from the SAMR model were substitution, augmentation, modification, and redefinition. For words and phrases coded use the levels of the SAMR model, I focused on activities described by participants in their responses. For example, Participant I explained that "my students are able to use technology for topic research." This task described by the participant was coded as substitution. I was also able to code specific tasks as augmentation. I used that code when Participant C said, "Then they took it a step further and published their work with images from websites." There was evidence of modification in analysis as well. Participant C described an activity as one in which "students shared their slides with peers for constructive criticism," then published. There was no evidence of redefinition during analysis of interviews.

I continued the deductive coding process as I coded words and phrases in each transcript that fit into the themes student-centered, technology-driven, and collaboration. For example, Participant F stated, "I show PowerPoints, videos, virtual lessons using the Promethean Board." This statement was coded using the code technology-driven. During analysis there was also evidence of student-centered words and phrases. For example, Participant E said, "we [students] use laptops in order to complete ELA and math assignments". Furthermore, Participant D stated that "they [students] all want to participate because they get a chance to use technology, have fun, and learn at the same

time.” As I continued to analyze the interview transcripts, I found evidence of collaboration throughout many transcripts. For instance, Participant C said, “Furthermore, they are able to work with their peers, either to complete a task together or provide feedback depending on the assignment.” This statement included the phrase, “work with their peers” and “together”, which indicated collaboration.

As I continued coding deductively, I continued to look for words or phrases that were aligned to the other a priori codes: barriers of technology integration, student engagement, motivation, and teacher-centered. For example, when asked about a time in which there was a struggle with technology, Participant E stated that “It is a big struggle when you plan and then all of a sudden links aren’t working.” This was coded as a barrier of technology integration. Another question probed into student engagement. During analysis, Participant L commented that “with SAMR, I see that my students are more engaged when using technology.” As I analyzed each transcript, I found evidence of motivation within the data, resulting in my use of motivation as a code. For example, Participant E said, “I can’t really say there is an increase in achievement but I can say they are highly motivated to do well.” Lastly, while analyzing the data, I looked for evidence of teacher-centered using the mentioned words and phrases. For example, Participant F indicated that whenever possible, she uses her “smartboard to show PowerPoints, videos and virtual lessons.” This was coded as teacher-centered.

After all of my a priori codes were exhausted, I began the to use inductive coding for responses that were not coded. During the inductive coding process, new codes were created to ensure all parts of participants’ interview responses were coded. In particular,

some words and phrases came about that were not expected. These new codes were created to capture the response of the interviewee but to also align with the study's purpose. One new code that was developed was technology device. During one interview, Participant B said, "I have my students use the laptops during centers." The word 'laptops' was coded using technology device. Reflection on current practice was a code that was developed as a result of inductive coding. This concept was found very common among participants, as a statement into what participants currently do in the classroom. The reflection on current practice code was a look into how participants currently integrate technology in their instructional practice. For example, Participant D stated, "Typically, I aim for more student-centered technology-driven activities when we've been on a skill a few days and my kids are really independent." In another interview, about designing lessons that are student-centered and technology-driven, Participant E said, "I do this when I know the lesson is going to hard for my 3rd graders to catch on just by sitting in their seats." These were both reflections on current practice of technology integration in the classroom. Another code derived from inductive coding was benefits of technology integration. As participants discussed the successes they have seen their students experience, words and phrases were fit into this code. For example, Participant J stated, "I see the difference in how engaged they are when I'm teaching versus when they are completing an assignment or doing something on the laptops."

Another code derived during analysis of interviews, which was, knowledge of students. This code came about as teachers spoke on designing their lessons. Many used phrases such as "I know my students would…" and "I think about what my students…"

In one interview, Participant K said, “I first have to know the students and their level of technology use.” Participant H stated that, “I usually start researching and thinking of what students will enjoy doing.” In another example, Participant F commented that she finds it best when she “front-load the information for my students.”

Observation

For each observation, notes were written based on the occurrences of technology integration during each observation. The notes were then read through for familiarity of the data collected. Phrases and actions were highlighted to apply the a priori codes. Following the coding using the a priori codes, observation notes were reread for thorough analysis and to determine the need for any new codes. The observation notes were all coded using deductive and inductive analysis. In Table 8, the observation coding is provided.

Table 8

Observation Coding

Codes	Number of Observations for Code (N = 24)	Example Activities Observed
Technology-Driven	24	Student use computer to complete task Student use iPad to complete given task Teacher use promethean board to model work
Student-centered	24	Students use laptop to complete AR test Students use computers to play Kahoot
Augmentation	11	Play a Kahoot game focusing on shapes Complete research assignment and present Create a digital timeline of French and Indian War Complete a digital worksheet after reading a passage
Collaboration	11	Students working with partners Students completing task as groups Providing feedback to peers
Substitution	7	Complete Accelerated Reader Assessment Practice addition facts online Type expository writing on computer Use Google Earth to for mapping locations
Modification	5	Plan, film, and post video of solving problem Use Google Docs to create a class summary of novel Create and post presentation and provide feedback to peers
Barriers	5	Trouble linking videos for assignment Forgetting passwords [student] Student having to wait till device is available
Redefinition	1	Use Flipgrid to post response to teacher provided discussion questions (respond to peers)

During the first phases of analysis, the same a priori codes, those used for the interview analysis, were applied to the happenings observed in the classroom. A deductive coding process was employed. The goal for conducting observations was to observe technology integration and code the evidence based on the SAMR technology integration model. Moreover, based on the students' assignments and tasks completed during the observation, I used the SAMR observation protocol to identify specific SAMR levels. My goal was to see if the instructional practices were technology-driven and student-centered. As Participant G began her instruction in modeling identifying geometric shapes, throughout the beginning, the action was coded as teacher-centered. Then as the lesson progressed, I was then able to apply other a priori codes based on what I saw taking place. For example, during that observation, Participant G was using the promethean board which I coded as technology-driven. In another observation, I saw students using technology in groups to complete an online quiz during class. I was then able to code what I was observing as student-centered. I was also able to code that task using the SAMR model protocol, applying the augmentation code from the model.

For the second set of observations, the analysis process was the same. A thorough reading of each observation description and the notes was done first to ensure the actions of the classroom, those done by the teacher and students, were captured. Secondly, this reading was done to ensure complete understanding of the notes. The first coding was completed using the a priori codes, which utilized a deductive coding process. Here again, the observation protocol was used to determine the level of the SAMR best

displayed by the students' use of technology. For example, during a second observation students completed a reading assessment through a digital platform for immediate feedback. This was coded as technology-driven as well as augmentation based on the SAMR protocol. Furthermore, the code student-centered was used based on students being the completers of the task. After the initial coding, a second read was done to develop any new codes that would be relevant to the study. The code collaboration was used when participants had students to work with their peers to complete an assignment, as was evident during one observation. Students were instructed to complete the task of finding and identifying locations using Google Maps, with a partner. In another observation, students began working group members to continue creating a digital book of figurative language.

As I continued analyzing observation notes, I also looked for evidence of teacher-centered actions, any evidence of barriers, and any signs of student engagement and motivation. Again, a deductive coding process was used during analysis. In one observation, Participant F began her instruction with a model of how to summarize a reading text on the display board. This action was coded as technology-driven as well as teacher-centered, because Participant F was the primary user of the technology. As analysis continued, I looked for evidence of any barriers faced by either the students or participant during the observation. For example, during an observation of a science lesson, once given the task, students were required to log into a web-based program. However, some students could not remember their login credentials. Additionally, there were some instance in which the videos would not load for some students as they tried to

complete the assignment. I also attempted to identify evidence student engagement and motivation within the observation notes. In one observation, engagement was seen as all students were completing the task given. Students were listening to story being read to them as well as focusing on the web-based assessment. Evidence of motivation was coded in an observation during a math lesson. As Participant L asked students to come to the board, all raised their hand to participate and answer the question.

During second review of observations, I began an inductive analysis of the notes. I had to ensure any development of new codes. During analysis, there were codes that came about during analysis. One in particular was knowledge of students. This code was based on actions by the participant within the instructional period. During one observation, Participant J had students grouped based on their performance on a quick assessment. This action was coded as knowledge of students. By grouping students in a specific manor prior to the task, the participant showed that she knows her students.

Lesson Plans

The lesson plans that were collected were the teacher's outline of what would be expected during the observation. This allowed me to corroborate the data and findings of the research study. Each plan was read thoroughly for understanding. Plans of what would take place and how were noted and highlighted using codes. During analysis of participants' lesson plans, each artifact was coded using deductive and inductive coding processes. The lesson planning coding process is provided below in Table 9.

Table 9

Lesson Plan Coding

Codes	Number of Lesson Plans for Code (N = 24)	Example Activities in Lesson Plans
Substitution	10	Students will use [web-based] geoboards to classify polygons Students will practice identifying fractions on fraction App Students will type expository writing
Augmentation	7	Students will create presentation on habitats Students will Solve math problems on display board
Modification	4	Students will film themselves, and post, solving math problem Students will create presentation on state land regions
Knowledge of Students	2	Results from Kahoot game will inform small groups for instruction
Redefinition	1	Students will post answers to discussion question; respond to peers

During the deductive analysis, the same a priori codes were used for analysis and review of participants' lesson plans as well. Both the lesson plans and observations were compared because outcomes from what is planned and what actually occurs can be vastly different at times. Each lesson plan was initially reviewed, again to become familiar with the information found in the plan, and to ensure participants indicated their SAMR levels. During the reading, codes were assigned to the appropriate words and or phrases. Participant A indicated in her plan that "Teacher will begin lesson by displaying a map of the United States to model locating the state." This statement was coded with teacher-centered. It was also coded with technology integration, and use of technology device. The plan indicated that Participant A would be using a technology device as well as

integrating technology. As the lesson progressed, Participant A described the modeling of the lesson; again, the code teacher-centered was applied. Then Participant A explained what students would be doing independently. Participant A stated that students would be identifying given locations using Google Maps. Student-centered was the code applied to this statement as well as technology-driven. I also coded the assignment based on the SAMR model levels, which was substitution.

For the second set of lesson plans, the same deductive coding process was followed as with the first set of lesson plans. The second set were the plans of the second round of observations; the lesson plans being an outline of what I would see in action. Throughout the lesson plans, words and phrases were highlighted and coded according to the a priori codes. For example, Participant G indicated in her lesson plans that "students will be using online geoboards to make specific types of quadrilaterals and triangles." This was coded using student-centered and technology-driven. I also coded this task using substitution from the SAMR model. Participant G also indicated that students would take those shapes and post in Google Slides for a future assignment. This task was then coded with augmentation.

After using those previously developed codes, I began a second review of the lesson plans, using an inductive analysis process. During this process, a second reading of all lesson plans, was done to apply any newly developed codes. Although new, any codes developed were relevant to the study's framework and purpose. One code that was used that was not an a priori code was knowledge of students. Participant J indicated in her plans that there would be differing groups based on the results from the Kahoot activity.

A note was written to indicate that this data would inform her instruction for the next day. This was coded as knowledge of students.

Axial Coding

The process of axial coding requires researchers to find connections between codes established during open coding. The codes used during the data analysis process for interview transcripts, the observations and review of lesson plans were tied together. I used an inductive thinking approach to see any possible relationships among the a priori codes and newly developed codes. In this coding process, I reread the codes that were used in all data sources and began looking at the repeated codes, especially the newly developed codes.

After all interviews were coded individually, I used axial coding to begin relating codes assigned to participants' responses. This required me to think of how the codes that were predetermined and codes that came about during analysis were related. I began to construct subthemes. For example, as I coded responses using teacher-centered and student-centered, I related these two codes together to form a subtheme, technology being used in all subject areas. The axial coding process was also used to connect codes used during analysis of the observations. For the initial codes, both predetermined and newly developed used during analysis of the observations, they were then related to those established during analysis of the interviews. This was to help connect data from what is being said by participants to what is actually put into action. Codes used during review of participants' lesson plans were also used to establish relationships and corroborate

analysis from the interviews and observations. In the table below, the open and axial coding are provided.

Table 10

Axial Coding

Open Coding	Axial Coding
Substitution PowerPoint show Research Online assessment Word processing Math facts	Assignments on lowest level of SAMR Not much change in function Substitution
Augmentation Kahoot Peer editing Video recording	Characteristics of next level Augmentation
Modification Peer feedback Collaborative peer editing Presentations Online feedback	Students are taking technology use to a higher level of SAMR Characteristics of Modification level [Modification]
Responding to peers Redefinition	Learning tasks may require students to take technology-driven tasks to highest level of SAMR Redefinition
Slow connection Not working Teacher self-efficacy Not enough devices Students technology skills	The challenges teachers (and students) may encounter as technology is integrated in everyday lessons Barriers in technology integration
Teacher use Teacher model While teaching	Teachers use technology throughout instructional practice Teacher-centered instruction
Engagement Motivation Participating Paying attention Excited Wanting to learn Focused	Students are engaged when technology is used Students are focused and motivated to learn when technology in integrated

Collaboration Independence Critical thinking Creative thinking	Positive thinking regarding technology integration Benefits of technology integration
Planning Research	Teacher researching and planning for technology integration

Development of Themes

The SAMR model contained four themes a priori, substitution, augmentation, medication, and redefinition. There are also the themes of student engagement and motivation, barriers of technology integration, and teacher-centered instruction that were predetermined. To add to the development of themes, a new theme came about as a result of new codes developed during analysis, that being benefits of technology integration.

Themes are related codes gathered together to form a bigger idea formed from all of the data (Creswell, 2012). There were themes that were developed a priori based on the conceptual framework: teachers are integrating technology at the substitution level, teachers are integrating technology at the augmentation level, teachers are integrating technology at the modification level, and teachers are seldomly integrating technology at the redefinition level. The following themes were developed a priori based on the literature: barriers of technology integration, student engagement and motivation are evident in technology-based instruction, and teacher-centered instruction is evident in technology-driven instruction. After using an inductive process, new themes were formed: benefits to technology integration, and teachers must plan for technology integration.

Table 11

Description of Themes

Theme	Description
Teachers are integrating technology on the substitution level	Basic technology integration for student use in classrooms
Teachers are integrating technology on the augmentation level	Basic technology integration for student use with some changes in purpose
Teachers are integrating technology on the modification level	Use of technology allows for students to broader audience
Teachers are seldomly integrate technology on the redefinition level	Shifting the instructional practice to allow students to learn beyond the classroom
Barriers of integrating technology	Issues that prohibit efficient technology integration
Teacher-centered instruction is evident in technology-based instruction	Primary users of technology within the classroom
Student engagement and motivation are evident in technology-based instruction	Technology integration has impact of student engagement and motivation
Benefits of technology integration	Teachers see benefits of integrating technology
Teachers must plan for technology integration	Technology is used daily, that is teacher-centered and student-centered

Evidence of Quality and Procedures

Internal validity. In terms of this study, I first established validity of the study by developing two interview protocols that were reviewed by technology-based instruction experts. Two members of the school district's technology department, both of whom have provided SAMR professional development for teachers. They were given the task of reviewing my Interview 1 and Interview 2 protocols. This was to ensure that each protocol helped to answer the RQs as well as provide relevant data to the research study.

In order to establish trustworthiness and reliability of my findings, I used members checks. This is a strategy for ensuring internal validity (Merriam, 2009). As I analyzed the collected data, summaries of my emerging findings were provided to

participants. They were asked to ensure that my interpretations of the data that were analyzed were correct. For the observations, participants were able to review the summaries of the observations that were conducted. Each participant was given the opportunity to review and provide feedback into the summary of what occurred during their observation. This was to ensure that there were no misunderstandings, had by the researcher, of what took place.

Triangulation is the process of corroborating findings from differing data sources. To achieve internal validity, I also triangulated or cross-checked the data. I compared data from my three sources, interview transcripts, observation notes, and lesson plan reviews. Due to triangulation of the various sources, the findings were more credible and accurate (Creswell, 2012).

External Validity

The concern with the extent to which findings of a study can be applied to that of other situations is external validity (Merriam, 2009). This primarily focuses on generalizability. Creswell (2009) writes that qualitative validity is when the researcher checks for accuracy within the findings. Researchers employ specific procedures to ensure findings are valid (Creswell, 2009). As the researcher, I describe the methods I employed to obtain validity.

In order to ensure validity of my codes being assigned to words and word phrases to all interview responses, transcripts were sent to three individuals. Each person has had experience in research methods—collecting and analyzing data. Two of the persons are my two doctoral committee members. Their initial feedback was for me to be go back

through all transcripts and code most, if not all words. The third person is an old colleague who has had experience in qualitative research. She is well learned in collecting and analyzing data, including coding and writing data analysis. She received my transcripts and observation notes as well as my list of a priori codes as well as the codes developed as I used an inductive coding process. My colleague was asked to code the data using the given codes. Furthermore, she was asked to check that I coded all words and word phrases appropriately. Her initial feedback was that although I did code appropriately, some codes were very similar and could be combined. For example, the two codes, technology-driven and technology-based could be combined based on their similarity in meaning. I accepted this feedback and used it to clarify what I was coding. To ensure external validity and transferability, I included quotes from interviews from the data. This was to strengthen the credibility of the findings.

Discrepant Cases

During analysis, discrepancies were found while comparing lesson plan reviews to observations notes. Although all participants were integrating technology, there were some evidence showing discrepancies in the degree to which the technology was used. Secondly, there were discrepancies noted in the indication of SAMR levels on a participant's lesson plan to the actual level of SAMR observed. Two participants indicated no level of SAMR on their lesson plans. Three of the twelve participants indicated the substitution levels on their lesson plans. During observations, two of those three participants had students using technology at higher levels of SAMR. These

discrepancies indicate that, while teachers may indicate a specific level of SAMR in their plans, the actual tasks may not actually be on that level.

Discussion of Themes

The data that were reported and analyzed came from interviews of participants, observations of technology integration and lesson plan reviews. The data was present to help determine how elementary teachers are integrating technology based on the SAMR model in their instructional practices. The data also showed the SAMR levels at which teachers are integrating technology in their instructional practices.

Interviews were conducted as well as observations. Lesson plans were also reviewed. Seven themes were developed a priori using the SAMR integration model: (1) teachers are integrating technology at the substitution level, (2) teachers are integrating technology at the augmentation level, (3) teachers are integrating technology at the modification, (4) teachers are seldomly integrating technology at the redefinition level, (5) barriers of technology integration, (6) teacher-centered instruction is evident in technology-based instruction, and (7) student engagement and motivation are evident in technology-based instruction. Two additional themes were developed inductively: (8) benefits of technology integration, and (9) teachers must plan for technology integration.

Overview of Themes

There were four themes that were developed deductively, based on the SAMR model. They were: (1) teachers are integrating technology at the substitution level, (2) teachers are integrating technology at the augmentation level, (3) teachers are integrating technology at the modification level, and (4) teachers are seldomly integrating technology

at the redefinition level. Extra themes were taken from the SAMR and also developed a priori: (5) barriers of technology integration, (6) teacher-centered instruction is evident in technology-based instruction, and (7) student engagement and motivation are evident in technology-based instruction. As I read and continued analysis, two additional themes formed using an inductive process: (8) benefits of technology integration, and (9) teachers must plan for technology integration.

Theme 1: Teachers are Integrating Technology at the Substitution Level

During analysis, I found that teachers are integrating technology on the substitution level. Out of the 12 participants, 10 of the twelve participants discussed tasks at the substitution level. Two participants discussed having their students use technology to perform low level research tasks, which coincides to the substitution level. Three participants discussed having students use web-based programs to complete online assignments. During the first observations, four participants engaged students in tasks that were on the substitution level. Participant A had students to use technology at the substitution level when students were required to use Google Earth to identify their location. Participant B also integrated technology on the substitution level; students used computers to practice addition and subtraction facts. This was a “skill and drill” activity for students. Participant D’s lesson involved students taking a narrative writing and using a word processing program to publish their final drafts. The students in Participant I’s class were responsible for reading a book and completing a quiz on Accelerated Reader. This was a substitute to the traditional paper and pencil-based quiz teachers traditionally give.

Tasks on the substitution level were evident in three of the 12 observations during the second round of data. Participant G also utilized technology at the substitution level when students were given the task of using a web-based program to create and classify triangles and quadrilaterals. Students in Participant F's class used technology at the substitution level as they used a web-based application to practice identifying fractions. During Participant I's second observation, students were engaged with technology at the substitution level while word processing a response to a text assignment.

Theme 2: Teachers are Integrating Technology at the Augmentation Level

Throughout analysis of each data source, it was evident that teachers are implementing technology-based tasks at the augmentation level of SAMR. There were five participants who mentioned student tasks that were aligned to the augmentation level of the SAMR model. Two participants mentioned using such tools as Kahoot and Mastery Connect to assess student learning and then gauge their teaching. Participant E engaged students in a Kahoot assessment that focused on shapes. Upon completion, she began reteaching and differentiating instruction. By utilizing the feedback from the assessment, this aligned to the augmentation level. Students in Participant J's class were responsible for editing and revising, thus annotating on an existing typed paper. In Participant I's class, students were engaged in a story that was read online. Students then had to respond to a quiz using Mastery Connect an online assessment application.

During Participant A's and B's second observations, students were engaged in a computerized reading assessment. Students in Participant A's class read in small groups but completed the assessment individually. In Participant B's class, students read as a

whole class and as they completed their reading, took the online quiz for specific books. In Participant L's class, during her math lesson, students were able to come to the board, that board being a team board, to solve problems she wrote on the board.

Theme 3: Teachers are Integrating Technology at the Modification Level

With the analysis of data, I also saw that teachers are having students use technology that shifts to the modification level. Seven participants mentioned tasks on the modification level. These tasks varied in grade level and content area. There were participants who described assignments in which their students collaborated with peers and provided them with feedback. Participants also mentioned having students use technology to present their product to their peers. In the observations conducted, participants engaged students in many collaborative (student-to-student) tasks. Participant H, in particular, designed a task in which students had previously started working on presentations using technology. Students then used technology to present their information (animal habitats) to students; students used a program (i.e. Prezi, PowerPoint, and Google Slides) of their choosing to design and present their content. Having students engage in this type of assignment, aligned with the modification level of the SAMR model.

Participant C's students used Google Slides to provide visuals of their chosen historical figure. Within their presentations, students were tasked with imbedding one video and web-page link for their historical figure. Participant J used feedback from a Kahoot game focusing on text structure to formulate her small groups for instruction. Participant E had students to work with a partner to create a presentation explaining one

of the state's land regions. Students would then take their product and post in on the class's Edmodo page. The subsequent lesson would give students opportunities to view and provide comments to each group's presentation. Receiving and providing such feedback shifted the task to the modification level.

Theme 4: Teachers are Seldomly Integrating Technology at the Redefinition Level

During analysis, it was also evident that teachers integrate technology at the highest level of SAMR, redefinition. Only one out of twelve participants mentioned tasks on the redefinition level. However, this level was evident in two of the participants' observations. Two of the teachers integrated technology that was even more student-centered, reaching the highest level. During a science/social studies class period, Participant K had students to complete a discussion using Flipgrid. Students were responding to peers after Participant K posed several questions. This student-to-student interaction, allowed for academic discourse as students were able to explain their thinking using Flipgrid as the mode of technology. Participant C had her students to work with partners using laptops to complete a peer assignment online using Google Classroom. Students used the internet, finding images to match similes of their choosing.

Theme 5: Barriers of Integrating Technology

In analyzing data collected, participants shared that while technology integration is important and beneficial, it does not come without its difficulties. There are barriers that teacher face when integrating technology, that may cause reluctance in moving to higher levels of the SAMR model. Ten out of twelve participants mentioned form of barrier when integrating technology. One of Participant A's barriers was indicated as

technology availability. She stated that “this year there are only two desktop computers.” She goes on to say that “the lack of having technology makes it harder to integrate technology.” Another barrier that was noted was teacher self-efficacy which was evident in Participant I’s interview. The participant stated that she often struggles with “the technology part of my teaching career.”

During four observations on four different occasions, the participants and students encountered technological issues. In Participant B’ classroom, the display would not turn on at the start of class. Technology personnel were contacted and the issue resolved. Internet connection, another barrier was experienced during three other observations. For one of the classes, the laptops would not connect during the planned time. However, students were able to go back and complete the task closer to the end.

Theme 6: Teacher-Centered Instruction is Evident in Technology-Based Instruction

Data collected from lesson plans, observations, and interviews helped to solidify that even with the implementation and use of the SAMR model, there is still teacher-centered instruction. All 12 participants indicated to occurrences of teacher-centered instruction. For example, during one interview, Participant B stated that she uses her promethean board to “model during direct instruction”. Participant C stated that she begins her instruction by showing the day’s agenda as well as modeling expectations for assignments. Participant C also stated that she uses the technology more teacher-centered for “direct instruction, the anticipatory set and to show short video clips.”

In every observation, participants began with teacher-centered instruction. During Participant A’s observation, the participant began her instruction by modeling how

students would go about using Google Earth. Teacher-centered instruction was also evident in participant G's observation as she was the primary user of technology while teaching strategies for multiplying whole numbers.

Theme 7: Student Engagement and Motivation are Evident in Technology-Based Instruction

Analysis of the data confirmed that teachers see that technology integration impacts student engagement and motivation. The impact of technology integration on student engagement and motivation was discussed in every interview. As participants were asked to reflect on the impact of technology, all 12 mentioned student engagement and motivation within their own classrooms. During one interview, Participant J explained that because of student-centered technology integration, her "students are more engaged when using technology." The same participant stated that "they [students] are raising their hands to come to the board or read what 's on the screen rather than what's on the page." Participants reflected on what student engagement and motivation looks like when student-centered technology-based tasks are offered to students. Participant G said, she sees "an increase in participation and student confidence." Moreover, the inclusion of technology engages students and motivates them.

Theme 8: Benefits of Integrating Technology

Through the analysis of interview transcripts, I found that teachers believed there are many benefits of integrating technology. Eight of the twelve participants mentioned possible benefits of integrating technology. Many of those benefits include critical and creative thinking, collaboration, development of independence in students and retaining

new learning. Integrating technology can be beneficial to the learner completing the tasks. By integrating technology, many participants felt that critical thinking is a benefit of integrating technology. Participant C said that when students use technology at higher levels of SAMR, they become engaged, independent and critical thinkers. There were also participants who thought that by having students use technology to complete various tasks that it contributed to their creative thinking. For most of the participants, they felt having students use the available technology, it "increases their excitement and willingness to participate" Another participant, Participant A, stated that the "technology component allows all students to be confident in what they're doing."

Participants also mentioned that implementing technology using the SAMR model allows for more collaboration among students. Participant E commented that by integrating technology, students are "willing to collaborate with and help their classmates." While designing student-centered technology-based instruction, participant H said that she considers ways in which students are able to collaborate with each other.

Theme 9: Teachers Must Plan for Technology Integration

Data collected from lesson plans and interviews helped to solidify that teachers do use technology. There is a planning component that is imperative to efficient use of technology. Of the 12 participants, each participant mentioned planning out the use of technology in their practice. During one interview, Participant E stated that "designing a SAMR lesson takes planning." Participant H, commented that as "as I plan my lesson for my students, I try to give the kids more opportunities to explore and use technology throughout my lesson." Furthermore, it is through planning that participants were able to

integrate technology, whether teacher-centered or students-centered. Participant A indicated that designing “lessons that are student-centered and technology-based, takes a lot of planning.” The responses from interviews were consistent with the idea that when integrating technology, teachers to plan effectively.

In evaluating the lesson plans, 10 out of the 12 participants planned SAMR lessons. The intended level of SAMR was indicated at the beginning of that specific day’s lesson. Although the levels of the planned assignments varied among the participants, teachers wrote out a plan of how students would be engaged with technology. As students begin to use technology, which was during independent practice on most lesson plans, the SAMR model was more evident.

Discussion of Findings

The purpose of this study was to investigate elementary school teachers’ implementation of the SAMR technology integration model in their instructional practice. The RQs that were written were to examine how teachers use technology in their instructional practice and examine the levels of the SAMR technology integration model at which teachers are integrating technology. There were two RQs which were:

RQ1: How are elementary teachers integrating technology in their instructional practices?

RQ2: Which levels of SAMR are being implemented by elementary teachers?

The framework for this instrumental case study was based on the SAMR technology integration model and the TPACK model. Both focus on the integration model, however, the SAMR model focuses on student-center technology-based

instruction. More importantly, using the SAMR model allows educators to view students as the primary users of the technology (Puentedura, 2014). After analysis, the findings were relevant to that which is found in the literature. Data showed how teachers are implementing technology-based instruction. Moreover, the data showed the levels at which teachers are implementing the SAMR model in their current practice.

Teachers Implement Technology at Varying Levels of SAMR

Participants in this study described their use technology in their current instructional practices. The participants also described how students use technology in the classroom. Participants who were diverse in years of experience, grade-level, and content areas, demonstrated their own implementation of technology-based instruction. These findings were consistent with SAMR-based literature. Student-centered technology-driven instruction can occur at any grade-level and in any content area. Moreover, the levels of SAMR can be implemented throughout content areas and grade levels. Many studies have been conducted to examine the integration of technology within different content areas. Research studies such as those conducted by Burke (2016) and Hutchison and Beschorner (2015), investigated the use of technology in literacy instruction. In both studies, like this one, the findings suggested that technology can have a purpose in literacy instruction. Furthermore, the purpose for which technology is used in any content area, can vary. Technology can be used just to take the place of an everyday task, such as typing an essay instead of writing it (Puentedura, 2014). Or students can use technology in a way that allows them to interact with the outside world. Studies have also been conducted with focus on technology integration in math, science education as well as

social studies. Effective student-centered technology-based instruction is not limited to a specific grade or subject matter (Puentedura, 2014). Engaging students with technology-based instruction can be on the substitution, augmentation, modification, and redefinition levels. This was evident in data collected throughout this study. Participants implemented student-centered technology-based instruction at every level of SAMR.

The implementation of the four SAMR levels in the different content areas and grade levels was evident, as participants described their current roles in education. Participants also describe how they have students to use technology, whether to complete online assessments, play a web-based game, or complete a group assignment. Each of the tasks described or observed showed that as teachers develop plans for use of technology, or a specific level of SAMR, grade and content have little influence. Participants indicated the intended level of SAMR and developed a lesson that would have students as the users of the available technology. The observation notes also made the claim that teachers are implementing technology at different levels of the SAMR model, very evident. Students were completing tasks, those described by the participants, using some technological device. Moreover, the student-centered technology-based instructional tasks were at all levels of the SAMR model.

Students are Using Technology at Different Levels of SAMR

They are tending to be more engaged and motivated in the learning process. Participants were able to describe just how students use technology in their classroom instruction during interviews. Participant L shared that she had students “do a recording of themselves reading their favorite part of the same book.” Additionally, Participant B

noted that “I have them to complete online assessments and practice content area skills on a web-based program.” Participant D explain that when using technology, students are “engaged and entertained throughout the entire lesson.” It was evident that participants in this study implement technology-based tasks at the substitution and augmentation levels of SAMR more frequently. The modification and redefinition levels were occasionally evident based on different reasons given by participants. This supports the findings of Hilton (2015). Hilton’s study focused on middle level implementation of SAMR and found that students typically performed tasks at the substitution and augmentation levels. It was also evident that tasks were occasionally aligned to the medication and redefinition levels of SAMR.

Observation analysis was another source used to confirm student use of technology within the classroom structure. Again, the substitution and augmentation levels were more frequently evident than modification and redefinition. In one classroom, Participant H, students were working collaboratively to create digital timelines of the battles in the French and Indian War. It was also noticed in another classroom as students in Participant F’s classroom were engaged in group work to summarize a chapter of the book they were reading. This study’s findings do not support the findings of McKnight et al.’s (2016) study. Conversely, in McKnight et al.’s (2016) multisite study, students were provided more opportunities to complete transformative tasks—tasks aligned to the modification and redefinition levels. This was attributed to the teachers at each settings’ well-established student-centered technology-based instructional practices.

Teachers See the SAMR Model as a Shift in Learning

Although it has not been proven that the use of technology increases student achievement, technology use has been linked to student engagement and achievement. The findings of this study are consistent with the literature surrounding teacher use of technology and student achievement. Studies conducted prior to this have focused on technology integration and its impact on student engagement and achievement. Harris et al. (2016) conducted a study in which the findings supported the claim that technology has the potential to motivate students and increase their engagement and learning. Data collected during the interviews demonstrated that when students are able to use technology, there is an effect on their level of engagement. Nearly all participants described a change in their students' success after providing technology-driven instruction. Additionally, the participants explained that with the use of technology, students tended to be more engage because they were using technology.

Participants also referenced students' motivation to learn content when they are using technology in the learning process. The findings from this study also supports studies like one conducted by Ciampa and Gallagher (2013). They claimed that the use of technology has the potential to increase student engagement and motivation to learn. Those findings were evident in the data collected in this study. As technology is used to shift the learning environment, Participant K, noted that the successes and level of engagement she sees is through her students' eagerness to learn social studies content. Participant H explained that it is through the technology-driven instruction that allows her

students to be involved in the learning process. Students are able to participate in what takes place in the classroom.

Planning is Required for Effective Student-Centered Technology-Based Instruction

No matter the level of SAMR that is implemented, teachers emphasized the importance of planning. Determining the right point in the learning process is also necessary to consider when designing a SAMR lesson. These findings correlate to SAMR literature in that student use of technology was described by students completing some assignment based on the learning goals. This was also evident in the study conducted by Kersaint et al. (2014), which looked at teacher implementation of student-centered technology-based tasks. The researchers claimed that effective implementation of student-centered technology-based practice, must be planned out. All participants in this study stated that importance of planning and researching in order to implement effective student-centered technology practices.

Designing student-centered instruction that is also technology-based requires teachers to do their own research. It requires teachers to find resources, practice the task themselves, before delivering the task to the students. Participants stated that when it comes to designing a SAMR lesson, they begin with the end in mind. They ask themselves, what is it that they want students to have done in order to meet the learning goal. Kersaint et al. (2014) also found that as teachers plan for technology use, they have to consider the purpose of the technology being used. Moreover, teachers believe that when technology integrated, the technology must support the intended goals of the content instruction (Kersaint et al., 2014). Teachers also consider the technology devices

available in order to design technology-based instruction (Puentedura, 2014). Furthermore, the connection between the learning tasks and the devices are also taken into consideration. For example, Participant F stated that she considers the task and the best device for students to use.

Conclusion

The data analysis and findings of this study adds to the body of literature that focus on technology integration and SAMR integration model. The study addressed the implementation of student-centered technology-based instructional practices as implemented by teachers using the SAMR model. The findings from this study demonstrate the implementation of technology-centered instructional practices along with the benefits as well as the barriers. Participants discussed, planned and put into action, the integration of technology that was student-centered. All participants shared how they integrate technology that is student-centered. The findings also support that for SAMR implementation, planning must take place. Most participants shared that as they design lessons that are technology-based for their students, they plan. They research resources, ideas, and examples while having the end goal in mind. When considering integrating technology, the goal is for effective student-centered technology-driven instruction to have a great impact on student learning (Puentedura, 2014).

Section 3 provides a description of the project I developed based on the findings of my study. The goal of this project is to strengthen teacher current practice in integrating technology at the modification and redefinition levels of the SAMR model. Another intended goal of the project is to provide teachers with real methods in which

they can integrate technology at the higher levels of the SAMR model. This study found that teachers do integrate technology at varying levels of the SAMR model. However, student-centered technology practices tend to stay at the substitution and augmentation levels. This section (Appendix A) outlines the training goals and outcomes, as well as the targeted audience for this professional development project. The project description, the evaluation plan, as well as project implications, are provided in section 3.

Summary

This section provided a layout of the conducted research study. The purpose of this research study was to examine elementary teachers integrating technology based on the levels of the SAMR model. The data presented in this section showed teachers' current instructional practices and perspective on technology integration in relation to student learning and engagement. This section also provided an outline of how data were collected and analyzed for this qualitative study. This section concluded a discussion of what the findings mean and its contribution to overall body of literature. In section 3, I discuss the proposed project, a professional development. Section 3 offers the introduction and recommendations made based on the findings of the research study. Then the section provides the project description, implementation, and implications on a local and larger scale.

Section 3: The Project

Introduction

The purpose of the study was to investigate how teachers integrate technology in their instructional practices based on the SAMR model. Based on the results of the study, teachers at the school can benefit from additional professional development that focuses on each level of the SAMR model. Additionally, teachers would benefit from professional development on implementation of the SAMR model in their instructional practice.

To respond to the findings of this study, I created a professional development plan (Appendix A) could help teachers make changes that could expand their instructional practices. The findings and literature review provide the basis for addressing research-based practices related to teachers further developing their instructional practices and increasing student engagement with technology integration. The recommendations include increasing teacher and administration knowledge of the levels of SAMR and its place in the classroom setting.

Rationale

Based on my findings, teachers can benefit from professional development that focuses on implementation of the SAMR model in their instructional practices. The goal of the SAMR integration model is to have students using technology in ways that could potentially transform their learning (Puentedura, 2014). Data collected from observations and lesson plan reviews showed that teachers in the local elementary school are integrating technology within their instructional practices. However, typical use of

technology was on the substitution or augmentation levels of the integration model. During observations, 75% of the observed activities, although student centered, were on the substitution or augmentation levels. The lesson plans review confirmed this finding as well. Based on my findings, I created a professional development project for teachers that reviews the SAMR model. Furthermore, the professional development provides methods in which teachers can have students using technology at the modification and redefinition levels of the SAMR model.

Review of the Literature

A review of scholarly literature was conducted focusing on qualities of professional development. Databases such as ProQuest, ERIC, EBSCO, and Education Source were used to find relevant research on the topic of professional development. Key words that revealed literature focusing on white papers were as follows: *teacher professional development*, *teacher perception of professional development*, *technology and professional development*, *professional development impact*, *teacher professional learning*, and *quality professional development*. This section includes discussion of the following topics: professional development, technology and professional development, and the impact of professional development.

Professional Development

Professional development has been a tool used to increase teacher capacity in their practice (Matherson & Windle, 2017). It is through professional development that teachers learn of new and emerging knowledge and use that to refine their own skills. Rather than professional development in which teachers simply sit and obtain new

information, districts must provide professional developments that allow teachers to be actively engaged in the learning process (Matherson & Windle, 2017). Moreover, professional development should be relevant to the teachers and students it is designed to impact. Any professional development that school districts provide should also influence instructional practices of teachers. For professional development that is technology focused, participating teachers should be able to engage with the technology in order to implement it effectively in their own classrooms. With any new learning opportunities for teachers, the goal should be that of increasing teacher capacity and impacting student learning.

Professional Development Criteria

There are four criteria that teachers desire from professional development: (a) learning opportunities that are engaging, interactive, and relevant; (b) learning opportunities that are practical in content delivery; (c) learning opportunities that are teacher-driven; and (d) learning opportunities that are sustained over time (Matherson & Windle 2017). Teachers want professional development opportunities that they can use immediately in their instruction and that are not a waste of time (Matherson & Windle, 2017). Providing teachers with this type of professional development allows them opportunity to drive their instruction and address students' needs. Teachers also desire professional development that they see as a need for themselves and that will improve their instructional practices over time (Matherson & Windle, 2017).

Similarly, there are many contributing factors for teachers and their perceptions of meaningful professional learning opportunities (Nooman, 2019). One of these factors is a

teacher's perception of content of which they were learning. Teachers desire to be engaged in learning that is relevant to their area of expertise. Additionally, teachers see powerful professional development when they see their learning as applicable to their practice.

Sustainability

Many professional development opportunities do not engage teachers with interactive trainings that directly impact their instructional practices and lead to results in teaching and learning (Redman et al., 2018). Teachers feel that professional learning opportunities are more effective when they are sustained over time and applicable to their needs (McCray, 2018). Additionally, professional development is seen as effective when teacher input and involvement is utilized throughout the development and implementation process (McCray, 2018). Sustainability is an important factor of professional development because it is more impactful if the trainings are long term enough for teachers to get feedback and try and modify their instructional practices (Bigsby & Firestone, 2017).

Delivery Styles

Professional development is often made available in various formats for educators. Some professional learning opportunities are presented through online courses, and others are presented through the traditional means of face-to-face interactions. Two of the highest-ranking methods of delivery among teachers are observing fellow teachers and peer coaching (Courtney, 2016). Other methods of delivery, such as online courses and video trainings, score lower. However, online professional development can be

beneficial if it is engaging and allows for interaction with the content delivery that is applicable to instructional practices (Parsons et al., 2019). Teachers find the training beneficial if they can see the ease with which they are able to implement the new learning in their own instructional practices (Sheridan et al., 2020). As school districts provide professional developments to their teachers, delivery styles must be considered (Courtney, 2016).

There are many factors that should be considered when designing and offering professional development to teachers. Based on previous research, professional development should be designed based on the needs of the teachers. This makes it relevant to the teachers who are participating (Courtney, 2016). Additionally, how the professional development is delivered must be taken into consideration. Researchers have found that effective professional development engages teachers in the learning process, modeling classroom instructional practices.

Technology and Professional Development

Research has indicated that professional development is needed in order to increase teacher self-efficacy and develop teacher capacity for technology integration (Johnson, 2014). A best practice for building teacher capacity in technology integration in the classroom is to develop a strategic process for ongoing development (Love et al., 2020). This includes professional learning communities, on-site technology leaders, and ongoing trainings for teachers who need additional support. By implementing these practices, teachers are able to increase their own capacity in technology integration. Further, as teachers participate in professional development, they should actively engage

with the technology to apply the new learning in their own classrooms (Love et al., 2020). Teachers have found professional development on the SAMR model beneficial in gaining knowledge about the technology integration model, especially when the presenter used the Web 2.0 tools they were expected to implement in their classrooms (Aldosemani, 2019). Research has shown that by participating in technology-enhanced professional trainings, teachers' self-efficacy and confidence with technology has increased, and their instructional practices have changed (Blanchard et al., 2016). Research has also shown some correlation between teachers who participated in a technology-focused professional development and student results from the Technology and Engineering Literacy assessment (Clark & Zhang, 2018).

Technology-based professional development can provide teachers with the tools necessary to integrate technology in their classrooms. Teachers, after being trained, are more confident and are able to use and have students use technology throughout their classroom instruction. When teachers participate in technology-based professional developments, their participation has the potential to positively impact students' competency levels with technology (Clark & Zhang, 2018).

Impact of Professional Development

Research studies have been conducted to investigate the impact of professional development on teachers and learning. Researchers have studied how participating in a content-specific professional development impact the instructional practice of the teacher. Based on the results, researchers have found that effective professional development can result in an increase in teacher capacity as well as teacher self-efficacy. Researchers have

also studied how a teacher's participation in a professional learning opportunity impact their students' learning.

One study, conducted by Goodnough (2016), was a focus on the impact of science-focused professional development on teacher instructional practices. The results were indicative of teachers participating in the professional learning provided and change in their teaching. Participating teachers were engaged in a training in which they collaborated with colleagues over a two-cycle (two-year) timeframe. As a result of participating in the science-based training, the teachers noticed a change in their instructional practices when teaching science. Furthermore, the teachers developed a greater sense of self-efficacy with teaching science curriculum.

Gupta and Lee (2020) investigated the impact of a site-based professional development on teacher instructional practices and student learning. Employing a mixed-methods approach, the researchers found that the professional development proved more effective when it was tailored to fit the needs of its participants. Secondly, the researchers discovered that as a result of having professional development specific to their needs, teachers were able to implement much of the learning and goals of the trainings. The researchers noted teachers and students showing behaviors evident of implementation of the strategies and practices offered in the professional development course. Although the researchers observed implementation of the reading strategies from the trainings, they did not see significant gains in student performance. Test data showed some gains on reading assessments (Gupta & Lee, 2020). The researchers saw this as a positive correlation between teachers participating in the professional developments and student outcomes.

Rutherford, Long, and Farkas (2016), conducted a study that examined how participating in a professional development can impact teacher capacity and self-efficacy. The researchers also examined the potential effect of professional development on student outcomes. Based on the results of the study the researchers concluded that there is positive correlation between teacher self-efficacy, as a result of professional development, and student outcomes. Likewise, researchers Smith and Williams (2020), conducted a study on the perceived impact of teachers participating in a professional development focused on literacy instruction. The researchers collected data after teachers participated in a specific literacy-based professional training that was geared toward improving the district's reading instruction. Teachers who participated in the professional development perceived it to be effective in their instruction. The researchers also saw that teachers felt they had gained more self-efficacy in literacy instruction. The results from data collection also indicated that the professional development needed to be sustained (Smith & Williams, 2020).

The goal of any professional development is to increase teacher capacity. The end of result of teachers participating in a professional development is the change in their instructional practices based on their new learning. The outcome of the designed professional development is to impact teachers' implementation of the SAMR model in their instructional practices. In order to do so, the training should meet the criteria of desired professional development. Firstly, the training should be technology-based. By integrating technology into the sessions based on the SAMR model, participating teachers should be able to take their new learning and model that learning in their own classrooms.

The professional development should feel relevant to the participants and their daily practice. In today's classrooms, technology has become paramount in the teaching and learning process (Love, Simpson, Golloher, Gadus, & Dorwin, 2020). The professional development should also be engaging and interactive for teachers. Matherson and Windle (2017) suggested that teachers desire trainings that are interactive, not sit and learn. Professional development should also be sustainable; teachers should learn new practices that will positively impact their teaching practices over time. Finally, the professional development should be teacher-led. Researchers have found that teachers desire to learn from each other (Courtney, 2016).

Project Description

The data analysis from this project study showed a need for additional training for teachers for implementation of more transformative student-centered technology use. The analysis of the interviews, lesson observations, and lesson plan reviews indicated a need for more supports for teachers. Based on the findings, a professional or staff development was chosen for the project. The local problem this study addressed was the elementary teachers integrating technology at mostly the substitution and augmentation levels of the SAMR model. My proposal is to implement a professional development for teachers in order to shift their implementation from the substitution and augmentation levels to the modification and redefinition levels.

The project created was a 3-day technology-based teacher-led professional development. This project is based on teacher need of shifting their instructional practices when implementing student-centered technology-based learning experiences using the

SAMR model. Although the data collected is from one school in the district, the proposed idea of professional development on the SAMR should be considered across the district.

Implementation and Timetable

School and district leaders should consider the resources needed to provide sustainable teacher-led professional development for teachers. Teachers are already given professional development opportunities prior to the beginning of the school year; no additional time would be required. Teacher learning will occur in the existing meeting times for review of the SAMR levels and implementation of the model in their instructional practice. More specifically, the professional development's intent will be to provide development in how to shift the learning experiences from substitution and augmentation to the two higher levels of SAMR. The professional development should sustain over a 3-day timeframe.

Resources, Existing Supports, and Barriers

One of the resources needed to successfully implement the recommendation is the time during opening week of the school year. Although no additional time will be needed, successful implementation of the recommendation will require teachers meeting for the training. Another resource that will allow for the recommendation to be successfully implemented will be technology hardware. Teachers have district provided laptops which will be necessary for the professional development trainings.

One potential barrier of successful implementation could be the lack of teacher and administrator buy-in or resistance from school staff. Teachers must feel that professional development is relevant and will ultimately impact their instructional

practice (Matherson & Windle, 2017). To increase participation from teachers and limit resistance, the findings of this study and potential benefit of the recommendation will be presented. Great effort will be given to ensure the training is interactive and engaging for all participants (Matherson & Windle, 2017). Another potential barrier will be scheduling of meetings. Although the school site has meetings during the first week of the school year, the administration could find other professional development needs as higher priority.

Roles and Responsibilities

Implementing professional development will require well-established roles and responsibilities. The trainings will include reviewing the integration model, an in-depth look at each level, and methods for integrating technology at higher levels of the SAMR model. Teachers will have the role of attending each training with the necessary tools to plan and carry out each level of SAMR.

Administrators will also have a responsibility in the implementation of the recommendation. School administrators will play a key part in securing resources at that the school site. I must first acquire administrator buy-in, which would require them to see a need and benefit in implementing the recommendation. The school administrators will also have the role of designating a location for the professional development to take place. Administration will also have the responsibility of communicating their expectations of teachers, and the researcher. Additionally, administrators will provide support for the researcher during the professional development. I worked with the administrators to devise how to ensure teacher buy-in of the professional development

and to willingly participate. The school leaders will also need to provide data from classroom observations into how instructional practices have been impacted as a result of the 3-day staff professional development.

Project Evaluation Plan

To determine the success of the project's implementation, I will gather teacher feedback at the conclusion of the staff development. They will provide their new learning as a result of the SAMR trainings. Teachers will collaborate with colleagues to plan, design and model SAMR lessons. More importantly, teachers will focus extensively on planning and designing lessons on the modification and redefinition levels. At the conclusion of the training, teachers could have "take-away" lessons they have created, that they can employ in their classrooms. The teachers at the site will also share how they intend to enhance their instructional practices have changed as a result of the training. Teachers will be given questions to complete and will return to me at the end of each session. Each evaluation form will ask for teachers to rate specific aspects of the day's session using a scale from "*1 - Strongly Disagree*" to "*5 - Strongly Agree*" (Appendix A). For example, teachers will rate the clarity of the objectives of each session. They will rate the usefulness of the information as well as the potential application of the new learning. Additionally, teachers will rate my knowledge of the content and presentation of the content. In addition to rating the professional development using the scale, participants will be able to offer their perspectives by answering short-answer questions. Teachers will be able to identify content that was helpful and any information that may have been confusing for the day. Teachers will also be able to explain their plans for

implementation of their new learning. The information collected at the end of each session will impact possible adjustments to the next day's session. The evaluation data collected at the end of the third day's session will lead to formation of smaller review sessions that teachers will be able to attend throughout the year. Such sessions will offer additional support for teachers in their implementation of the SAMR model.

Project Implications

Local Implications

The professional development has been designed to provide teachers with review into the SAMR model as well as an in-depth look into each level. Evidence of positive social change at the local level should include teachers' instructional practices that have changed as a result of the trainings. Teachers should be integrating technology at the modification and redefinition levels of the SAMR model. Furthermore, teachers and administrators will be more knowledgeable about the SAMR model and its impact on student learning. In turn, this should positively impact student engagement and students' learning experiences. Implementation of the recommendation and continued emphasis of the SAMR model could result strengthening teachers' confidence in technology use.

Larger Context

This project study would add to the needed body of research and literature related to the SAMR model and teachers' instructional practices. Although the teachers at the target site are integrating technology that is students-centered, the tasks they implement are at the substitution and augmentation levels. There is not much research that emphasizes the SAMR in implementation and practice. The desire of this project study is

to add to the body of research by providing suggestions for teachers to improve their technology-based instructional practices that are student-centered with implementation of the SAMR model. The goal is to have students utilizing technology at the modification and redefinition levels, ultimately transforming their learning experiences. This is based on the interview, observation, and lesson plan review data.

Conclusion

Based on the data analysis of the semi-structured interviews, all of the lesson observations, and lesson plan reviews, professional development was designed to address the gap in practice in technology integration based on the SAMR model. Currently, the school district does not have evidence, at any school level, of how the data are used to support instructional practices. This professional development was created to potentially shift teachers' instructional practices to greater implementation of the SAMR model. More specifically, the professional development could lead to teachers more consistently integrating technology at the modification and redefinition levels. Section 4 includes the reflections and conclusions from this doctoral study.

Section 4: Reflections and Conclusions

Introduction

In this section, I discuss the strengths and limitations of this project. I also provide recommendations for alternative approaches to solutions based on the problem of the study. Within this section, I also reflect on my work as a scholar, practitioner, and developer of this project. The implications and applications of the professional development will also be discussed in this section. Additionally, I will include possible directions for future research studies.

Project Strengths and Limitations

Project Strengths

One possible strength of the professional development is addressing the needs of the teachers based on the collected data. The problem was that although teachers were integrating technology in their instructional practice, the use of the technology was more teacher centered. Furthermore, students' use of technology was at the lower levels of the SAMR model. One of the greatest strengths of this project as a professional development is providing teachers with an interactive and engaging training (see Matherson & Windle, 2017). Teachers will have the opportunity to expand their knowledge of the technology integration model and collaborate with other teachers. Another strength of the professional development is that by participating in the professional development, teachers can alter their instructional practices (see Blanchard et al., 2016). Moreover, the professional development may shift student-centered technology driven practices.

Another strength of this project is the minimal resources needed to implement. The school district has technology resources available for teachers that they can use during the recommended training sessions, and no additional monetary resources are necessary. The district has a Technology Department and an Instructional Technology Department that provide technology support for teachers throughout the district. The Technology Department along with the Instructional Department can provide additional resources for the SAMR training. The school district also has instructional technologists within all schools who can provide additional and direct support for teachers after participating in the professional development (Gupta & Lee, 2020). A final strength of this project is the potential impact the project can have on similar districts that have issues in student-centered technology integration.

Project Limitations

The main limitation of this project is that the professional development is designed specifically for the school district. Consequently, the professional development is not designed for an entire district audience but rather school-wide. If other districts wanted to consider the professional development, then the professional development would need to be revised to audiences beyond those of this study. Another limitation may be acceptance of the professional development given. Some teachers may feel apprehensive about shifting their instructional practices with technology integration based on their own self-efficacy (Clark & Zhang, 2018). Additionally, teachers' comfort level with technology may influence their integration of student-centered technology in their instructional practices (Blanchard et al., 2016).

Recommendations for Alternative Approaches

This study addressed the issue of teachers in the school district not fully engaging students in technology use even with the district-wide implemented technology integration model. Another alternative to the approach taken in this project study is a series of smaller trainings that could occur over a series of weeks. The 3-day professional development was designed as a training to shift teachers' instructional practice. The smaller trainings would provide the teachers and school administrators with smaller chunks of new learning that could be held during teachers' planning sessions. These trainings, much like the professional development, would have a specific purpose, goals, and learning outcomes that are connected to the data. Moreover, the trainings would still allow for teachers to put their new learning into practice. The trainings would be interactive and require collaboration among participants. Without the necessary resources needed to carry out the professional development, implementation would not be beneficial.

Scholarship, Project Development and Evaluation, and Leadership and Change

Scholarship

Working toward this degree taught me about research and the research process. Finishing my individual courses and developing my research study required an insurmountable about of reading and analysis of other research studies. Through the research process, my scholarship has developed as I became more knowledgeable about reviewing and critically analyzing studies. Researching other topics, writing literature reviews, and learning of many other research methods has shifted my work as a scholarly

writer. As a result, engaging in the research process has further developed my scholarly writing skills.

I have gained valuable knowledge focusing on identifying a local problem and designing a study that would lead to potential solutions. Moreover, I learned about the process required to conduct an institutional review board approved research study, which included identifying a problem, choosing an appropriate research methodology, and the appropriate tools to carry out the study. Collecting, organizing, and analyzing data was a challenging experience for me. Throughout this entire process, scholarly writing has been quite the challenge for me as a researcher. I have learned that researchers may go through several revisions, edits, and changes within their own research process.

Project Development and Evaluation

Through the research process, I began to understand that the project development is based on the data gathered from the study. At the beginning of my project development phase, I initially had professional development in mind. I had this specific project type in mind because of my own experiences with professional development as an educator. I felt I had the experience to design a professional development that could meet the needs as found in my study. Through more research, and suggestion made by my committee chair, I found a white paper report to be a more appropriate project. In my research, I found that a white paper report would allow me to present the problem, my study as well as my findings. Most importantly though, the white paper would allow me to share recommendations as solutions to the identified problem. The idea is to provide a solution that would bring about positive change in the field of education.

Leadership and Change

Completing this research study has given me much confidence in the way of leadership and desiring social change. What started as more of an acquisition of another degree, has morphed into a strong desire to use my newly acquired knowledge to promote change. Ultimately, this entire process has strengthened my goal of aiding teachers in their instructional practices and impacting student learning. More specifically, my goal is help teachers in shifting their instructional practices to have students utilize technology in a way that prepares them for a future in the 21st century. This would mean providing transformative learning experiences for every student.

As a scholar, this Walden process has been one that required a huge commitment to learning and growing as a student and as a researcher. As an individual who was not too familiar with research methods and the research process, this experience came as quite a challenge. I had to grow as a scholarly writer, learning through reading research studies, and textbooks about the various types of research methodologies. Additionally, I was able to receive feedback which also allowed me to grow as a scholarly writer. I also had to remain objective throughout the process, ensuring that my own biases did not influence my interpretations of the collected data.

As a scholar-practitioner, I feel I will continue to conduct research that will bring about positive change in the teaching and learning process. As a teacher leader myself, I can provide support for teachers in their instructional practices. Furthermore, through my development as a researcher, I have gained a wealth of knowledge in the SAMR model and how teachers can apply it to their instructional practices. As a practitioner, I shifted

my instructional practices based on my consideration of technology integration. Now, I am more critical of the technology-driven learning experiences that I provide my students.

Reflection on Importance of the Work

Instructional technology has become a crucial component in the teaching and learning process. While the impact of technology on student achievement still remains inconclusive, teachers are still charged with integrating technology in their instructional practices on a daily basis. Technology integration models such as TPACK help shape the approach teachers used when they utilize technology on any given day. However, this model focuses on teacher-centered technology-based instruction. The research I conducted focuses on technology-based instruction that is student-centered based on the SAMR model.

The findings from my study revealed that the student-centered technology-based learning tasks given by the teachers remain at the lower levels of the SAMR model. Teachers are integrating technology on a daily basis; however, the technology is merely serving as a substitute for their everyday tasks. The data collected throughout my study, interviews, observations, and lessons, indicated that teachers would benefit from professional development. This led to the development of my project, which was a professional development focusing on the SAMR model. The 3-day professional development sessions would serve 2 purposes for teachers. They would: (1) review the SAMR model and each of its levels, and (2) demonstrate technology-based learning experiences at the modification and redefinition levels.

The professional development would involve teachers engaging and interacting with colleagues throughout the professional development sessions. Such development focuses on the SAMR model. Teachers would have to collaborate with and learn from colleagues in designing learning experiences for students that are student-centered and technology-driven. Additionally, the trainings would be conducted in a way that would result in integrating technology at the higher levels of the SAMR model. The interactive and collaborative nature of the trainings would lead to teachers planning more effective and transformative learning experiences for students.

Education today strives to prepare students for a future that is unknown. Helping students cultivate necessary skills, such as critical thinking, creative thinking, and problem solving is imperative in schools today. Technology is a tool most teachers use to help students develop those very skills. Moreover, technology is often used to engage and motivate students in the learning process. This project has the potential to shift the teaching and learning process, enabling teachers to provide transformative learning experiences for students while integrating technology. I firmly believe that this project has the potential to impact district leaders' decisions regarding instructional technology and teachers' instructional practices. Thus, helping to prepare students for a future in the 21st century.

Implications, Applications, and Directions for Future Research

This project study set out to answer the RQs: (1) How are elementary teachers integrating technology based on the SAMR model in their instructional practices? (2) Which levels of the SAMR are being implemented by elementary teachers? Nine themes

resulted from the conceptual framework and data analysis. The four levels of the SAMR model were used as themes: (1) substitution, (2), augmentation, (3) modification, and (4) redefinition. These themes addressed how teachers are integrating technology based on the SAMR model and the levels at which teachers are integrating technology.

The professional development opportunity was designed to apply specifically to the school site in which the study took place. This professional development was designed as a technology-driven interactive professional learning opportunity for teachers. Throughout this professional development, teachers will review then design SAMR centered learning tasks. As a result of participating in the professional development, implementation of the SAMR levels throughout their instructional practices would also continue. As for future research, one focus should be to conduct the study using a larger sample size. Increasing the population size would allow the study to be more generalizable for similar districts. Another direction would be to duplicate this study on the middle and secondary levels. This would allow for a wide range of perspectives on technology integration, rather than just the elementary level.

Conclusion

Technology plays a key role in the education of students; technology is present and is dormant in the instructional practices of all teachers in a classroom today. As educational researchers develop new strategies and best-practices, technology is a factor in implementation. This study sheds light into the many ways in which technology can be used in today's classroom. From this study, I see that the purpose of different technology devices, Chromebooks, laptops, or iPads, can vary in every classroom. Furthermore,

technology can be used differently and to varying degrees based on the SAMR model. However, the goal of any technology used within a lesson is to impact student learning. Moreover, teachers want to help transform students' learning experiences through the use of technology-based student-centered tasks.

Section 4 begins with the project's strengths and the project's limitations. Any alternative approaches to this project study are also presented to the reader. In this final section, I also reflect on my own experience as a scholar, practitioner and project developer. As I continue, I also discuss the potential impact this study can have on social change. Finally, Section 4 concludes with the professional development's implications and applications. In this discussion, I also include possible directions of future research studies.

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Appendix A : The Project

SAMR Professional Development

Transforming Student Learning through Technology

Purpose: Transforming Student Learning through Technology will be a professional learning opportunity for teachers to dive deeper into the benefit of effective implementation of the substitution, augmentation, modification, and redefinition (SAMR) technology integration model. Teachers will be provided with opportunities to collaborate with peers, develop instructional plans, and create student-centered, technology-based learning experiences for students. As teachers prepare students for a technology-driven future, this professional development will help teachers shift their instructional practices. Additionally, the purpose is to help teachers transform student learning as teachers integrate student-centered technology-based tasks. By the end of the professional development, teachers will have developed technology-based tasks designed for students of varying grade levels and content areas.

Goal: The goal of this professional development is to provide teachers with the tools and knowledge needed to shift their instructional practices in technology integration. Another goal of this professional development is to increase teachers' capacity for providing students with technology-driven experiences that will transform their learning.

Learner Outcomes

Teachers will actively engage and collaborate with peers to:

- ✓ Explain the impact of technology integration in the classroom
- ✓ Identify and describe each level of the SAMR technology integration model

- ✓ Develop technology-based instructional plans based on the levels of the SAMR model
- ✓ Create SAMR model focused learning tasks for students that will transform their learning
    - Teachers will work as grade levels [CD – 5th; Art Music, and Physical Education] to design SAMR-based tasks.
    - Each task that teachers plan, design, and create will align to each level of the SAMR model.
    - There will be a task created in each content area for each grade level.
    - Special area teachers will work together to create SAMR-based lessons for their subject area as well.

Targeted Audience: Teachers, PreK-5th

Activities: Teachers will complete tasks requiring collaboration and interaction with other teachers. Participating educators will review each level of the SAMR model. Throughout the trainings, teachers will create SAMR focused lessons at all levels of the technology integration model. The teachers will collaboratively work with peers to model a lesson they have created.

Day 1

Presenter: Good morning, to you all! Today is day one of the Transforming Student Learning through Technology professional development. Day one's session will begin with targeting our approach to teaching and learning with technology. We are going to first begin with a discussion of technology's place in the classroom and the potential

benefits. We will then take a brief look into the SAMR technology integration model and each of its levels. Today's activities will require your participation as well your engagement with technology. The goal is to have you utilize technology in ways that are aligned to the levels of the SAMR model. Furthermore, the methods in which you use technology can be taken back to your own classrooms.

Presenter [Describes ice breaker]: Before we begin, we're going to begin with an ice breaker. As you were coming in, you wrote the title of your favorite song. As each song is played, you will guess the colleague who has identified that song as their favorite. If your song is guessed correctly, you will stand and share one thing you hope to get from today's session.

Presenter [Why technology in the first place?]: We will now have an open discussion about technology in the classroom. Think-Pair-Share. For each question, you will think, pair with a colleague, then share your thinking. As you pair up, one person is Partner A, the other is Partner B. (Each question one minute for Partner A, one minute for Partner B.)

Presenter: [21st century classroom] You will participate in a digital discussion about what the 21st century classroom looks like with technology. You will use Flipgrid to post your initial response and engage in a discussion with colleagues.

(1) *Flipgrid Discussion* – Teachers will discuss what a 21st century classroom looks like and how they are preparing their students for the future. The prompting questions will be posted by the presenter. Teachers will post their responses using Flipgrid. This task aligns with the redefinition level of the model.

Presenter: Discuss positive impacts of technology on student learning [Slide 5]. Play YouTube video by clicking the video link.

Presenter: Now that you have shared what the 21st century classroom looks like, we will now review the SAMR model and each of the levels. We can use technology to also transform student learning experiences [Slide 6].

Presenter [Slide 7 – Intro to the SAMR model]: Proceed through Slides 7 through Slide 13, breaking for lunch after Slide 7.

Presenter [Slide 14]: Research and Create! Explain directions to teachers (researching and developing the paper slide presentation).

(2) *SAMR Research* – Teachers will research a specific level of the SAMR model based on their assigned group. Each group will present their findings to the entire group through video. Such a collaborative task is on the substitution level.

Presenter [Describe Paper Slides]: A paper slide video is a presentation method that can be used by students to present content. A paper slide video can be done very easily using very few materials. All you'd need is a recording device--cell phones work perfectly fine--paper, and art crafts. First, begin with the idea. For this training, you and your group members will research one level of the SAMR model. After gathering your research, you will develop a 2-minute paper slide show, providing a summary of that specific level.

(3) *Paper Slide Video* – Teachers will work with group members to create a paper slide video about a specific level of the SAMR model. After completing their videos, teachers will view and provide feedback to peers. This task is aligned to the augmentation level.

Presenter [Reflections]: Navigate to Nearpod (web-based platform that permits students to interact with lessons and collaborate with peers. Post the closing question, have teachers to respond via Nearpod.

(4) *Parking Lot* – Using Nearpod, teachers will post questions they have from the day's session. Teacher will also be able to comment about their learning from the day's session. This activity would align to the substitution level of the SAMR model.

Presenter [After distributing evaluation forms]: Please complete the evaluation form for today's session. Collect and review suggestions and questions to address at the beginning of the next day's session.

Day 2

Presenter: Welcome participants to Day 2 of Transforming Student Learning through Technology PD.

Presenter [Begin with ice breaker, "Have you ever?"]: We're going to start today off with another ice breaker. For this ice breaker called "Have you ever?", we will be using Google Forms to give and keep track of our responses. As each question comes up, you will choose Yes or No based on whether you have or haven't done what is being asked.

(1) *Google Forms Survey* – Teachers will complete the icebreaker, "Have you ever?", using Google Forms. Questions will be asked during icebreaker, and teachers will respond in Google Forms. This task is aligned to the substitution level.

Presenter [Slide 19]: Discuss the potential impact of implementation of the SAMR model on student learning. Play video. Ask the question, what key ideas can we take from Dr. Puentedura? Record responses on chart paper in front of the room.

Presenter [Slide 20-21]: (Substitution – Level 1) Read information from slide 20 and play video of substitution level explanation. Then proceed to slide 21 for directions of teacher task. Provide instructions for teachers and what is expected of them. Distribute Lesson Planning Guides to participants.

(2) *Plan*. *Design*. *Create*. – Teachers will plan, design, and create SAMR model lesson that is on the substitution level. Teachers will use their technology devices to design a SAMR lesson. As groups present their lessons, teachers will engage in completing activities on the substitution level.

Using online resources (Technology for Learners - SAMR, Kathy Schrock's Guide to Everything – SAMR, i.e.), to design a SAMR lesson on the substitution level. These resources, and many others, are good resources to use as a starting point for the lesson designing process.

a. Include standard and objective for each lesson.
b. Provide student-centered technology-based tasks at beginning, middle and end of lesson.
c. Describe how each task aligns to the Substitution level of SAMR.

Presenter [Slide 22-23]: (Augmentation – Level 2) Read information from slide 22, play video focusing on Augmentation level. Proceed to slide 23 for teacher task. Provide

instructions for teachers and what is expected of them. Distribute Lesson Planning Guides to participants.

(3) *Plan*. *Design*. *Create*. – Teachers will plan, design, and create a SAMR model level that is on the augmentation level. Teachers will use their devices to engage colleagues in a SAMR lesson. The lessons teachers engage in, will align to the augmentation level of the model.

Using online resources (Technology for Learners - SAMR, Kathy Schrock's Guide to Everything – SAMR, i.e.), to design a SAMR lesson on the augmentation level. These resources, and many others, are good resources to use as a starting point for the lesson designing process.

a. Include standard and objective for each lesson.
b. Provide student-centered technology-based tasks at beginning, middle and end of lesson. Model one lesson as planned in your group.
c. Describe how each task aligns to the augmentation level of SAMR.

Presenter [display blog wall to participating teachers]: A blog is based on the internet and can be access globally. Blog posts have the potential to engage students with audiences beyond the classroom. You will be posting on a blog, reflecting on today's session and the future of the SAMR model in the classroom.

(4) *Blog Post* – Teachers will respond to a reflective question by posting on a blog created by presenter. Teachers will answer a question about the future of the SAMR model in the next three years. By posting on the blog, teachers will be engaging in an activity on the modification level.

Presenter [After distributing evaluation forms]: Please complete the evaluation form for today's session. Collect and review suggestions and questions to address at the beginning of the next day's session.

Day 3

Presenter: Welcome all attendees to third and final day of Transforming Student Learning through Technology PD.

Presenter [Access digital tournament bracket for all to view]: You will be able to move around for this ice breaker – Rock-paper-scissors! You will go around the room playing with a different partner each time. The best out of 3 wins, and you move on. As you move on and win, names will be added to the bracket as shown.

(1) Icebreaker Tournament – Teachers will compete in a rock-paper-scissors tournament; winners will be posted in a digital tournament bracket. Instead of a paper tournament bracket, winners will be recorded on a digital copy of the form. This will be a task on the substitution level.

Presenter [Slide 28-29]: (Modification – Level 3) Read information from slide 28 and play the video describing the modification level. Then proceed to slide 29 for the assigned activity for teachers. Provide instructions for teachers and what is expected of them. Distribute Lesson Planning Guides to participants.

(2) Plan. Design. Create. – Teachers will plan, design, and create a SAMR model lesson that is on the modification level. Teachers will use technology devices to create lessons that are aligned to the modification level. Colleagues will be engaging in assignments on the modification level.

Using online resources (*Technology for Learners - SAMR, Kathy Schrock's Guide to Everything – SAMR,* i.e.), *to design a SAMR lesson on the modification level. These resources, and many others, are good resources to use as a starting point for the lesson designing process.*

a. Include standard and objective for each lesson
b. Provide student-centered technology-based tasks at beginning, middle and end of lesson. Model one lesson as planned in your group.
c. Describe how each task aligns to the augmentation level of SAMR.

Presenter [Slide 30-31]: (Redefinition – Level 4) Read information from slide 30 and have teachers watch the video focusing the redefinition level. Proceed to slide 31 for the directions of teacher activity. Provide instructions for teachers and what is expected of them. Distribute Lesson Planning Guides to participants.

(3) Plan. Design. Create. – Teachers will plan, design, and create a SAMR model lesson that is on the redefinition level. Using technology to design and present lessons on the redefinition level. Participating teachers will engage in the lessons that are aligned to the redefinition level of the model.

Using online resources (Technology for Learners - SAMR, Kathy Schrock's Guide to Everything – SAMR, i.e.), to design a SAMR lesson on the modification level. These resources, and many others, are good resources to use as a starting point for the lesson designing process.

a. Include standard and objective for each lesson

b. Provide student-centered technology-based tasks at beginning, middle and end of lesson. Model one lesson as planned in your group.

c. Describe how each task aligns to the redefition level of SAMR.

Presenter [Reflection]: You and a partner will be using Google Forms, which is very much like Microsoft Word, to develop a Cheat Sheet. This Cheat Sheet will be used as a guide for other teachers learning to implement technology-based tasks that are student-centered. Include a brief description of the levels of the model and sample activities. You can be as creative as you'd like.

(4) Reflections [Cheat Sheet] – Teachers will collaborate with colleagues and create a digital cheat sheet about the SAMR model. Teachers will type their cheat sheet using Google Docs. All cheats will be combined to make one document. This task is aligned to the substitution level of the SAMR model.

Presenter [After distributing evaluation forms]: Please complete the evaluation form for today's session. Collect and review suggestions and questions that will be addressed to assist teacher implementing SAMR model in daily student-centered tasks. Teachers with similar questions and suggestions can be combined to hold smaller review sessions and provide support.

Daily Schedule

Day 1	Agenda
8:00 – 8:30	Arrival/Sign-in
8:30 – 9:30	Introductions & Ice Breaker
9:30 – 10:15	Why technology in the first place?
10:15 – 10:30	Restroom Break
10:30 – 11:30	The 21st Century Learner and the Classroom
11:30 – 12:00	SAMR Model Introduction
12:00 – 1:30	Lunch
1:45 – 2:15	Substitution and Augmentation Overview
2:15 – 2:45	Modification and Redefinition Overview
2:45 – 3:00	Reflections and Closing

Day 2	Agenda
8:00 – 8:30	Arrival/Sign-in
8:30 – 9:30	Welcome & Ice Breaker
9:30 – 10:00	Impact of SAMR Model on Learning
10:00 – 10:15	Restroom Break
10:15 – 10:45	The Substitution Level – A Closer Look
10:45 – 11:45	Presentations of Substitution Lessons
12:00 – 1:00	Lunch
1:00 – 1:45	The Augmentation Level – A Closer Look
1:50 – 2:45	Presentation of Augmentation Lessons
2:45 – 3:00	Reflections and Closing

Day 3	Agenda
8:00 – 8:30	Arrival/Sign-in
8:30 – 9:30	Welcome & Ice Breaker
9:30 – 10:00	Impact of SAMR Model on Learning
10:00 – 10:15	Restroom Break
10:15 – 10:45	The Modification Level – A Closer Look
10:45 – 11:45	Presentations of Modification Lessons
12:00 – 1:00	Lunch
1:00 – 1:45	The Redefinition Level – A Closer Look

1:50 – 2:45	Presentation of Redefinition Lessons
2:45 – 3:00	Reflections and Closing

Evaluation Plan: Participants in the Transforming Student Learning through Technology will complete an evaluation form for each day's session. The evaluation forms will be used to determine effectiveness of each daily session. The feedback will be used to make necessary adjustments to the next day's sessions. Adjustments may include time adjustments for each component and assignments of the session. It may also include addressing any questions or concerns from the previous day's session. Feedback from the last day's session will be used to develop and plan future small-group sessions for teachers. These sessions will be used to review and highlight SAMR instructional practices as well as to provide additional support to teachers.

Transforming Student Learning through Technology – Day 1

Technology in the Classroom	
Technology in the Classroom (Benefits)	21st Century Classroom (Attributes)
• _____ • _____ • _____ • _____ • _____	• _____ • _____ • _____ • _____ • _____
SAMR Model Description: _____ _____ _____	

Substitution	**Augmentation**
Impact: _____ _____ *Sample Activity:* _____ _____	*Impact:* _____ _____ *Sample Activity:* _____ _____
Modification	**Redefinition**
Impact: _____ _____ *Sample Activity:* _____ _____	*Impact:* _____ _____ *Sample Activity:* _____ _____

Technology Ideas for Classroom Implementation
• _____ • _____ • _____

Paper Slide Video Planning Guide

Level of SAMR for video:

S	A	M	R

Narrator	**Recorder (Notes/Video)**	**Paper Slider**
	Timekeeper	

Description of pictures to include:

(1)	(2)	(3)	(4)	(5)

Transcript (2 minutes):

Transforming Student Learning through Technology
~Lesson Planning Guide~
(Day 2/Day 3)

Subject: Standard:

Objective:

Beginning of Lessson Technology Integration

- Description of Task:
- What technology is being used?
- How does the activity align to this level of the SAMR model?

Middle of Lesson Technology Integration

- Description of Task:
- What technology is being used?
- How does the activity align to this level of the SAMR model?

End of Lesson Technology Integration

- Descripton of Task:
- What technology is being used?
- How does the activity align to this level of the SAMR model?

Transforming Student Learning Through Technology Professional Development

Transforming Student Learning through Technology

A Professional Development focusing on implementation of the SAMR model

By: Carlos Jenkins

Day 1 - Agenda

- Welcome
- Introductions
  - Ice -breaker (Guess that Song)
- Why technology? And how does tech look in the class?
- Transforming student learning through technology.....
- SAMR? What's that?
- Lunch (On Your Own)
  - **Substitution** - A Brief Overview
  - **Augmentation** - A Brief Overview
  - **Modification** - A Brief Overview
  - **Redefinition** - A Brief Overview
- Reflections – Parking Lot

Introductions – Guess that Song!

- Each of you have given your favorite song while signing in this morning.
- After hearing a song, you will guess who's favorite is being played.
  - The person who guesses correctly and the person whose song is being played:
    - Stand and introduce yourself

Why technology in the first place?

Opening Discussion

Think-Pair-Share

Q1: How does technology integration look in your classroom?

Q2: Who uses technology in the classroom?

Q3: What do you see as the benefits for technology integration?

21st Century Classroom

Flipgrid Post

- What are some traits of the 21st Century Classroom?
  - Write your ideas on the chart paper!
- How are you preparing your students for the future?

Why technology in the first place?

- There is evidence that technology can positively impact student learning.
  - Engagement
  - Academic motivation
  - Collaborative efforts
  - Participation

https://www.youtube.com/watch?v=QtEEVDq1f9I

Transforming Student Learning

As we prepare our students for the 21st century, we must transform our instructional practice.

That means providing students with transformative learning experiences.....using technology to:

- Collaborate and interact with peers
- Communicate with outside audience
- Create using technology
- Think critically and solve problems
- Take ownership of their learning

The SAMR Model – What is it?

The SAMR model is a technology integration model designed to enhance student-centered technology-based learning.

Students become the primary users of technology. Furthermore, they use technology to complete tasks that were previously inconceivable (Puentedura, 2013).

Lunch – Time to Eat

12:00 – 1:30

On your own. Enjoy!

The SAMR Model – *There are levels to this*

SAMR – 4 Levels

Substitution – Level 1
Augmentation – Level 2
Modification – Level 3
Redefinition – Level 4

https://www.youtube.com/watch?v=SC5ARwUkVQg

Substitution – Level 1

- Technology serves merely as a substitute; completing a task that could be done before technology (Puentedura, 2013).

Sample Activities aligned to the Substitution level:

- Using Word or Google Docs, instead of writing on assignment
- Using PowerPoint or Keynote, instead of verbal presentation
- Sketching on a computer, instead of on paper

Augmentation – Level 2

- This level involves incorporating interactive digital enhancements and elements like comments, hyperlinks, or multimedia.

Sample activities aligned to the Augmentation level:

- Using an online map instead of paper map
- Adding links within a document
- Adding videos or voice recording

Modification – Level 3

- Technology at this level allows for significant task design.

Sample activities aligned to the Modification level:

- Producing podcasts summarizing a topic; available for peer review
- Creating an informative video presentation

Redefinition – Level 4

- Students use technology to make entirely new learning opportunities possible (Puentedura, 2013).

Sample activities aligned to the Redefinition level:

- Publishing work online for a wider audience
- Recording student presentation, then used later for reflection

Research and Create!

- Using the assigned number (1, 2, 3, or 4), you and your group members will research a specific level of the SAMR model
  - 1 – Substitution
  - 2 – Augmentation
  - 3 – Modification
  - 4 – Redefinition
- After researching and finding information, plan, design and create a Paper Slide Video
  - Summarize your specific level
    - Must be no more than 2 minutes
    - Must include 1 activity that coincides with that level
    - Be clear! Be concise! Be creative!

Research and Create!

- Using the assigned number (1, 2, 3, or 4), you and your group members will research a specific level of the SAMR model.
  - 1 – Substitution
  - 2 – Augmentation
  - 3 – Modification
  - 4 – Redefinition
- After researching and finding information, plan, design and create a Paper Slide Video
  - Summarize your specific level.
    - Must be no more than 2 minutes
    - Must include 1 activity that coincides with that level
    - Be creative consider be creative!

Reflections – Parking Lot [Nearpod]

Comments	Questions
Write any new learning from today's session.	What questions do you have about the SAMR model?
Greatest impact from today's session.	What questions do you have from today's session?

Transforming Student Learning through Technology

A Professional Development focusing on implementation of the SAMR model

By: Carlos Jenkins

Day 2 - Agenda

- Welcome!
- Ice – breaker (Have you ever ...!)
- Impact of the SAMR Model
- **Substitution** – Level 1
  - What does it look like?
  - Plan. Design. Perform.
- Lunch (On Your Own)
- **Augmentation** – Level 2
  - What does it look like?
  - Plan. Design. Perform.

Icebreaker: Have you ever?

- Respond to each question using Google Forms

Impact of the SAMR Model

- SAMR model creator, Dr. Ruben Puentedura describes the impact of the technology integration model on student learning.

Substitution – Level 1

"'Substitution' means replacing traditional activities and materials—like in-class lectures or paper worksheets—with digital versions. There is no substantial change to the content, just the way that it is delivered."

-Teradix, 2020

- This is the first level of the SAMR model.
- At the substitution level, technology enhances the learning experience.
  - There is no substantial difference in function.

Substitution – Level 1

Plan.

With your group, plan one activity for math, reading, science, and social studies.

Related Arts – Art, Music, PE

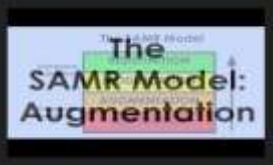
Design.

Choose one lesson and design a model lesson.

Perform.

After designing the lesson, your group will perform (model) the lesson.

Augmentation – Level 2



The augmentation level of the SAMR model introduces more independent and student-centered learning. This level calls for less teacher-led instruction.

- This is the second level of the model.
- This stage of the model requires enhancement.
  - Features within programs, such as bold/italics and folds are used.

Augmentation – Level 2

Plan.
With your group, plan one activity for math, reading, science, and social studies.
Related Arts – Art, Music, PE

Design.
Choose one lesson and design a model lesson.

Perform.
After designing the lesson, your group will perform (model) the lesson.

Reflections – *So What Now?*

Answer the following question:

What takeaways from the lesson will be important to know three years from now? Why?

Transforming Student Learning through Technology

A Professional Development focusing on implementation of the SAMR model

By: Carlos Jenkins

Day 3 - Agenda

- Welcome
- Icebreaker (Rock-Paper-Scissors)
- **Modification** – Level 3
  - What does it look like?
  - Plan. Design. Perform.
- Lunch (Provided)
- **Redefinition** – Level 4
  - What does it look like?
  - Plan. Design. Perform.

Icebreaker – Rock-Paper-Scissors Tourney

- Starting with the person to your right, play rock-paper-scissors.
- Winners will be posted in the digital tournament bracket.

https://www.printyourbrackets.com/fillable-brackets/8-team-single-fillable.pdf

Modification – Level 3

This is the level where technology is being used more effectively. The same task is not being done using different tools but new parts are being redesigned to transform students' learning.

- This is the third stage of the SAMR model.
- This stage requires technology to redesign the original task to transform learning experiences for students.
  - It's more than enhancement.

The SAMR Model: Modification

Modification – Level 3

Plan.
With your group, plan one activity for math, reading, science, and social studies.
Related Arts – Art, Music, PE

Design.
Choose one lesson and design a model lesson.

Perform.
After designing the lesson, your group will perform (model) the lesson.

Redefinition – Level 4

The SAMR Model: Redefinition

The redefinition level of the SAMR model involves using technology in ways that create new tasks. These tasks were previously inconceivable (Puentedura, 2014).

- This is the fourth and highest stage.
- In this stage, technology use moves from enhancement to true transformation.

Redefinition – Level 4

Plan.
With your group, plan one activity for math, reading, science, and social studies.
Related Arts – Art, Music, PE

Design.
Choose one lesson and design a model lesson.

Perform.
After designing the lesson, your group will perform (model) the lesson.

Reflections – Cheat Sheet

Working with a partner, create a cheat sheet of information that would be useful for a colleague who's new to the building.

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Professional Development Evaluation Form

Professional Development Presentation: "Transforming Students Learning through Technology"

Dates: _____

Directions: Rate the training using the criteria for #1-5. Please provide feedback for #6.

Strongly Disagree 1	**Disagree** 2	**Neutral** 3	**Agree** 4	**Strongly Agree** 5

Circle a rating for each number.					
1. The objectives of the training were clearly stated	**1**	**2**	**3**	**4**	**5**
2. Today's session was informative.	**1**	**2**	**3**	**4**	**5**
3. I can take today's learning and apply it to my everyday work.	**1**	**2**	**3**	**4**	**5**
4. The trainer was prepared and well knowledgeable about the content.	**1**	**2**	**3**	**4**	**5**
5. The training objectives were met.	**1**	**2**	**3**	**4**	**5**

Please answer each of the following questions.
1. What was most helpful in today's session? _____ _____
2. What was most confusing in today's session? _____ _____
3. What did you learn that you did not know during today's session? _____ _____
4. How can you use what you have learned today in your class? _____ _____
5. How would you change today's activities? _____ _____

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Appendix B : Screening Questionnaire

Participant Screening Questionnaire

Question 1
What grade do you teach?

_____

Question 2
What subject/content area do you teach?

_____

Question 3
How long have you been a teacher here?

_____

Question 4
Have you participated in the SAMR model training offered by the technology department?

_____

Appendix C: Interview Protocol 1

Interviewer: C. Jenkins

Interviewee: _____

Date: _____

Location: _____

Question 1: What is your current position in the school system?

Question 2: Tell me about how you are using technology in your classroom.

Question 3: Tell me about a time that your used technology and it worked well.

Question 4: Tell me about a time when you struggled with technology.

Question 5: Tell me about how you have used SAMR to design your lessons.

Question 6: What does your students' learning and engagement look like now that you are using SAMR?

Appendix D: Interview Protocol 2

Interviewer: C. Jenkins

Interviewee: _____

Date: _____

Location: _____

Question 1: How do you decide when to design lessons that include student-centered technology-driven practices?

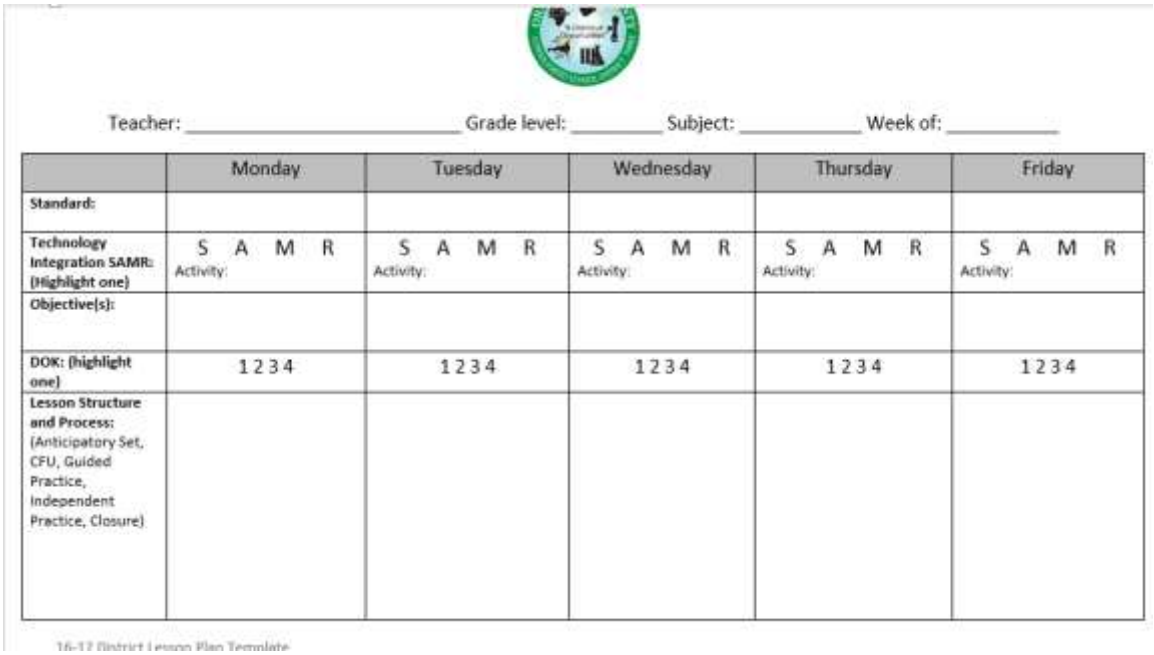
Question 2: Tell me about any changes you would make to your instructional practices that would include students as the primary users of technology?

Question 3: Tell me about a time you planned to use technology one way and it turned out differently.

Question 4: Having integrated technology in your lessons, what successes did students experience due to the use of technology?

Question 5: Describe your process for designing student-centered technology-based instruction.

Appendix E : Lesson Plan Template

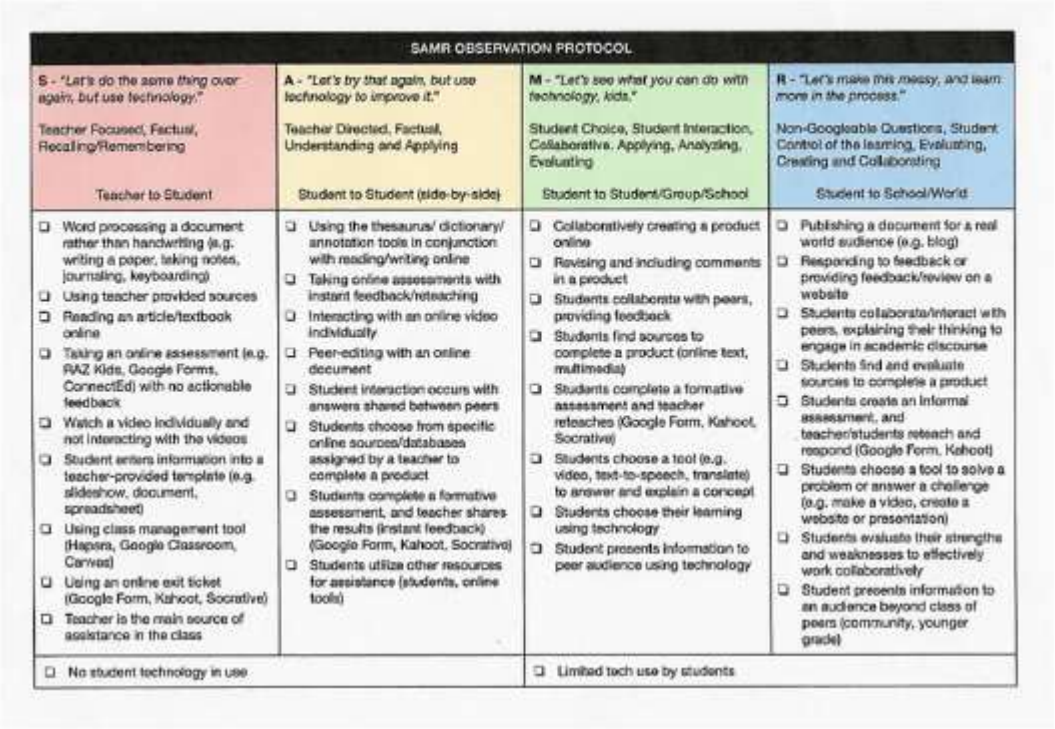


Teacher: _____ Grade level: _____ Subject: _____ Week of: _____

	Monday	Tuesday	Wednesday	Thursday	Friday
Standard:					
Technology Integration SAMR: (Highlight one)	S A M R Activity:	S A M R Activity:	S A M R Activity:	S A M R Activity:	S A M R Activity:
Objective(s):					
DOK: (highlight one)	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Lesson Structure and Process: (Anticipatory Set, CFU, Guided Practice, Independent Practice, Closure)					

16-17 District Lesson Plan Template

Appendix F : SAMR Observation Protocol



SAMR OBSERVATION PROTOCOL

S - *"Let's do the same thing over again, but use technology."* Teacher Focused, Factual, Recalling/Remembering Teacher to Student	**A** - *"Let's try that again, but use technology to improve it."* Teacher Directed, Factual, Understanding and Applying Student to Student (side-by-side)	**M** - *"Let's see what you can do with technology, kids."* Student Choice, Student Interaction, Collaborative, Applying, Analyzing, Evaluating Student to Student/Group/School	**R** - *"Let's make this messy, and learn more in the process."* Non-Googleable Questions, Student Control of the learning, Evaluating, Creating and Collaborating Student to School/World
❑ Word processing a document rather than handwriting (e.g. writing a paper, taking notes, journaling, keyboarding) ❑ Using teacher provided sources ❑ Reading an article/textbook online ❑ Taking an online assessment (e.g. RAZ Kids, Google Forms, ConnectEd) with no actionable feedback ❑ Watch a video individually and not interacting with the videos ❑ Student enters information into a teacher-provided template (e.g. slideshow, document, spreadsheet) ❑ Using class management tool (Hapara, Google Classroom, Canvas) ❑ Using an online exit ticket (Google Form, Kahoot, Socrative) ❑ Teacher is the main source of assistance in the class	❑ Using the thesaurus/ dictionary/ annotation tools in conjunction with reading/writing online ❑ Taking online assessments with instant feedback/reteaching ❑ Interacting with an online video individually ❑ Peer-editing with an online document ❑ Student interaction occurs with answers shared between peers ❑ Students choose from specific online sources/databases assigned by a teacher to complete a product ❑ Students complete a formative assessment, and teacher shares the results (instant feedback) (Google Form, Kahoot, Socrative) ❑ Students utilize other resources for assistance (students, online tools)	❑ Collaboratively creating a product online ❑ Revising and including comments in a product ❑ Students collaborate with peers, providing feedback ❑ Students find sources to complete a product (online text, multimedia) ❑ Students complete a formative assessment and teacher reteaches (Google Form, Kahoot, Socrative) ❑ Students choose a tool (e.g. video, text-to-speech, translate) to answer and explain a concept ❑ Students choose their learning using technology ❑ Student presents information to peer audience using technology	❑ Publishing a document for a real world audience (e.g. blog) ❑ Responding to feedback or providing feedback/review on a website ❑ Students collaborate/interact with peers, explaining their thinking to engage in academic discourse ❑ Students find and evaluate sources to complete a product ❑ Students create an informal assessment, and teacher/students reteach and respond (Google Form, Kahoot) ❑ Students choose a tool to solve a problem or answer a challenge (e.g. make a video, create a website or presentation) ❑ Students evaluate their strengths and weaknesses to effectively work collaboratively ❑ Student presents information to an audience beyond class of peers (community, younger grade)
❑ No student technology in use		❑ Limited tech use by students	

Appendix G: A Priori Codes

The following codes are predetermined from the literature and will be used to analyze the data collected from lesson plans, interviews, and observations:

- Student centered
- Teacher centered
- Substitution
- Augmentation
- Modification
- Redefinition
- Student engagement
- Motivation/motivating
- Technology driven
- Barrier of technology

Appendix H: Themes and Codes

Themes and Codes	Number of Participants for Code (N = 12)	Example Quote
Substitution		
Substitution	10	Students were able to see increments of measurements on a ruler that were not able to see in the textbook.
PowerPoint show	4	Students were provided the opportunity to create PowerPoints.
Research	3	My students are able to use technology for topic research.
Online assessment	2	I do have them to complete online assessments and practice skills on web-based programs.
Word processing	2	They were able to type their drafts.
Math facts	1	I also have them play math games which helps them practice their math facts.
Augmentation		
Augmentation	5	Then they took it a step further and published their work with images from websites.
Kahoot	2	I was able to have students do a Kahoot game on the different types of precipitation and told them what they scored.
Peer editing	1	Then students used did some peer using the editing marks on google docs.
Video recording	1	During one of the assignments that I had students to do a recording of explaining one of their chosen animal habitats.
Modification		
Modification	7	Even I was excited to allow them the time for peer critiquing.
Peer feedback	3	After the PowerPoint was done, students shared their slides with their peers for constructive criticism.
Collaborative peer editing	2	Even I was excited to allow them the opportunity for peer editing – all with less to no use of several sheets of notebook paper.
Presentations	2	I design lesson that have opportunities for students to complete and present those projects using technology.
Online feedback	1	Then students can view and provide some informative feedback.

Redefinition		
Responding to peers	1	Blogging their answer to an exit slip question.
Redefinition	1	Blogging their answer to an exit slip question.
Barrier in Technology		
Slow connection	5	A time in which technology did not work so well was when the laptops kept disconnecting from the Wi-Fi and the students couldn't complete their work.
Not working	3	It is a big struggle when you plan and then all of a sudden links aren't working.
Teacher self-efficacy	3	I struggle often with the technology part of my teaching career.
Not enough devices	2	We do not have access to laptops at this grade level
Students' technology skills	2	I would have students use devices they are comfortable with.
Teacher-centered		
Teacher use	12	For one of my math lessons, using the smartboard to teach measurement was very beneficial.
Teacher model	6	I use my promethean board to model during direct Instruction.
While teaching	4	I find videos that would not only be instructional but easy to understand.
Student engagement & Motivation		
Engagement	12	I try to design lessons that require my students to be the users and gets them engaged in the learning.
Motivation	12	There is an increase in motivation, and they are willing to collaborate with and help their classmates.
Participating	5	They all want to participate because they get a chance to use technology.
Paying attention	4	Students are more tuned-in because they are waiting to see what we'll be doing for the day.
Excited	3	For my babies, they're always into what I'm teaching if it involves me turning on my promethean board.
Wanting to learn	2	Fortunately, my students tend to be pretty motivated on a daily basis.
Focused	1	I have to think about using technology overall, and my students tend to be more engaged.
Benefits of Integrating Technology		
Collaboration	5	They get to collaborate with peers.
Independence	4	Independence

Critical thinking	3	Students become engaged independent and critical learners.
Creative thinking	2	Creative thinking
Teacher Planning of Technology		
Planning	12	Thinking of what students will do, thinking of the right devices to get them done, takes a lot of planning.
Research	4	When designing student-centered technology-based instruction, I do lots of research first.