USING TABLET TECHNOLOGY TO TEACH SECONDARY CONTENT VOCABULARY: A COLLECTIVE CASE STUDY

by

Annie R. Raney

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this collective case study was to provide an understanding of the instructional methods of teachers who use tablet technology in middle school classrooms to teach complex content vocabulary. Dewey's theory of constructivism guided this study, as it explains that students learn by building upon what they know. Middle school students add new terms to their existing vocabulary banks so that they can learn the related concepts in their content-area classes. The study took place in a southern state with technology standards that require students to use technology for reading and learning purposes. There is extensive research about vocabulary instruction and secondary content-area reading, but there is limited research about how middle school teachers use tablet technology for vocabulary instruction. Data gathered in this study were used to identify and describe the perceptions of technology, successes, and challenges of middle school content teachers using tablet technology in teaching vocabulary as well as the strategies and activities used to incorporate tablet technology in their vocabulary lessons. Data were collected through participants' lesson plans, interviews, observations of teacher participants, focus groups, and memoing. Data were triangulated and analyzed to detect common themes that described middle school teachers' perceptions of technology and their successes and challenges using the technology and to provide an understanding of the methods of instruction that the middle school teachers use to teach vocabulary with tablets. The study revealed that teachers use tablet technology to supplement the direct instruction of vocabulary and not as a replacement for teacher-to-student interaction.

Keywords: content area, instructional methods, tablet technology, teaching strategies, vocabulary

Copyright Page

Dedication

I dedicate this dissertation to four people who have had the greatest influence on my academic journey. My father, the late Abraham S. Thomas (my Yoda), instilled in me a love for reading and learning. He was proud of all my accomplishments and was thrilled to tears to watch me become a teacher just like our Savior, Jesus Christ. My mother, the late Mary E. Thomas (my Moo), loved me unconditionally and inspired me to share my talents and time with children. Her passion and strength live on in me. Together my parents raised me to love Jesus and spread His kindness, joy, and gift of salvation with the world.

I would also like to dedicate this dissertation to my husband, Rodney. He has been patient and helpful throughout this journey to obtain my doctorate. Whenever I was weary and stuck in a rut, he pushed me through with words of encouragement. He made sure dinner was on the table and that our son attended birthday parties and other events on time. I could not have completed this journey without his loyal, faithful, and loving support. Rodney, thank you for believing in me. Till death do us part, and forever after, you are my husband, my partner, and my friend. I love you.

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List of Abbreviations

Bring Your Own Device (BYOD)

Maryland Technology Literacy Standards for Students (MTLSS)

Mobile Assisted Language Learning (MALL)

Mobile Learning Device (MLD)

Russell Stover Middle School (RSMS)

CHAPTER ONE: INTRODUCTION

Overview

Learning new words is often a difficult and frustrating process (Scott, 2015). Vocabulary lessons in school can be boring and tedious, requiring students to memorize and recall spelling and definitions for weekly tests, only to have students forget the words and meanings in the weeks that follow. Content areas have large collections of specific or technical terms that denote key concepts (Alvermann, Phelps, & Gillis, 2013; Weiss, Evmenova, Kennedy, & Duke, 2016). Teachers cannot teach content knowledge if students do not understand the meaning of the vocabulary and how the words connect to the academic concepts of the subject. If teachers want their students to learn targeted concepts, they must use different instructional activities and approaches to help students expand and retain their vocabulary knowledge (Abbasian & Arianezhad, 2013; Alvermann et al., 2013). Many middle school classrooms are inclusion settings in which students with disabilities are part of the general education classroom. Teachers must use strategies and techniques to teach vocabulary to all students in the classroom. One such approach to assisting all students, including those with disabilities, in expanding and retaining their vocabulary knowledge is the use of technology (Alvermann et al., 2013; Vacca, Vacca, & Mraz, 2016). Blackwell (2013) explained that "historically, technology has been seen as a potential solution to increase educational attainment" (p. 231). Currently, tablets and mobile devices are used as motivators in the classroom and show promising influence on student learning outcomes (Blackwell, 2013; Hu & Garimella, 2014).

The focus of this collective case study was to provide an understanding of the instructional methods that middle school teachers use to teach vocabulary with tablet technology. Thirteen teacher participants were used as case studies to provide multiple realities and multiple forms of data collection in order to describe and understand the instructional methods used to

teach vocabulary with tablet technology in middle school content-area classrooms (Creswell, 2013). Chapter One presents a framework for the study and covers the following areas: background, situation to self, the problem statement, the purpose statement, the signifiance of the study, the research questions, and definitions of key terms.

Background

In the early elementary grades, students learn how to read. Teachers spend time instructing students about sentence structure, parts of speech, and how those elements come together to form paragraphs. Paragraphs and reading passages tell stories or convey information. Students learn how to identify main ideas, details, and elements of plot structure (School Improvement in Maryland, 2010). Students' reading focus changes from learning how to read to using reading to learn as they progress into upper elementary and then into secondary grades. Biancarosa (2012) found that secondary students read for academic purposes. At this stage of the academic journey, teachers want students to learn about the content in their science, math, or social studies classes. Students' ability to read becomes the mechanism through which they gain knowledge about a subject. However, if students do not know how to properly use the reading mechanism, or reading strategy, they will not understand what they are reading and will be unable to learn the concepts contained in the reading material (Biancarosa, 2012). If students do not apply empirically based reading strategies, then they will not be able to decipher the complex text presented in secondary classrooms (Vacca et al., 2016).

Historical Concepts

Secondary content-area reading materials are filled with complex vocabulary terms that students must understand in order to learn the subject matter. The words students read not only get longer and more complex, but also refer to more complicated, specific concepts (Biancarosa, 2012). Therefore, it is not enough for teachers to be well versed in their content area

(Greenwood, 2010). Teachers must find ways to help their students grasp the concepts of the content area by helping them understand the content vocabulary. However, many secondary teachers do not want to teach reading. They want to, or only understand how to, focus on teaching their content material (Ardasheva & Tretter, 2017). They assign pages and chapters of reading assignments that are filled with unfamiliar vocabulary terms for the students, only to have students either not complete the reading assignments or not perform well on quizzes and tests. Research indicates that helping students learn and understand content vocabulary will help them comprehend the subject matter (Alvermann et al., 2013; Fisher & Frey, 2014; Kelley, Lesaux, Kieffer, & Faller, 2010; Larson, Dixon, & Townsend, 2013; Lembke et al., 2017; O'Connor, Sanchez, Beach, & Bocian, 2017; Sonbul & Schmitt, 2010).

Reading specialists have recommended that teachers incorporate reading strategies into their lessons. Alvermann et al. (2013) discovered that teachers in secondary (seventh-12th grade) content areas do not use engaging reading strategies and activities to aid students in learning the academic content from the required textbooks and other reading material. Teachers are often angry and frustrated because they feel they do not have the time to teach their secondary students reading strategies in addition to their content. Researchers found that using technology to teach vocabulary can be a time-saving, collaborative, and effective method of engaging students and helping them learn complex content vocabulary, and it can therefore help students comprehend academic content in their reading materials (Ciampa, 2014; Ensor, 2012; Hu & Garimella, 2014).

Social Concepts

Over the past 30 years, the Internet has become an information and communication resource inside and outside of the home (Stevens & Brown, 2011). Children often use iPhones, iPads, or other smartphones and tablets to play games, shop, and listen to music. Incorporating

these new technologies, also called “new literacies,” into reading and vocabulary lessons may create the engaging strategies that can grasp the attention of students and motivate them to learn new terms (Spires, Morris, & Zhang, 2012). Technology is advancing at a rapid rate. Classrooms across the country have progressed from having one computer in the room to having several computers in each classroom along with a school computer lab with a set of computers. Tablet computers, iPads, and smart phones are now present in many schools and homes. Roepke (2012) stated that “tablet manufacturers that include Apple, Amazon, and Microsoft are responding to the growing demand for tablets by educators” (p. 348). Savas (2014) explained that the use of tablet computers in daily lives is becoming more common; however, the use of tablet computers as instructional tools in different fields of education is an emerging construct. Kaufman (2012) affirmed that 1.5 million iPads are being used in schools across the United States. This number may appear to be large, but it represents a small percentage of the over 49 million students enrolled in American public schools (National Center for Education Statistics, n.d.). However, Kaufman (2012) asserted that increasing numbers of schools are receiving iPads and devices for educational use. Furthermore, Bring Your Own Device (BYOD) is becoming a common practice as students are encouraged to bring their own tablets to school for educational purposes (Cristol & Gimbert, 2014; Marcoux, 2014; Sangani, 2013).

Tablets and mobile devices can be used in the classroom to catch students’ attention and engage them in learning. Khansarian-Dehkordi and Ameri-Golestan (2016) revealed that mobile devices helped learners acquire and retain vocabulary terms. Research indicates that tablets and applications are often used to help students learn English as a second language. Jackson and Ain (2015) noted that two different applications and videos helped introduce English vocabulary to Arabic-speaking students by making the terms relevant to their lives. Making these real-life connections to new or complex vocabulary through tablets is easier to do for students who are

frequently online or on tablets (Jackson & Ain, 2015). The games and activities on tablets keep track of student performance and can show results during or immediately after an activity. Furthermore, the tablets give students opportunities to form social groups by playing games or sharing results through virtual scoreboards or wall postings (Khansarian-Dehkordi & Ameri-Golestan, 2016).

Theoretical Concepts

Tablet applications provide immediate and individualized feedback that encourages students to actively engage in learning activities (Outhwaite, Gulliford, & Pitchford, 2017). The use of apps on iPads and tablets gives students more independence in the learning process, allowing them to receive immediate feedback and increase the difficulty level of the activities (Greer, White, Zeegers, Au, & Barnes, 2017). Giving students corrective feedback is important to help reinforce the learning of terms (Ramirez & Jones, 2012–2013). Jackson and Ain (2015) found that one of the top three reasons students were motivated to use a tablet to learn new vocabulary was the immediate feedback, or score, they earned at the end of the activity. Tablet applications provide users with results that let them know if they are on the right track (Outhwaite et al., 2017). Students can be encouraged to practice more or to move onto a new activity. The pressure of pronouncing or using words correctly in front of classmates is not present when using tablets. The applications provide a method for English language learners to practice their skills without fear of being embarrassed in front of their peers because of a foreign accent or other challenge (Ghanbaran & Ketabi, 2014).

Teachers often use technology for organizational purposes such as grading, taking attendance, or creating lesson plans but do not often use tablets for learning with their entire classroom (Ditzler, Hong, & Strudler, 2016). Current research shows that educators need professional development and training on how to use technology in the classroom (Hu &

Garimella, 2014; Kelly-Williams, Berson, & Berson, 2017; Varol, 2013; Young, 2016). However, there is limited research that identifies strategies and techniques middle school teachers can use to incorporate tablet technology to teach content vocabulary. This study provides understanding about the instructional methods teachers employ when using tablets to teach vocabulary in the middle school classroom.

Situation to Self

My experience as a middle school classroom teacher, teacher trainer, and professor of reading made the use of tablets to teach vocabulary interesting and beneficial to my professional work. In each teaching role, I created vocabulary lessons that involved direct and indirect teaching. I would go over words and definitions with the class and give the students assignments that required independent practice with vocabulary terms.

When laptops and then tablets began being integrated into the classroom, I thought that my paper-based methods of instruction may have been insufficient. I saw a few colleagues use tablets in their lesson activities to engage the students and help them understand what they were reading. I became excited about the possibility of using tablets to teach vocabulary. At this point in my career, I began researching the use of tablets in the classroom. This has led me to my beliefs about tablets in the classroom. Creswell (2013) asserted that researchers bring their own beliefs and philosophical assumptions into their research. Creswell (2013) defined philosophy as "the ideas and beliefs that inform our research" (p. 16). My training in education and in the area of reading instruction has instilled in me a belief in the use of innovative and interactive methods of instruction of vocabulary, to include tablet technology, in all content-area classrooms. The ontological issue of this study is the multiple realities that the teacher participants brought with them. I wanted to examine the realities of teachers who were using tablets in their classrooms to teach vocabulary. Using various methods of data collection

enabled me to identify the different themes that presented from the multiple realities of the different participants (Creswell, 2013).

In this collective case study, I used the social constructivism paradigm to investigate middle school teachers' perceptions of technology and their successes and challenges using technology to teach vocabulary as well as the strategies and activities the teachers use to incorporate technology in their vocabulary lessons. Examining teachers' range of pedagogical methods and their implementation of tablets into the classroom to keep students motivated is essential to understanding the effective use of tablets. I observed what teachers are doing with tablets in the classroom and how they prepare lesson plans to include tablet usage. Using a pragmatic approach to analysis, I employed multiple methods to collect data (Creswell, 2013). A pragmatic approach to analysis enabled me to see teachers' methods of planning for tablet implementation in different ways.

I taught eighth-grade language arts for 10 years and currently teach methods of teaching reading in the secondary content areas to preservice teachers. As a teacher, I frequently listened to my colleagues complain about being told by administrators to teach reading in their social studies, math, science, or other content-area classes. They wanted to teach their content and resented having to teach reading. The more I thought about their position, the more I realized that my colleagues were not rebellious teachers who were refusing to follow the rules. They were frustrated because they lacked knowledge of evidence-based reading strategies that might help their students read and comprehend their complicated content textbooks.

I worked with my school's instructional team to conduct professional development training to equip content-area teachers with reading strategies to use in their classes. Many of the strategies were designed to teach essential vocabulary. My colleagues expressed their excitement when students began to better understand the academic content in their textbooks.

Providing secondary content teachers with vocabulary strategies and helping them understand the importance of implementing them to teach their content have been the most exciting and rewarding aspects of my career as a classroom teacher and college professor. During the past decade, these vocabulary strategies have expanded and joined the world of computers, tablets, and smartphones (Ditzler et al., 2016; Greer et al., 2017). However, teachers are not using these tools even though they are increasingly accessible in schools.

Researchers have found that not all teachers are implementing evidence-based reading practices in their classrooms (Ely, Pullen, Kennedy, & Williams, 2015). In the past, content-area teachers felt that it was the responsibility of the English teachers to teach reading. This is one of the main reasons why the best reading strategies are not taught or reinforced in the content areas (Carter, Crowley, Townsend, & Barone, 2016; Vacca et al., 2016). However, the recent emphasis of content-area reading instruction by the Common Core Standards encourages and demands that content-area teachers teach and use reading strategies in their classrooms (Common Core State Standards Initiative, 2014). Secondary teachers need to look beyond whether they should be teaching reading strategies and focus on the best strategies and technologies to use in their classrooms.

Problem Statement

The problem of the study is the lack of teacher knowledge of how to effectively use tablets to teach secondary students complex content vocabulary (Baker & Nosratirad, 2013; Ditzler et al., 2016; Greer et al., 2017; Lan, 2013; Madden, 2012; Savas, 2014; Spires et al., 2012; Weiss et al., 2016; Young, 2016). Current literature shows that mobile-assisted language learning (MALL) is an effective way to teach students new words, including a second language (Khansarian-Dehkordi & Ameri-Golestan, 2016; Schaefer, Bowyer-Crane, Herrmann, & Fricke, 2016). Teachers may use tablets for students to read a passage, take a picture, or look at photos

for various assignments. Students may use tablets to access electronic dictionaries quickly, but not necessarily to teach vocabulary (Ditzler et al., 2016; Greer et al., 2017).

Ditzler et al. (2016) found that tablet technology adoption in the classroom is happening with increased frequency. However, the study showed that the tablets were mainly used for productivity in the classroom and, more often than not, provided distractions for students. The researchers also found that students and teachers expressed an aversion to the use of tablets. The aversion was directly connected to the lack of effective integration of tablets into lessons and activities to provide beneficial ways to learn content and students' lack of knowledge of how to properly use the apps (Ditzler et al., 2016).

Further research is needed to describe how new technologies are used in the classroom for academic learning (Ditzler et al., 2016). There are few studies that describe the instructional methods, perceptions, challenges, and successes of middle school teachers who effectively integrate tablet technology to teach complex content vocabulary to middle school students (Greer et al., 2017; Weiss et al., 2016)

Purpose Statement

The purpose of this collective case study was to provide an understanding of the instructional methods of teachers who are incorporating tablet technology in middle school classrooms to teach complex content vocabulary. Dewey's theory of constructivism guided this study, as it explains that students learn by building upon what they know. Dewey (1916/2008) asserted that learning inside and outside of school should be continual. Using tablet technology in the classroom that students are familiar with at home may motivate students to be more engaged in the learning process. In this stage of the research, instructional methods were generally defined as the strategies and activities middle school classroom teachers use to teach content-specific terms to their middle school students (Alvermann et al., 2013). Additionally,

content vocabulary will be understood as the specific terms in expository textbooks and reading selections that students need to understand to learn the concepts in a content area such as math, science, or social studies (Alvermann et al., 2013; Vacca et al., 2016).

Significance of the Study

Over 40 U.S. states have adopted the Common Core standards and incorporated them into their state learning standards (Common Core State Standards Initiative, 2014). This study took place in the state of Maryland, where students must demonstrate the ability to use different technologies for learning purposes, specifically in the area of literacy. This collective case study described for teachers and administrators the methods that middle school content-area teachers use to teach vocabulary with tablet technology. By conducting interviews and observations, I provided a firsthand perspective of how teachers integrated technology in their secondary classrooms to benefit both students and educators (Yin, 2014). The focus groups allowed teacher participants, technology specialists, and school administrators to speak informally about the benefits and challenges of using tablet technology in the classroom. I contributed to the body of knowledge on educational technology by showing how content-area teachers are currently using tablet technology to teach academic vocabulary.

To use technology for instructional purposes, teachers need to have knowledge of and be adept in tablet usage. They should also be familiar with software and hardware and how to access and implement it into their daily lessons (Varol, 2013). The results of this study inform teachers of the strategies, activities, and attitudes that may be necessary to use tablet technology in middle school classrooms.

Research Question(s)

The following three questions guided this study:

1. How do teachers use tablet technology in a middle school classroom to teach complex content vocabulary?

Weiss et al. (2016) asserted that it is imperative for secondary teachers to have technological pedagogical content knowledge as well as knowledge of technology and the ability to blend the two effectively. When teachers have strong content knowledge, they can create lessons and activities with tablets that will engage the students in learning. Pearson and Ward (2011) suggested that students should be involved in authentic tasks that relate to their world to be able to visualize the new vocabulary word and commit it to memory. Students should be actively participating in the learning process, not just passively receiving a lecture from the teacher or copying words and meanings from a dictionary (Roepke, 2012). Teachers should utilize an array of vocabulary practices to support students with reading comprehension. Explicit instruction of academic and content-specific vocabulary aids in retention of the terms and information related to the terms (Ardasheva & Tretter, 2017). Cristol and Gimbert (2014) discussed the governmental legislation that recognized the use of technology as essential in all learning environments. Tablets allow users to continue learning inside and outside of the classroom and provide a variety of activities that can encourage students to study and learn (Gerard, Knott, & Lederman, 2012). The overall purpose of this question was to find the methods being used by teachers who are incorporating tablet technology in their vocabulary lessons in middle school classsrooms. Two subquestions followed to understand how the 12 teacher participants choose to use tablet technology in their classroom and what they perceive are the benefits and challenges.

2. How do the teacher participants perceive the use of tablet technology impacts student learning of content vocabulary?

Alvermann et al. (2013) suggested content-area teachers remember that the content that they are teaching is filled with the vocabulary of their discipline. While vocabulary is being taught, content is also being taught. Researchers found that students are motivated to read literature that is meaningful and interesting to them (Gallagher & Anderson, 2016; Kelley et al., 2010). Tablet technology gives teachers and students access to a myriad of literature, media, books, and other reading materials. Tablets have numerous apps that students can use at their own pace and receive constant and immediate feedback, motivating them to continue (Ciampa, 2014). Students are able to participate in tablet activities in the classroom or at home. Ciampa (2014) also found that the students were quieter and more focused on activities that involved interacting with tablets.

3. How does the teacher participants' appreciation of tablets for teaching vocabulary affect their lesson planning and instructional methods in middle school?

Neville, Shelton, and McInnis (2009) compared the use of digital game-based learning to traditional text learning. The results of the study showed that in the area of vocabulary, students who used digital game-based learning retained more of their vocabulary knowledge. Currently, teachers are being trained in the traditional model of learning, and tablet technology is just beginning to become part of the training for preservice teachers (Blackwell, 2013; Ely et al., 2015; Schaefer et al., 2016). Teachers' teaching philosophies, attitudes, beliefs, and perceived appreciation of technology may affect their use of tablet technology in the classroom (Blackwell, 2013; Ditzler et al., 2016).

Definitions

The following terms are pertinent to this study.

1. *Apps* – Applications on iPads or tablets that may provide tools, activities, and books (Ditzler et al., 2016).

2. *Content area* – Content areas are the subject areas in secondary education in which reading is generally not taught; the concepts embedded in reading are taught. Subjects include, but are not limited to, science, history, mathematics, literature, music, and physical education (Alvermann et al., 2013; Vacca et al., 2016).

3. *Tablet technology* – Mobile computers such as iPads with touchscreen sensitivity that allow the user to access apps and the Internet for personal, educational, and professional use anytime and anywhere (Blackwell, 2013; Gerard et al., 2012; Hu & Garimella, 2014; Roepke, 2012).

4. *Teaching strategies* – Teaching strategies are the methods and techniques used by teachers to motivate and teach students (Alvermann et al., 2013; Blackwell, 2013; Ciampa, 2014; Kelley et al., 2010; Pitcher, Martinez, Dicembre, Fewster, & McCormick, 2010; Tovani, 2011b; Vacca et al., 2016).

5. *Technical terms* – Words specific to a discipline such as science, math, or social studies. For example, in science class, technical terms may include *photosynthesis*, *mitosis*, or *mitochondria* (Alvermann et al., 2013).

6. *Vocabulary* – In this study, *vocabulary* is the term used to represent the words students must learn and understand to comprehend and grasp the concepts in their secondary content areas (Alvermann et al., 2013; Groves, 2016; Kelley et al., 2010; Vacca et al., 2016).

Summary

Researchers have found a strong connection between students' vocabulary knowledge and reading comprehension (Alvermann et al., 2013; Fountas & Pinnell, 1996; Groves, 2016; Lembke et al., 2017; Tovani, 2011b; Ward & Williams-Rossi, 2012; Yates, Cuthrell, & Rose, 2011). The more vocabulary students know and understand, the greater their comprehension of subject matter will be. Teachers must use captivating strategies and activities to engage students

in learning vocabulary. In order to provide students with learning opportunities in the classroom that could seamlessly continue at home, teachers must incorporate the newest technologies into their teaching practices. Tablets provide teachers with a medium to motivate students through fun and interactive methods of learning new vocabulary. Currently, there is a gap in the literature regarding research that will provide middle school teachers with methods and strategies to effectively incorporate tablet technology into their vocabulary lessons. I conducted a collective case study of 12 middle school teacher participants who use tablet technology to teach vocabulary. Data were collected through documents, interviews, observations, focus groups, and memoing.

CHAPTER TWO: LITERATURE REVIEW

Overview

A review of the literature concerning vocabulary instruction revealed that actively teaching vocabulary in interesting and fun ways in secondary classrooms is essential for helping students learn new material from their textbooks (Ardasheva & Tretter, 2017; Ciampa, 2014; Gorjian & Hamidav, 2017; Greenwood, 2010; Khansarian-Dehkordi & Ameri-Golestan, 2016; Lesaux, Harris, & Sloane, 2012; Scott, 2015; Vacca et al., 2016). The process of learning new vocabulary is rooted in constructivism, a process in which the learner builds on prior knowledge as he or she progresses from elementary to secondary levels (Piaget, 1947/2003). Current research discusses whether traditional paper-based methods are necessary, or whether they should be eliminated and replaced with newer, technology-based methods (Ditzler et al., 2016; Sonbul & Schmitt, 2010; Spires et al., 2012; Weiss et al., 2016). Middle school consists of sixth, seventh, and eighth grades. Middle school marks the first time students no longer have reading as a class but instead have to read to learn in all content-area classes (Alvermann et al., 2013; Dieker & Little, 2005; Vacca et al., 2016).

In the primary grades, students participate in guided reading to help them improve their reading skills and increase their reading levels (Fountas & Pinnell, 1996, 2013; Richardson, 2009). Teachers meet with small groups of children, usually four to six at a time, to help each reader develop "effective strategies for processing novel texts at increasingly challenging levels of difficulty" (Fountas & Pinnell, 1996, p. 2). Teachers guide students through a balanced literacy approach which allows students to work with their teacher as a whole class, in small groups, and then independently, all to learn, practice, and then apply reading strategies. Each group of students uses a different book at their instructional level. Elementary school teachers monitor students' progress by observing, taking copious notes, and completing written and oral

activities and assessments. Reading strategies to strengthen comprehension and vocabulary learning are taught and retaught to ensure students choose the best one for a given situation and are apply it correctly (Fountas & Pinnell, 1996; Richardson, 2009).

When students enter middle school, traditional reading classes from elementary school are replaced with language arts classes that focus on grammar, writing skills, and analyzing literature. Students transition from guided reading that taught them how to break down reading passages to using reading to learn content in areas such as science, math, social studies, and health. The time for direct instruction of reading by a specific teacher during whole group or small group instruction is gone. According to Fang and Pace (2013), "To access disciplinary content, then, students must be able to read, write, and evaluate disciplinary texts" (p. 104). Language arts or English classes focus more on how to analyze the author's craft, tone, or mood; the meaning of a reading passage; how to critique what the author wrote; or how to explain allegories, metaphors, and other figurative language (Maryland State Department of Education, n.d.). Therefore, the acquisition or improvement of reading skills becomes a task for all middle school teachers (Ardasheva & Tretter, 2017; Merkuri, 2012; O'Connor et al., 2017). If teachers do not know how to teach students more about reading strategies and how to select the best strategy for each reading task, then the students' comprehension of complex text will suffer, deterring them from gaining knowledge from the content text (Lovette, 2013).

One of the areas where reading instruction is needed in middle school is vocabulary development. Fisher and Frey (2014) emphasized that "the demand on vocabulary knowledge intensifies throughout the elementary and middle school years" (p. 594). On average, children learn about "3,000–5,000 words each year from kindergarten through twelfth grade" (Smith, 2014, p. 78). Smith (2014) found that of the thousands of words learned per year, only about 300 are systematically taught by teachers. However, these 300 vocabulary words are technical terms

that directly relate to the subject matter that students have to learn and understand, words that are not a usual part of the everyday English language (Marzano, 2012; Smith, 2014). Teaching students what to do when they encounter difficult or unknown words can help them understand what they are reading. Students' ability to make connections between the vocabulary terms and the subject matter is enhanced when they understand the meaning of complex content vocabulary (O'Connor et al., 2017). Their reading comprehension becomes stronger as their vocabulary of the content area expands (Alvermann et al., 2013; Larson et al., 2013; Shore, Ray, & Goolkasian, 2013; Smith, 2014; Vacca et al., 2016; Ward & Williams-Rossi, 2012). The greater the number of words students know, the more abstract language is at their disposal with which to be strategic while reading (Lesaux, Kieffer, Faller, & Kelley, 2010).

The teacher is a part of the process of introducing and reinforcing new vocabulary to the students. Exposing students to new vocabulary words helps them learn the words, but a more direct approach is needed to teach the meaning of the vocabulary words (Christ & Wang, 2011). Teaching and demonstrating the use of vocabulary and comprehension strategies gives students the tools they need to figure out the meaning of words when reading independently. When teachers create lesson plans, they should include time for teaching students a variety of strategies to use to break down words, identify meaning, and connect to the text (Alvermann et al., 2013; Vacca et al., 2016). These strategies may require students to use books, paper, pencils, or new technologies. A combination of both paper methods and computer technology can provide students with appealing options to learn and apply vocabulary and comprehension strategies (Goodwin, Cho, & Nichols, 2016).

Tablets, including iPads, and mobile devices have become prevalent in schools. Mobile smartphones may not be allowed in middle schools, but tablets are more readily available and usable. Tablet technology is equipped with a myriad of applications that can be used with the

touch of a finger and be fully operational within seconds (Ditzler et al., 2016; Walsh & Simpson, 2013). The interaction of the teacher, technology, and students and the impact of tablet technology on vocabulary retention and reading comprehension is included in this study.

Theoretical Framework

The educational learning theory of constructivism is rooted in the work of Dewey and Piaget (as cited in Mooney, 2013). The theory of constructivism states that students learn by building upon what they know (Piaget, 1947/2003). Every student comes into the secondary classroom with some prior knowledge. This knowledge may be formal, informal, or a combination of both. Teachers are tasked with getting students to understand how to tie together new knowledge with pre-existing knowledge. Problems with comprehension arise when students open their content-area textbooks and try to read and understand. They feel stumped when faced with difficult vocabulary terms. It may be difficult for students to understand relationships between various ideas and thoughts communicated in the text (Watson, Gable, Gear, & Hughes, 2012).

Dewey (1916/2008) gave an example of a person coming into a room and yelling out the word *paper*. People who do not understand English may not recognize the word at all. Those who do understand the English word may immediately understand that the person is referring to some type of paper but may not be able to identify the exact paper the person is referencing. Upon further analysis of the situation, some may realize that the person needs paper, is selling paper, or sees a significant piece of paper nearby and is calling attention to it. This example shows that an individual's ability to think effectively depends upon one's possession of a capital fund of meanings which can be applied when needed (Dewey, 1916/2008).

Students entering the secondary school come with some background knowledge of reading strategies. They may have a basic level of understanding, but they often do not see the

overall meaning or grasp the big picture of a passage (Dewey 1916/2008; Piaget 1947/2003). In order for students to see the whole picture, teachers must help them comprehend the small pieces that create the whole. Dewey (1916/2008) distinguished between the two modes of understanding: one of the direct consumption of the meaning of a word and one of indirect apprehension.

To assist students in grasping the basic meaning of a term, teachers may use direct instruction and other strategies to make sure students know the word. Taking the students to the level of circuitous comprehension requires more in-depth and interactive teaching methods. These methods may involve direct or indirect instruction (Vacca et al., 2016). Rather than the teacher always leading instruction, involving students in the teaching and learning process may motivate them to study and retain knowledge about content vocabulary. Students may learn more easily and be able to add to their current knowledge if they interact with the learning process (Dewey, 1916/2008). If students do not know the complex terms used in their content-area textbooks, they will not understand and gain new content knowledge (Alvermann et al., 2013; Vacca et al., 2016).

Vygotsky stated that "social interaction with cultural artifacts forms the most important part of learner's psychological development" (as cited in Shabani, Khatib, & Ebadi, 2010, p. 238). He further explained how things used every day such as pens, spoons, languages, and beliefs all work together externally before they become an internal mental function (Shabani et al., 2010). One of the tools or artifacts that middle school students use on a daily basis is the laptop or tablet computer (Ditzler et al., 2016; Greer et al., 2017)

According to Dewey (1916/2008), one's initial vocabulary is formed in the ordinary course of everyday life. Dewey (1916/2008) asserted that learning in school should coincide with the learning that occurs outside of the classroom. Over 90% of middle school students

either own smartphones or tablets or have used these devices and are familiar with them (Madden et al., 2013). A large majority of students in classrooms are more than familiar with technology; they are often adept at using tablets and other advanced technologies. Using tablet technology in the classroom to teach complex vocabulary will allow children a connection between school and home, making them feel more comfortable and less anxious (Dewey, 1916/2008). When teachers use tablet technology for instruction, they are connecting home and school in a productive manner, encouraging students to play in order to learn. This will motivate and engage students so they can learn complex content vocabulary.

Related Literature

Since the 1980s, the term used to refer to academic classes has transitioned from the word *subjects* to *content areas* (The Glossary of Education Reform, 2013). In public schools across the country, subjects and classes that students take are called content areas. The secondary content areas include, but are not limited to, math, science, social studies, English or language arts, physical education, and the arts (Alvermann et al., 2013; The Glossary of Education Reform, 2013; Vacca et al., 2016). Each content area in public schools must cover the curriculum outlined by the state standards. Students take various standardized tests throughout the school year to determine how well they are being taught the information from the curriculum standards.

Maryland's State Department of Education produces a curriculum that specifically defines and provides a framework of standards, objectives, and outcomes for all content-area classes in the public schools (School Improvement in Maryland, 2018). Teachers use this as a guide or rule book for what students should know and be able to do at each grade from kindergarten to 12th grade. To learn the required information in each content area, students must

read and comprehend textbooks and other content literature (Ardasheva & Tretter, 2017; Carter et al., 2016; Lembke et al., 2017).

Content-area teachers become responsible for teaching both their subject-area information and reading or literacy strategies (Hagaman & Casey, 2017). The Common Core places an emphasis on including informational or expository texts in addition to the required textbooks. Therefore, middle school and high school teachers have to be teachers of language and content (Alvermann et al., 2013; Carter et al., 2016; Vacca et al., 2016)

Content-Area Reading

Most middle schools do not offer a class that teaches students how to read and what reading strategies to use to glean information from text. Teachers of middle school science, health, math, social studies, and other content areas perceive vocabulary and reading instruction to be the responsibility of English teachers (Carter et al., 2016). Unlike elementary classes that teach students how to read, middle school English and language arts classes are designed for students to learn about plot, figurative language, various genres of literature, and the use of proper grammar. Shakespeare, Hawthorne, and Chaucer are some of the great literary writers that are studied, read, and analyzed. English teachers focus on literary terms and other vocabulary words found in the literature being read. Middle school English teachers do not review reading strategies for students to use in their other subject areas such as science, math, or social studies. In middle school and high school, English is a content-area class for which students also need to practice incorporating reading strategies and vocabulary lessons (Lovette, 2013). English teachers' focus is not to help students understand what they are reading but to discuss figurative language and inherent literary themes. Students still need reading and vocabulary instruction to think critically in middle and high school level English (Weiss et al.,

2016). Therefore, when students go to their other content classes, they are left to their own devices to figure out how to understand the grade-level textbooks and learn the content.

Schuld (2014) found that students often view reading as something they do solely in their language arts class; therefore, when they enter their science or math classes, they are prepared to talk about other subjects but not in the frame of mind to read about the content. Students go to their science class thinking about cells, periodic tables, and other science materials or topics. They are not actively thinking about the large amounts of complex reading material they will have to peruse in order to learn about cells or the other topics. At the same time, science teachers go through the same thought process. They want their students to achieve their objective for the day, such as, "Students will be able to select several body systems and explain the role of cells" (Maryland State Department of Education, 2008).

Teachers become focused on attaining the objective and may forget to take into consideration the complex textbooks and other content-specific and difficult reading materials students need to use in order to select body systems and explain the role of cells (Alvermann et al., 2013; Vacca et al., 2016). This leaves students with the challenging task of extracting the content knowledge from the readings that they often have difficulty understanding on their own, leading to confusion, frustration, boredom, or time spent without comprehending or learning anything new. This frustration can be part of the students' and teachers' experience (Lovette, 2013). The content-area teachers feel frustrated because their students are not learning the material being taught. The teachers get more upset because they are not trained to teach reading and may not want to teach reading because it takes away from time they want to use to teach their content (Lovette, 2013). However, Schuld (2014) encouraged educators to see vocabulary instruction as an opportunity to incorporate reading into all content areas. Larson et al. (2013) asserted that understanding vocabulary is a critical part of academic reading comprehension.

Spending a little bit of time every week helping students use strategies to become familiar with the vocabulary can help them better understand what they are reading and learning.

When students encounter an unfamiliar vocabulary word, they may stop trying to figure out what they are reading or stop reading altogether. With a weak vocabulary in any given subject, a reader will most likely stumble over unfamiliar words, possibly losing his or her train of thought. The reader will end up concentrating on words rather than on meaning (Smith, 2014). For example, if a student is in a science class reading about the process of photosynthesis and does not understand what chemical energy or glucose is, he or she may not fully grasp the concept of photosynthesis. Rather than focusing on the process of this scientific concept, the student is distracted by unknown terms. The science teacher's goal for the student to identify and explain the process of photosynthesis will not be achieved unless the student understands the meaning of all the relevant terms. Helping the students to define and comprehend the content-specific terms will aid them in interpreting and engaging with the subject material, increasing their comprehension of the complex content (Larson et al., 2013).

Kelley et al. (2010) stated that reading comprehension is a complex skill that requires higher-level processing skills such as drawing on prior knowledge, making inferences, and resolving structural and semantic ambiguities while reading. Good readers automatically use strategies to break down complicated text to understand what they are reading. When students comprehend reading passages, they learn the academic content of the text. Tovani (2011b) found that high school students who struggle to read and write well are expected to master the same content as their more skilled reading and writing peers. Many students do not know which strategy to use and when to use it. They end up becoming frustrated and confused and are less likely to understand or even try to learn from what they are reading.

Pitcher et al. (2010) noted that the seven middle school students in their case study struggled in reading comprehension. After interviewing and observing the students, the researchers found that students had the most problems reading in the content-area classes and received no help with strategies on how to understand their materials. The students had the most difficulty comprehending expository text, which is the type of reading material most often used in content-area classes.

Middle school teachers want to teach their content to their students; however, this is less likely to happen if they do not use reading strategies to help students understand what they are reading. Alvermann et al. (2013) found that content-area teachers should remember that the content that they are teaching includes vocabulary related to their discipline. Vocabulary terms that are applicable only in a particular subject matter field are also known as technical vocabulary, which students have to learn in their content-area classes (Vacca et al., 2016). Teachers must teach the technical vocabulary in order to teach their subject matter (Alvermann et al., 2013). If students are not grasping the meaning of complex vocabulary terms in their textbooks and other reading materials, they are not going to learn new information (O'Connor et al., 2017). Vacca et al. (2016) stated that "content area vocabulary must be taught well enough to remove potential barriers to students' understanding of text in the content area" (p. 238).

Middle school teachers often assume that students come to them with a mind full of vocabulary and reading strategies, but the students are often ill equipped to deal with the advanced and complicated vocabulary in their content textbooks (Alvermann et al., 2013; Hagaman & Casey, 2017). Based on these assumptions, teachers mold their teaching methods, unknowingly leaving many students confused and behind.

Greenwood (2010) asserted that it is not enough for teachers to be well versed in their content area. Science, social studies, and all other content-area teachers must also include

reading strategies in their daily instruction and activities (Hagaman & Casey, 2017). According to Fisher and Frey (2014), "Content teachers must be aware that reading, writing, speaking, and listening are grounded in the formulation and understanding of written and verbal messages" (p. 595). The teachers must figure out what strategeis to use to help students translate the meaning of the text in order to learn the content. Middle school classroom teachers are not required to teach reading, but they do need to find a way to help their students grasp the concepts of the content area by helping them understand the content vocabulary (Alvermann et al., 2013).

Vocabulary Retention

The more often students are exposed to a word, the more likely they are to add it permanently to their personal vocabulary banks. Johnson said that it takes six encounters with an unknown word to understand and retain its meaning (as cited in Cuthrell & Yates, 2007). Marzano (2012) explained a three-tiered model of vocabulary development. The first tier is composed of words that are common in everyday language and that most students understand with ease due to daily exposure. The second tier is composed of words that are not encountered daily and are best learned through direct instruction of the teacher. The third tier includes vocabulary that is specific to a content area such as *archipelago*, *hypotenuse*, or *chloroplast*, terms used in geography, math, and science classes respectively. It is not enough to give students a list of 10 to 20 words in the second or third tier on a Monday with a pronouncement of an upcoming vocabulary test at the end of the week. Directly and actively teaching students new vocabulary in fun and interesting ways in secondary classrooms is essential for helping students learn new information from their textbooks (Marzano, 2012; Shore et al., 2013; Ward & Williams-Rossi, 2012).

Technology is prevalent in 21st century classrooms. Bluetooth and wireless electronic devices and access to hundreds of television channels and other oral and visual stimuli are found

in the classrooms and hallways of most schools in America. This growth in technology challenges educators to find ways to motivate and engage students within the confines of a quiet, structured classroom when they are so used to the fast-paced, exciting, technologically advanced world outside of school. Students come to school with the notion that they are in for a long day of typical practices of verb drills, translations, and random vocabulary lists (Arnett, 2008). Memorizing terms and definitions is not an effective method of remembering new words. Teachers must be creative and use fun and interesting methods to motivate students to learn new vocabulary. Parsons and Ward (2011) suggested that students should be involved in authentic tasks that relate to their world in order to be able to visualize new vocabulary words and commit them to memory. Students should be active participants in the learning process, not just passively receive a lecture from the teacher or copy words and meanings from a dictionary. Left to inactive tasks such as rote memorization or copying words from a dictionary, students may lose interest, focus, and the desire to retain any new knowledge.

Tovani (2000) discussed "fake reading" in school. Students pretend they are reading an assignment but wait for a peer or the teacher to give the responses to questions and then piggyback off their words. Sometimes students get away with this because teachers are busy getting the right answer from the class instead of assessing individuals' level of understanding. Tovani (2000) explained that when a person wants to understand how to do something, they go to an expert in that field. For example, if someone wants to learn how to play a bass guitar, he or she goes to a bass guitar expert, listens to them, and emulates them. Reading a textbook should be approached in the same manner. The teacher is the expert and should therefore share reading strategies that good readers can use to understand text. Teacher modeling is important to help students feel comfortable and confident when applying the new strategies. A teacher's enthusiasm toward the subject and activity will also motivate students to participate. Using a

variety of methods helps to engage students. Arnett (2008) stated that activities that encourage more contextualized and authentic language use are more likely to keep students on task and eager to learn new terms. Rote memorization of definitions should be obsolete but is still widely used in the middle school content areas. If teachers in these classes want students to learn in their discipline, fun and energetic instruction and engaging activities are crucial. Three approaches are effective to get students interested in trying to learn new terms: direct instruction, engaging and motivating instruction, and instruction with interactive technology (Baker & Nosratirad, 2013; Kelley et al., 2010; Kelly-Williams et al., 2017; Vacca et al., 2016).

Direct Instruction

The term *direct instruction* refers to teaching the class directly before group or independent work. Dalton and Grisham (2011) stressed that while reading without any instruction can help students learn, direct vocabulary instruction is also very important. Students tend to take an assignment and look at the information more seriously if the teacher emphasizes the importance of the material during a direct lesson. Direct instruction does not mean writing new terms on the board and then going over the definitions with the class. A teacher's direct instruction should be designed to equip students with the tools necessary to figure things out on their own. In a study by Hamedani and Yazdanimoghadam (2016), English learners were explicitly taught using interactive vocabulary strategies. Teachers taught one group the meaning of vocabulary terms and then students read text that included the new terms. Another group of students were not directly taught the meaning of words. The students were also encouraged to be proactive and figure out the meaning of the words while they were reading. The students who received direct instruction and used contextualized learning strategies did significantly better matching terms with meaning in this activity than those that only used contextualized learning strategies.

Goodwin et al. (2016) presented a mnemonic strategy called WIN. The teacher explicitly teaches students about word morphology before they read their textbooks. Students learn how to break words down into parts in order to determine the meaning of larger words. Then, as they begin reading, they use the WIN strategy to figure out what words mean. The *W* reminds students to "word solve" by finding smaller units within bigger words. Next, the *I* reminds the students to look "in another word" by using a big word to define smaller units in other words. Finally, the *N* reminds students to "notice the context" by asking questions such as, "Does this definition make sense?" or "Can I use the word and meaning in my own life?" (Goodwin et al., 2016, p. 95). After receiving the direct instruction from the teacher, the students independently apply the WIN strategy to determine the meaning of unknown and complex terms.

A saying by a well-known philosopher is used to illustrate the meaning of direct instruction combined with independent learning and understanding. Maimonides stated, "Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime" (as cited in BrainyQuote, 2015, para. 1). Teaching a man how to use bait, cast a rod, pick good fishing spots, and other relevant fishing techniques will equip him with the strategies to go fishing. Thus, whenever he wants some fish, he can use some of the techniques learned to catch what he needs or maybe more. The more he practices fishing, the better he becomes, improving his skills and growing his arsenal of fishing equipment. The lesson to learn from the famous philosopher is that by teaching others how to do something, you enable them to face a problem equipped with the knowledge of how to think through the problem and figure out the proper solution.

Applying this analogy of teaching someone how to do something, rather than simply giving them something, can help a teacher illuminate the need for direct instruction of vocabulary and vocabulary learning strategies. Rather than giving students the words and having

them memorize each word and its definition to complete one assignment or test, teachers have the opportunity to teach students "how to fish," or how to use strategies to help them decipher the meaning of complex terminology. Every complex vocabulary word a student encounters should be defined and not just brushed aside (Vacca et al., 2016). When students encounter a new word, they can employ one of the strategies, such as WIN, that the teacher has taught them to figure out the meaning and make solid connections to the text in order to develop meaning and learn new information. Students must posess an understanding of specialized terms in order to comprehend the meaning of the content-area text (Goodwin et al., 2016; McAdams, 2011). Teaching students what to do when they do not understand vocabulary terms is critical to their overall comprehension of the reading passage and acquisition of content knowledge.

Sonbul and Schmitt (2010) conducted a study in which they compared students' retention of new vocabulary under two distinct conditions. One group learned new terms on their own by reading to themselves. The other group read to themselves as well but also received direct instruction from the teacher. The teacher explained the new terms directly to them. Sonbul and Schmitt (2010) concluded that students were more likely to retain the meaning of the vocabulary words if they also received the direct instruction from the teacher.

Teaching students how to use comprehension strategies to break down word meanings shows students what proficient readers do to understand what they are reading. The think-aloud method is an example of a strategy that teachers can use to guide their students' thought processes (Tovani, 2011b). Teachers demonstrate this strategy by reading a passage of a textbook or other reading material and speaking their thoughts aloud to show the metacognitive process of reading. A teacher may say the following out loud as they read a science, social studies, or other content-area textbook: "I wonder what this means," or "I think I have learned," or "I'm confused by this, so . . . " (Ness & Kenny, 2016, p. 456). By using this method, the

teacher shows the students how to attack difficult words using a specific strategy. Instead of copying definitions, students can use a strategy given during explicit and direct instruction when they encounter complex terms (Ness & Kenny, 2016).

Indirect Vocabulary Instruction

Indirect learning of vocabulary happens as a "by-product of doing additional things such as reading or listening" (Naeimi, Foo, & Choo, 2013, p. 409). Most classes in middle school are between 45 and 90 minutes long. At first glance, this may appear to be a long period of time. However, given the rigorous demands of national standards and state curricula, teachers have to move at a rapid and steady pace in order to address all required standards and objectives. The limited class time means that one day's lesson may not be enough time for direct instruction of all vocabulary. Therefore, direct instruction should be supplemented with activities that allow more indirect learning (Goodwin et al., 2016; Morrow, 2013).

Incidental or unintentional learning is beneficial to students because it may be less instructionally focused. With this type of learning, students may feel less nervous primarily because they might not realize that they are learning. Being exposed to new or complex words in several different ways can give students more context clues to help them figure out the meaning of the words (Ghanbaran & Ketabi, 2014). In the 1970s and 1980s, teachers would assign reading passages that might contain complex academic vocabulary (Alvermann et al., 2013). Students would read the text for homework and use a paper dictionary or context clues to determine the meaning of the complex terms. While this method may still be used today, the increase of easily accessible technology has paved the way for exposing students to vocabulary terms and definitions in multiple ways. Ghanbaran and Ketabi (2014) found that using multimedia games can help middle school students learn new vocabulary. They indicated that further research needs to be done on the use of technology for vocabulary learning, but thus far,

the use of multimedia games to learn new vocabulary and increase vocabulary acquisition seems to be effective in helping students retain the meaning of new vocabulary terms.

Biancarosa (2012) asserted that vocabulary terms need to be viewed and read numerous times to gain understanding of the terms. Therefore, teachers must plan multiple activities that allow students opportunities to be exposed to the vocabulary. Even when they may understand the meaning of a few terms or be able to use a select number of strategies, students will be faced with increasingly difficult terms as they continue to progress through the school year and to higher grades. When students read a text that is more complex than the previous one, their need for instruction grows (Hill, 2011). If students have a bank of reading and vocabulary strategies from which to choose and engaging activities and reading materials readily available through advanced technology, they may be able to retain the meaning of new vocabulary terms (Baker & Nosratirad, 2013; Fisher & Frey, 2014; Ghanbaran & Ketabi, 2014;).

Engaging and Motivating Vocabulary Instruction

The words a speaker or author chooses makes a difference in their ability to communicate meaning. According to Scott (2015), "A reader or listener is going to get more out of a text, or lecture . . . if they understand the words" (p. 14). A teacher's goal is to get students involved and eager to learn new words. This is not an easy task because vocabulary terms get increasingly difficult as students progress from grade to grade. Teachers must use a variety of methods such as context clues, narrative writing, peer conversations, and competitive games to get students excited about learning new words (Kelley et al., 2010). Middle school students do not want to memorize or be handfed information. Crawford (2007) pointed out that adolescents thrive on meaningful challenges that are relevant to their lives or the world around them. Greenwood (2010) found that middle school students will leave their comfort zone of learning if teachers model their willingness to do the same. Making a lesson challenging for adolescent students

requires teachers to provide engaging instruction that involves intellectual stimulation and active involvement of students. Gallagher and Anderson (2016) found that students who were encouraged by their teachers to actively search for new and complex terms got excited and "jazzed up" (p. 280) about vocabulary learning because they were thrilled to be engrossed in the process of independent learning.

Lesaux et al. (2012) described an academic vocabulary intervention implemented on a group of sixth-grade students whom teachers identified as struggling readers. The intervention program involved collaborative learning activities such as role play and word play. The collaborative activities increased the social interaction in the classroom and gave students the responsibility of overseeing their learning and progress. Furthermore, the teachers' direct instruction focused on giving students a myriad of strategies to choose from to build their word knowledge as they read informational text. At the end of the intervention program, students expressed their excitement toward learning new words and felt that the program gave them the tools to actively and independently figure out the meaning of complex terms and text. The researchers found that students' vocabulary knowledge and reading comprehension increased after participating in the two-year reading intervention program. The responses of students suggested that the participants linked word learning to motivating feelings of academic enjoyment and confidence (Lesaux et al., 2012). Students felt engaged in the learning process and an increase in their self-confidence. Knowing they could accomplish the tasks set before them affected the amount of work and effort they put forth during reading and vocabulary activities. When students believe they can do something, they will become more engaged and motivated with an activity. This mindset and students' confidence in their ability to read and figure out meaning will encourage them as they make the link between listening comprehension and using strategies independently while reading (Tovani, 2011b).

Instructional methods that engage students with academic vocabulary activities do not require teachers to constantly include vocabulary games during class. Engaging instruction occurs when teachers actively and explicitly give students opportunities to see, hear, and use these academic words (Scott, 2015). One part of engaging instruction is to allow students to practice and apply the vocabulary and comprehension strategies on their own during self-selected and independent reading. When given these opportunities to think critically about text in language arts and content areas, students are more prone to retain the meaning of the terms (Pitcher et al., 2010). When applying reading strategies, students will read the key words in their content-area textbooks independently and determine the meanings of new or difficult words and concepts (O'Connor et al., 2017).

Instruction should be scaffolded by incorporating direct instruction, guided instruction, and independent learning. After teaching students about a new strategy, teachers should illustrate how to use it and monitor students as they practice using the strategy. As students gain more confidence, teachers can encourage them to apply the strategies as they read on their own without the teachers' guidance (Fisher & Frey, 2014; Gallagher & Anderson, 2016).

Strategies to Teach Vocabulary

Utilizing a variety of strategies to engage students and help them understand new or difficult terms enables them to develop their academic language and approach content-rich readings with confidence (Larson et al., 2013). Analyzing the morphology of words is one strategy that content-area teachers could use to help students break down the meanings of words in their subject area (Goodwin et al., 2016). Pacheco and Goodwin (2013) indicated that instead of a quick overview of a whole word, the use of "root words, prefixes, and suffixes supports middle school students' word-learning demands by helping students consider the specific semantic information within morphemes" (p. 542). Content-area teachers would teach the

meaning of root words and prefixes and suffixes relevant to their subject rather than having students temporarily memorize the meaning of morphologically complex words such as *neurobiology*. If the science teacher has taught the students that *-ology* means, "the study of," *neuro* has to do with nerves, and *bio* means life, students may not be as frightened of the complicated-looking term *neurobiology* as they would have been without the knowledge of morphology. Students would be more likely to figure out that *neurobiology* has something to do with the study of the nervous system. Having a medium to strong grasp of the meaning of the term will encourage students to continue reading to learn more about the subject. Although it may take time to initially instruct students about the morphology of words, the strategy of breaking down content vocabulary can strengthen students' ability to understand the specific concepts being taught (Goodwin et al., 2016).

Another example of a strategy that a content-area teacher could use to emphasize terms is a visual and interactive word wall in the classroom and in the hallway. Typically used in elementary schools, word walls are becoming more prevalent in middle schools because of the constant exposure students get to vocabulary words displayed. Yates et al. (2011) observed the interaction of students with word walls in their science, math, and language arts classes and the hallways. As students learned new content terms, they placed the terms on both the classroom walls and the hallway walls. While going about their daily routines, students would walk by the walls and engage in conversations about the terms displayed and suggest other relevant academic terms to add to the wall (Yates et al., 2011). The word wall strategy encourages students to make connections between new words and their own experiences and fosters collaboration between students (Gallagher & Anderson, 2016).

Employing strategies in the content-area classrooms such as word walls or breaking down the morphology of complex words can help students learn the meaning of content-specific terms

and comprehend difficult content-area text. Content-area teachers need to move away from the idea that using reading strategies to teach vocabulary is the job of English teachers. In order to teach their students, content-area teachers need to move beyond feeling uncomfortable being called reading teachers (Andrelchik, 2015). To make students capable of meeting the challenge of reading complicated text, teachers need to use a variety of engaging strategies to motivate students and help them understand what they are reading. Hong-Nam and Swanson (2011) stressed that in "today's educational climate, teachers are responsible for the performance, progress, and overall academic achievement of their students" (p. 29). Using multiple methods to motivate students to learn new vocabulary is one way content-area teachers can help students to conquer their challenging textbooks. Larson et al. (2013) found that delivering focused vocabulary instruction does not mean that content-area teachers must take time away from teaching their material. Teachers need to find ways to frequently expose students to academic and technical vocabulary. Most students do not encounter technical terms such as *photosynthesis*, *stalactite*, or *pythagorean theorem* outside of the classroom (Lembke et al., 2017). Mentioning the words in class or explicity teaching them in class does not provide sufficient exposure for students to learn the words.

Robers, Torgesen, Boardman, and Scammaca (2008) found that students require, on average, 12 to 20 exposures to new and difficult academic terms in order to understand and remember them (as cited in Weiss et al., 2016). There is not enough time in a class period to provide the necessary number of interactions with content vocabulary terms. However, if students are given applications or activities electronically, they will have additional exposure to challenging technical terms and have a greater chance of internalizing and mastering the meanings (Khansarian-Dehkordi & Ameri-Golestan, 2016; Weiss et al., 2016). After providing explicit vocabulary instruction with indirect exposure to the vocabulary terms, the teachers can

do quick reviews in class to check for students' understanding of the terms as they relate to the content of the day's lesson. Using different activities on tablets or mobile phones will expose students to the vocabulary words inside and outside of the classroom and allow the teacher to use more class time to discuss the content-specific terms and connections to the text.

Technology and Vocabulary Instruction

The world is saturated with technology. Electronic stimuli and active lifestyles affect students inside and outside of the classroom. In just a half century, computers have gone from being exclusively for governments, big companies, and the rich to being a common fixture in schools and homes around the world. When computers were first invented in the middle of the 20th century, they were primarily used by researchers and scientists. Today, they are an integral part of every aspect of people's lives, a trend that experts refer to as pervasive computing. This trend is also referred to as ubiquitous computing, which means there are few parts of modern lives that are untouched by computers and computer technology (Morley & Parker, 2015). It was over 50 years ago that computer-based instruction first entered the classroom.

In their infancy, computers consisted of room-sized mainframes and microcomputers that were considerably larger than today's computers. In 1960, a government-funded project at the University of Illinois provided instructors with one of the first programming environments (Sozcu, Ipek, & Taskin, 2013). Most people did not have knowledge of how computers worked or could not afford the exorbitantly priced large machines. Some people did not see the need for these machines. The change from a computerless world to a computer-saturated world happened gradually. In the early 1980s, personal computers became available and affordable for regular working people, not just universities, researchers, or scientists. When the World Wide Web was created in the late 1980s, technology grew rapidly around the world (Morley & Parker, 2015). Using the Internet enabled people to talk to others around the world within seconds. Computers

had the capability to interact with other computers, small or large, depending on the depth of communication the owners allowed (Wempen, Hattersley, Millett, & Shoup, 2015). Professionals in education, medicine, law, sports, and every field began to incorporate computers into the workforce to facilitate on-the-job tasks and to communicate with others (Morley & Parker, 2015).

In the 1980s, Steve Jobs helped Apple "pioneer the use of computers in schools with the graphical interface of the Macintosh" (Abramson, 2011, para. 2). Computers became a staple in the school and the classroom throughout the 1990s and into the 21st century. At first, Apple dominated the educational scene, but in the 1990s, Microsoft took the lead. Cell phones began to change from the size of one-liter soda bottles to hand-sized, sleek, almost weightless devices. Morley and Parker (2015) stated that in early 2000, most mobile phones became smartphones with Internet capabilities and the ability to run mobile programs or applications. In 2010, Apple introduced the iPad, which revolutionized personal computer use in the classroom for both teachers and students (Abramson, 2011). The introduction of tablets and mobile phones into mainstream society has made computer technology more easily accessible and portable than it had been when laptops were primarily used. Mobile devices such as smartphones and tablets allow users to make phone calls, search the Internet, or create documents or presentations at a lower price. Incorporating these technologies into educational lessons and activities is more possible today than it was 50 years ago (Bowman, 2015; Maich & Hall, 2016).

Mobile learning devices. Neville et al. (2009) studied the use of digital game-based learning and compared it to traditional text learning. The researchers showed that students who used digital game-based learning retained more of their vocabulary knowledge. Cristol and Gimbert (2014) investigated the impact of mobile learning devices (MLDs) on student performance on state achievement assessments in reading, science, math, and social studies in

middle and high school. They found that students who used MLDs showed greater levels of improvement in test scores in the subject areas being tested than those students who did not use MLDs. While Neville et al. (2009) did not address student motivation or teacher perceptions of using MLDs, they did point out an important factor that needs to be considered. Students are the ultimate consumers of classroom instruction and technology; therefore, teachers must have faith that students are going to use the devices for the academic purposes the teachers set (Cristol & Gimbert, 2014). If that trust and follow-through is not consistent between the teachers and the students, then the impact of the MLDs will not be significant.

MLDs have many free applications that teachers can use to monitor students' progress as they study vocabulary terms, read passages, solve problems, and create new projects. ShowMe, Educreations Interactive Whiteboard, and Screen Chomp are applications that record pen strokes and audio simultaneously, allowing math problems to be recorded with audio instructions (Pilgrim, Bledsoe, & Reily, 2012). Tablets can provide students and teachers with quick and free access to content-specific apps that can help students study basic and advanced skills. Dictionary applications enable students to quickly look up a word while reading or completing another task. Pilgrim et al. (2012) emphasized that even though technology and many wonderful applications are readily available, teachers may not be successfully integrating technology into the classroom.

Bring your own device. Tablet technology is beneficial for educational use because of its accessibility, affordability, and size. Mobile e-learning merges education with mobile technology, and the interaction is fast and easy, often with immediate feedback (Sozcu et al., 2013). Many students in middle school own smartphones that have fun applications that capture and hold their attention for hours. Teachers must come up with activities and strategies that involve using electronic devices that keep students focused and excited about learning.

Some school systems question whether providing each student with a tablet will be cost prohibitive. School districts invest hundreds of thousands of dollars to try to provide 1:1 laptop computers for students and teachers. Recently, many school systems have stopped purchasing high-priced laptops and have begun purchasing affordable technology such as Chromebooks, iPads, and tablet computers (Ditzler et al., 2016; Greer et al., 2017; Harper & Milman, 2016). Tablet computers are available at a lower cost than laptop computers, creating room for programs such as Project Tomorrow that work to provide 1:1 devices for students in certain school districts in California (Ditzler et al., 2016).

Across the country, school districts are investing in technology for classrooms. However, given the lofty cost of providing 1:1 devices and the constraints of school budgets, many schools are accepting and fostering the BYOD culture that is flourishing around the world (Cristol & Gimbert, 2014; Sangani, 2013). Students would be able to bring their own iPad or tablet to be used for academic purposes in the classroom. Allowing students to participate in BYOD would decrease the number of tablets a school would need to provide for those who do not have one (Cristol & Gimbert, 2014; Sangani, 2013).

The number of schools using tablets and other advanced technologies in the classroom is steadily increasing. Baker and Nosratirad (2013) pointed out that when computer games are used as learning tools, they create an altered environment with an independent learning atmosphere. Furthermore, when children use tablets, they are generally found to be very engaged in the process of learning (Ciampa, 2014). Ciampa (2014) explained that students are motivated to use tablets inside and outside of the classroom even if they are using them for learning purposes.

Several intrinsic factors keep students focused when using applications on tablet devices. One of these factors is that learning applications are designed to be games and activities that

students can progress through at their own pace, moving from level to level. They automatically meet the students at their level of expertise. Another intrinsic motivator is the challenge of competition with peers. Students can chat with one another to find out how each individual or group is performing in a particular application. Certain applications may allow teachers the ability to make students' progress visible to others in order to create healthy competition and recognition of achievement (Ciampa, 2014). Having access to these creatively designed applications is not the same as using them purposefully and regularly, however. There is a discrepancy between general concepts of how technology should be used in schools versus how, when, and how often the technology is actually used (Morrison, 2010).

Vocabulary applications on MLDs. There are a growing number of applications on MLDs for education, specifically for vocabulary practice. Many useful apps are either free or can be purchased for relatively affordable prices. Merkuri (2012) asserted that middle school teachers need ongoing professional development to keep up with all of the assessments, methods, materials, and supplemental programs that are needed to teach reading and vocabulary. It is not just enough for students to have access to the technology and the applications. Teachers must be well versed in the applications they assign students to use so that they can monitor and make sure that students are using the application correctly and that the application is helping students' vocabulary knowledge improve. Most middle students are adept at using MLDs, but they may need some "guidance on how to effectively and strategically utilize vocabulary apps to maximize their learning and reach their own goals" (Nisbet & Austin, 2013, p. 6). With the proper explanations, teachers can assist students in using the applications for academic activities. Teachers can also help students make learning relevant to their lives by meeting students where they are in the online environment (Jackson & Ain, 2015).

An example of a vocabulary application is iTooch for middle schoolers. It is designed for the iPhone, iPod, iPod Touch, and iPad. Included in this application are vocabulary boosters, or exercises, for language arts and math for first through twelfth grade (iTooch, 2014). The educational exercises are based on the National Common Core Standards and include incentives such as games and badges that students can earn as they progress through various levels of activities (Dabbs, n.d.). Teachers can direct students to geometry, algebra, multiplication, critical reading, author's purpose, literary texts, and other math and language arts topics.

Quizlet is another application that has the advantage of being available on Apple or Android devices, as well as being fully functional on computers and laptops. In 2005, a 15-year-old student, Andrew Sutherland, created Quizlet to help him and his friends study for a class (Jackson & Ain, 2015). Little did he know at that time that it would grow to over 100 million users in just 10 years. It is designed specifically for vocabulary acquisition in any subject area. It includes easy to make, or usable, flashcards, tests, and study games to make learning fun and engaging for students of all ages and in all subjects and grade levels from elementary to doctoral level (Quizlet, n.d.). Teachers can create their own sets of flashcards and can monitor students' progress and time spent on Quizlet. Another popular feature is that students can challenge themselves, or their friends in the various activities. Quizlet's mission is to provide free access to powerful and inspiring learning tools for everyone (Quizlet, n.d.).

Computer Usage

The rapid rate at which computers transmit information via the World Wide Web allows teachers quick access to more knowledge and skills than ever before. With a few taps of their fingers on a computer keyboard, teachers can find information, pictures, and videos and can live chat with people around the globe. In 2001, before classroom computers became commonplace, Cuban stated that technology supporters believed that if computers were introduced in the

classroom and made easily available, then they would be used. Many applications and programs are available on computers that increase reading efficiency and learning overall.

When students' reading comprehension improves, their grades also improve, leading to increases in graduation numbers. More qualified candidates for the workforce might emerge when high school graduation rates improve (Cuban, 2001). In the beginning of the 21st century, the opportunities for learning through technology gave Cuban's (2001) prediction credence. When student learning improved, the business world improved because of the better understanding and more efficient use of computer technology (Cuban, 2001). However, more recent research points out some of the disadvantages of using mobile devices for learning (Bowman, 2015; Fabian & MacLean, 2014; Hu & Garimella, 2014; Kee & Samsudin, 2014).

Kee and Samsudin (2014) found that the screen size of tablets or mobile phones is sometimes too small. Learners are often distracted by the features highlighted on the mobile devices, most notably, games and social network sites. In this same study, Kee and Samsudin (2014) emphasized that students preferred to use mobile devices to learn facts, languages, and skills because of the independence and self-pacing of the activities. Overall, the students in the study enjoyed using the mobile technology but preferred to have face-to-face interaction with the teachers so that they could ask questions to clarify things as they were learning. Kim and Samsudin (2014) arrived at the same conclusion as Cuban (2001) did over 10 years earlier: the main purpose of teachers using the computers was not to eliminate the need for teachers but to assist teachers in being more productive.

Computers, tablets and mobile devices are not intended to replace human beings such as teachers. They are there to provide immediate support and information as well as additional activities and ideas to help teachers meet the needs of all students in innovative and creative ways (Cuban, 2001; Kee & Samsudin, 2014; Suwantarathip & Orawiwatnakul, 2015). Teachers

need to adjust their lessons and select appropriate activities that fit students' needs (Suwantarathip & Orawiwatnakul, 2015, p. 169). Morrison (2010) asserted that educators need to reform their instructional practices so that they engage students in meaningful learning while using 21st century knowledge and skills. Morrison (2010) further described the five areas of skills that students should have for entering the 21st century workforce. A framework for 21st century learning was created by P2, a coalition made up of representatives of the business community, educational leaders, and policy makers. They looked to determine ways for U.S. K-12 education to equip students with 21st century skills. They classified these skills into the following five categories:

- knowledge of core subjects: English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government, and civics;
- 21st century themes: global awareness, financial, economic, business, and entrepreneurial literacy, civic literacy, and health literacy;
- learning and innovation skills: creativity and innovation skills, critical thinking and problem-solving skills, communication and collaboration skills;
- information, media, and technology skills: information literacy, media literacy, and ICT (information and communication and collaboration skills);
- life and career skills: flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. (P21 Partnership for 21st Century Learning, n.d.; Morrison, 2010, p. 6)

Two necessary 21st century skills are the knowledge of English and the skill of using technology for literacy and for communication. Even though there are some disadvantages to using mobile technologies, such as the aforementioned small screen size and possibly distracting features, it is inevitable that students will have to use these new technologies either in their

academic journey or in their future careers (Kee & Samsudin, 2014). Computers and mobile devices have become an integral part of daily life at home, at work, and at school (Kee & Samsudin, 2014; Suwantarathip & Orawiwatnakul, 2015). While children as young as kindergarteners are sometimes more adept at handling mobile devices than their parents and teachers, they primarily use the devices for fun and play. Although there are many apps that teachers can use in the classroom to teach vocabulary, children and students do not spend the bulk of their screen time learning and using educational apps. Instead, they use these devices for social interaction and communication. Students interact with each other on Facebook, Instagram, and other social media apps (Kee & Samsudin, 2014). To increase the use of mobile apps for educational purposes, educators must be adept at navigating the apps so they can teach students how to use them. Teachers are essential for helping students bridge the gap between technology and academic learning. According to Cator (2013), "Access to technology has become as important to learning as access to a library, yet teachers remain the critical link between students and the content" (para. 2).

Computer Availability

In 2013, President Obama announced the ConnectED Initiative to empower teachers with the best technology and training to make the most of their classroom experience (ConnectED Initiative, 2015). As part of this program, companies have committed to contribute billions of dollars of hardware, software, training, and other support to schools across America. A few of the companies contributing as part of the ConnectED Initiative (2015) are:

- Adobe, which will provide more that $300 million worth of free software to teachers and students, including Photoshop;

- Apple, which will donate $100 million in iPads, MacBooks, and other products, along with content and professional development tools to enrich learning in disadvantaged U.S. schools;
- Esri, which will provide $1 billion worth of free access to ArcGIS Online Organization accounts to every K-12 school in America to allow students to map and analyze data; and
- Microsoft, which will launch a substantial affordability program open to all U.S. public schools by deeply discounting the price of its Windows operating system, which will decrease the price of Windows-based devices (ConnectED Initiative, 2015).

The preceding section is an abbreviated list of participating companies and their contributions to schools in America. The goal of the ConnectED Initiative is for all students to have access to high-speed Internet connectivity to improve their education experience (ConnectED Initiative, 2015). Every company on the list is a household name, but Microsoft and Apple are two companies that stand out in the area of tablet technology and mobile devices.

Microsoft. The Bill and Melinda Gates Foundation recently granted $25.9 million dollars to the Alliance for Education and Seattle Public Schools to develop classrooms, leadership, teachers, and school resources to help all students achieve (as cited in Coe, 2000). Part of this educational initiative is to provide current technology to all schools in the district and to provide training for teachers and staff to use the updated technology. The Gates Foundation (2015) emphasized that teachers need professional growth opportunitites in order to differentiate instruction and avoid a one-size-fits-all solution to classroom instruction (Bill & Melinda Gates Foundation, 2015). Rather than spending millions of dollars to give every student a computer or tablet, the Gateses emphasize the need to spend millions more on education and training opportunities for teachers and administrators so that the technology will be utilized to its full potential.

Apple. Through the ConnectED program, Apple has committed to providing "support to schools where at least 96 percent of the students are eligible for the free or reduced-price lunch program" (Apple Education, 2015, para. 1). As part of this initiative, Apple wants to help even the playing field of schools across America. Many schools cannot afford to purchase basic supplies, let alone advanced technologies of tablets and laptops. Apple (2015) affirmed that they see the inequality in the schools and that minorities are significantly underrepresented in the technology industry. Due to Apple's effort to increase the number of minority students who have access to tablet devices, 92% of the students in the 114 schools from 29 states across America that will benefit from Apple's ConnectED contributions are of Hispanic, Black, Native American, Alaskan Native, or Asian heritage (Apple Education, 2015). With the magnanimous efforts of companies such as Apple and Microsoft, technology accessibility for teachers and students is far greater today than it was a decade or two ago.

Teacher Preparedness

In order for tablet technology to be properly utilized in the classroom, teachers must be prepared to implement tablets into their lesson plans and activities in ways that are effective for student learning. Teachers often use tablets and MLDs for personal purposes such as planning, searching the Internet, creating documents, and emailing (Katzan, 2015; Nadelson et al., 2013). Combining tablet technology and education in the actual art of teaching involves more than just using a calendar, e-book, or note-taking app. Teachers have to be knowledgeable about how to use tablets and the applications that will best motivate and teach their students. Otherwise, using tablets in the classroom will create situations similar to classes where the teachers who do not know how to read ask their students to open their history books to chapter three and expect students to learn information from the text without any explicit or guided instruction.

Students cannot be expected to use or do something properly without being taught. For example, if the goal is to have students use a tool to build something, the students have to be taught how to use the tool. Prior to teaching someone how to use a tool, the teacher must be skilled with using the tool (Ditzler et al., 2016; Greer et al., 2017; Varol, 2013). In the content areas, books, charts, and literary devices have been the tools that teachers have used to teach students history, science, English, and other subjects. Teachers in the content areas possess skills and knowledge in their subject areas. In a history class, the history teachers have the ability to lecture about minute details of events in chronological order. A science teacher can label the parts of a cell without glancing at a diagram, while English teachers can recite soliloquies from Shakespeare as though they composed the poetic verses themselves (Huggins & Stamatel, 2015; Tovani, 2011b). However, teachers cannot expect students to be as skilled until the students are taught how to use academic tools to analyze a chronological chart, scientific diagram, or Shakespearean sonnet. Qualified teachers combine creativity and professional knowledge to create lessons that will show students how to recite, label, and analyze (Huseyin, 2014). With the integration of tablet devices in the classroom, teachers have to show students how to use tablet technology as a learning tool without assuming students already know. By using innovative teaching methods, teachers can reach the technologically driven children of the 21st century (Ditzler et al., 2016).

Galvin, general manager of Intel Education, stated, “The winning formula is to make sure that the teachers are prepared and that they know how to use the technology and how to incorporate it” (as cited in Sangani, 2013, p. 44). Mulholland (2011) indicated that as teachers get more comfortable using iPads in the classroom, the demand for iPads and tablets will increase. Teachers’ perceptions and attitude about the effectiveness of tablets and iPads influence how much effort is put into incorporating them into lesson plans and classroom

activities (Liu et al., 2016). Teachers have the choice of using tablets to make learning more student centered or to enhance current teacher-driven methods of instruction (Liu et al., 2016). Teachers need to be familiar with the apps and their educational potential or usefulness in order to show students how to use and learn from the tablets (Ditzler et al., 2016)

Even when tablets are being used effectively, teachers and administers must exercise caution when using them, especially in BYOD programs. Teachers may not have full control over what happens with the tablets, and school firewalls may not be enforced on students' personal devices. Hu and Garimella (2014) found that professional development designed to train teachers on iPad use and integration for teaching STEM content had positive effects on student achievement. The training helped teachers apply their knowledge and skills to design tablet-based lesson plans that engaged students in learning activities and assessments (Hu & Garimella, 2014). Blackwell (2013) asserted that the teachers in her study felt that they were not properly trained to use the iPads given to them for classroom use. Those who received them during the summer were given a brief overview but did not feel properly prepared to implement them into the classroom for academic purposes. Many of the teachers who use tablets in their classroom for instruction also are adept at using tablets outside of the classroom for personal and professional reasons. More and more teachers are using tablets to enhance their teaching activities. To go beyond enhancement and to create effective changes in emerging pedagogies for tablet use will require professional training and development to help teachers better use tablets to improve student learning (Greer et al., 2017). However, with proper training and with a balanced use of technology and traditional teaching methods that do not use the tablets, student engagement can be improved (Fabian & MacLean, 2014).

Summary

The current research on vocabulary instruction in secondary content areas is vast and plentiful. Researchers emphasize the importance of using direct and indirect instruction to teach vocabulary in the content areas. Students must understand the academic content vocabulary before they can learn the information of the content (Alvermann et al., 2013; Fisher & Frey, 2014; Groves, 2016; Larson et al., 2013; Vacca et al., 2016). Over the past 50 years, computer technology has become an integral part of the classroom.

Recent studies show the possibilities of using technology for learning purposes (Baker & Nosratirad, 2013; Christ & Wang, 2011; Greer et al., 2017; Lan, 2013; Madden, 2012; Outhwaite et al., 2017; Reychav, Warkentin, & Ndicu, 2016; Savas, 2014; Spires et al., 2012; Varol, 2013; Wong & Looi, 2010). Technology can be used to create engaging and interactive activities that will motivate students to read and use vocabulary strategies to understand and retain terms and their meanings. However, the literature does not show how technology can be integrated into lessons to teach content vocabulary necessary to learn content material in middle school. This study will attempt to fill this gap in the literature by providing understanding of the instructional methods of teachers who use tablet technology in middle school classrooms to teach complex content vocabulary.

CHAPTER THREE: METHODS

Overview

The purpose of this collective case study was to provide understanding of the instructional methods of teachers who use tablet technology in middle school classrooms to teach complex content vocabulary. This study focused on providing understanding of the strategies and activities, perceptions, challenges, and successes of middle school teachers who use tablet technology to teach content vocabulary. Chapter Three includes descriptions of the design, research questions, setting, participants, procedures, researcher's role, data collection and analysis, trustworthiness, and ethical considerations of this study.

Design

"Much qualitative research aims at understanding one thing well . . . one phenomenon" (Stake, 2010, p. 27). A case study approach allowed me to examine the phenomenon of how teachers use technology and the strategies, activities, perceptions, challenges, and successes of middle school teachers who use tablet technology for vocabulary instruction. Case study research is most likely to be appropriate for "how" and "why" questions (Yin, 2014). Creswell (2013) discussed three types of case studies: the single instrumental case study, the intrinsic case study, and the collective or multiple case study. In a single instrumental case study, the researcher focuses on one specific issue and then studies one case to illustrate the issue. In an intrinsic case study, the focus is on the case itself because the case presents an unusual situation. The final type of case study is the multiple or collective case study. In a collective case study, multiple cases are analyzed to allow for individual case analysis as well as cross-case analysis (Creswell, 2013). The single instrumental and intrinsic case studies were not best suited for the purpose of this study. Both of these types of case study focus more on an individual or single aspect of a phenomenon. However, the multiple case study approach allowed me to explore the

phenomenon in its natural setting but not interfere with or manipulate participants' behaviors. According to Yin (2014), "Analytic conclusions independently arising from two cases, as with two experiments, will be more powerful than those coming from a single case (or single experiment) alone" (p. 64). Within this multiple case study, I observed, analyzed, and described the methods middle school teachers use to effectively integrate tablet technology in vocabulary instruction.

A collective case study design will allow the results to be a literal replication of the findings. If a significant finding is located in one case, having multiple cases increases the chances of identifying similar findings again (Creswell, 2013; Yin, 2014). Yin (2014) emphasized that selecting a "few cases (2 or 3) would be literal replications, and selecting more might lead to patterns of theoretical replications" (p. 57). For the purposes of literal and theoretical replication, I selected 12 teacher participants to describe how teachers use tablet technology to teach vocabulary in their content-area classrooms.

Research Questions

The overarching question of this research study was: How do middle school teachers incorporate tablet technology in their instruction of content vocabulary?

The following three questions guided this study:

RQ1: How do teachers use tablet technology in a middle school classroom to teach complex content vocabulary?

RQ2: How do the teacher participants perceive how use of tablet technology impacts student learning of content vocabulary?

RQ3: How does the teacher participants' appreciation of tablets to teach vocabulary affect their lesson planning and instructional methods in middle school?

Setting

The state of Maryland has implemented technology standards into its curriculum. Standard 3.0, Technology for Learning and Collaboration, indicates that students use a variety of technologies for learning and collaboration (Maryland Technology Literacy Standards for Students [MTLSS], 2007). Under this standard (3.A.1.a), the middle school teachers are to use technology tools, including software and hardware, to teach new content or reinforce skills (MTLSS, 2007). The location of the participants' school was important to allow easy and frequent access to collect data for analysis. Maryland schools were a good place for selecting participants that are actively and effectively using tablet technology in their classroom primarily because integrating technology into the classroom is a part of the required technology standards of the state. The district where the study took place is geographically close to me, and the school district aligns its classroom practices with the state curriculum and provided a large pool of teachers for case selection. After receiving Liberty University's Institutional Review Board's approval, I obtained the approval of the district's office that handles permission for research studies. This office gave me approval to conduct my study within three middle schools. Three middle schools were in the area that met the geographical requirements and were equipped with computer labs and classroom sets of tablets that teachers can reserve for their lessons that require tablet devices. At least one of the schools has participated in the BYOD program so teachers could incorporate tablet activities into their daily lessons without having to sign up for the computer lab in advance. The three schools are located in suburban neighborhoods in northern Maryland. The schools are diverse, with the suburban schools housing a little over 70% nonwhite students and 40% English language learners. The median income of families in the suburban neighborhoods is over $95,000 annually ("Maryland School District Demographic Profiles," 2015).

Three schools were contacted, and two schools responded initially, but only one of the three schools continued communication and allowed me to conduct the study at the facility. This school was given the pseudonym, Russell Stover Middle School (RSMS). The school had a 2017–2018 population of 840 students. Sixty-six percent of the students are black, 15% are Hispanic, and less than 20% are White, Pacific Islander, or multiple race. Five percent of the students are English language learners. The ethnic diversity of the population did not affect the selection of the school or participants. However, it is significant to this study that all schools in the county, regardless of the diversity, have equal access to tablet devices for classroom learning.

Participants

Each case in this collective case study was carefully selected so that the cases provided a literal replication or a theoretical replication (Yin, 2014). This collective case study allowed me to compare common themes among each of the 12 separate cases that provided insight about the instructional methods middle school teachers use to integrate tablet technology into their vocabulary lessons. To narrow the selection of participants for this focused collective case study, I used a typical case approach to case selection (Gerring, 2007) to identify 12 teachers who were actively using tablet technology in their content classroom to teach vocabulary. After receiving approval from the Institutional Review Board at Liberty University and the school district (see Appendices A and C), I contacted the principals of the three approved middle schools to request permission to complete my study in their school (see Appendix D for Request to Principals). One principal contacted me immediately, but after initial contact did not return any other messages. Finally, RSMS contacted me and agreed to allow me to conduct my study at that school. I asked for a list of middle school teachers that actively use tablet technology in the classroom. Participants who used tablets to teach vocabulary a minimum of two times a month were considered to be active users of tablet technology because they demonstrated

consistency and frequency in tablet usage. The participants were chosen based on their consistent and frequent use of tablet technology and recommendations from school administrators.

Procedures

The Institutional Review Board "is charged with reviewing and approving all human subject research before the research can proceed" (Yin, 2014, p. 78). Following my proposal defense and approval by the Liberty University IRB and school district (see Appendices A and C), I contacted RSMS and worked with an administrator to request volunteers for my study. After sharing my inclusion criteria with administrators, they gave me a list of 12 teachers who volunteered and fit the criteria of my study. All 12 people on the list were state-certified teachers with at least one year of teaching experience who actively use tablets in the classroom. Each person who volunteered for the study was required to sign a consent form (see Appendix E).

For a period of two and one half weeks, I collected data through interviews, observations, and focus groups. I recorded the interviews with an audio recorder on my phone and then transcribed the interviews for analysis. The participants were informed that their interviews and focus group sessions were being audio recorded. I conducted one focus group at the beginning of the first week, and all 12 teacher participants were invited. Only five participants were able to attend. Over the course of the next two weeks, I met with eight of the participants and interviewed them one-on-one in their classroom. Four of the participants did not have any time to meet with me given that my study was done within the final two weeks of the school year. I gave them the option of turning in their responses to the interview questions through email, and they willingly agreed. Three of the four teachers submitted their responses. One of these four teachers attended a focus group, allowed me to observe her, and submitted lesson plans, but did not submit her responses to the interview questions. At the end of the two weeks, I conducted a

second focus group. Seven teachers and one administrator attended this focus group. Both focus groups were asked the same three questions in a semistructured format. The recordings were kept in a locked filing cabinet in my office. They will remain in a locked cabinet for a period of five years, after which they will be destroyed. Participants were asked to check the transcripts of their interviews to verify their responses. All sources of data were analyzed and coded to highlight repeated words and profound statements that indicated emerging themes.

The Researcher's Role

For 10 years, I taught seventh- and eighth-grade language arts in a Maryland public school. My colleagues often complained about having to teach reading in their science, social studies, and math classes. They wanted to teach their subject matter and were tired of being told by school and district administrators that they had to teach reading as well. They would look to me and say, "Isn't teaching reading *your* job? Why should we teach reading?" These questions haunted me and soon became the impetus for this study. I was interested in answering those questions for my colleagues and for other middle school content teachers who struggled with the same issue. Through discussions with reading specialists and attendance at mandatory professional development, I began to understand that students need to comprehend complex secondary expository text before they can learn the information about the subject matter in their textbooks. Greenwood (2010) asserted that content-area teachers are not required to teach reading, but they do need to find a way to help their students grasp the concepts of the content area by first helping them understand the content vocabulary terms. In order to do this, content-area teachers need to use engaging and interesting vocabulary teaching strategies to teach the complex terms.

A few years ago, when my son was three, I was downloading apps on my iPhone to help increase his vocabulary. There were several free apps that helped children learn new terms

through game play. He quickly and easily figured out how to navigate through all levels of each app. As I watched him play with my phone, I thought about my new job as an education professor and how I could use these apps in my class to give my preservice teachers strategies to use in their content-area unit plans to teach vocabulary.

The next day in class, my preservice students enjoyed playing with the apps in class but had difficulty creating lesson plans that would allow them to incorporate the new technology in their vocabulary instruction. When I turned to research journals for answers, I found there were limited studies about successful implementation of tablet technology in middle schools to teach vocabulary.

Looking at the school districts situated around my college allowed me to have an unbiased response to all situations involved with this study. I do not work with science or social studies teachers in nearby middle schools. However, my previous teaching experience in the surrounding school districts and my prior responsibility to prepare preservice teachers to follow the state curriculum standards and use best practices have kept me up to date and informed about the current curriculum and technology requirements of the local public school systems. My years as a classroom teacher also add to my insider's point of view. My understanding of the role of a classroom teacher assisted me when I was collecting and analyzing data. When conducting interviews of teachers, I was mindful of the requirements of the curriculum and technology standards. This was helpful with the questions I asked at the interviews and with the observational notes I took during vocabulary instruction. The data analysis that I conducted will hopefully provide answers to my colleagues and my current preservice teachers as to how teachers effectively incorporate tablet technology to teach content vocabulary. Throughout this research process, I was the human instrument.

Data Collection

Data were collected primarily through document analysis, interviews, and focus groups; however, four types of data were collected. First, I solicited names of teachers who actively use tablet technology in their classrooms from school administrators to create a pool of teachers from which to select 12 to 15 participants for this study. Next, I finalized the selections for the study based on school administrators' recommendation to include 12 teacher participants and one administrator in a focus group. I collected lesson plan documents related to vocabulary instruction from each participant. Interviews were conducted of the teacher participants. I observed teachers during implementation of vocabulary lessons and held two focus groups. One group was held with only teacher participants to gather feedback from the teachers on their usage of tablet technology in the classroom. The second focus group was a blend of teachers and a school administrator to gather feedback from different levels of school staff and faculty. My final method of data collection was continued throughout the study. I maintained a memoing journal for organizing, scheduling, and processing of ideas.

Documents

I wanted to understand how teachers use tablets to teach vocabulary. Examining teachers' lesson plans enabled me to see how teachers included tablets in their vocabulary lessons. I used these lesson plan documents for review and analysis (Creswell, 2013). I asked each teacher participant for a hard copy or digital copy of their lesson plans to examine the planning process involved with integrating tablet technology into the daily lessons (see Appendix E). These documents provided insight into students' level of vocabulary performance students before they interacted with the tablet technology in teacher-led vocabulary instruction and after the tablet vocabulary activities. Per Creswell's (2013) suggestion, I collected documents (and visual materials) along with an agenda of what I hoped to find in the documents. When

analyzing the data, I tried to make sense of what I saw and how it showed the effects of tablet infused vocabulary instruction. These documents were a primary resource for analysis because the focus of this study was to provide understanding about the instructional methods teachers use to use tablets to teach technology. Analyzing these lesson plan documents enabled me to see the teachers' instructional methods and how they specifically used tablets.

Interviews

I conducted semistructured interviews with teachers to find out how they utilized technology in the classroom (see Appendix E). Semistructured interviews allow the researcher to prepare questions in advance that will help the participant transition easily from one question to the next (Saldana & Omasta, 2018). I conducted the interviews for this study with two things in mind: (a) satisfying the needs of my line of inquiry and (b) being "friendly" and "nonthreatening" in my open-ended interviews (Yin, 2014, p. 110). I established a rapport with the participants by introducing myself and explaining the purpose of my study and that I was a former middle school teacher. I explained that I was a doctoral candidate, studying the practices of middle school teachers who use tablets to teach vocabulary. When the teacher participants realized I was not an evaluator but a fellow educator interested in exploring their middle school world, they visibly relaxed, smiled, and welcomed me into their classrooms. This rapport enabled the interview process to be flexible, open, and honest. I allowed the participants to answer the questions in their own way without any guidance or coaching from me. The interviews were held in areas convenient for each participant and away from students. Most of the interviews took place in participants' classrooms or in the teacher's lounge. Each interview lasted between 15 and 20 minutes and were audio recorded on my mobile phone. Each teacher participant responded to the following 11 questions:

1. How do you perceive that using technology to teach vocabulary has impacted you positively or negatively?
2. How are you challenged when trying to get students to learn complex content vocabulary with technology?
3. Please describe the techniques you use to incorporate tablet technology into the classroom.
4. How does the use of a tablet enable you to match your curriculum goals and standards related to learning essential content vocabulary?
5. How much time are the students working with the tablets, as compared to the amount of time that you are lecturing or using other traditional teaching methods?
6. How has the use of a tablet affected reading comprehension in your classroom?
7. Explain how the use of tablet technology motivates students to learn vocabulary.
8. Why are you motivated to use tablets to teach vocabulary in your classroom?
9. Describe the resources you have used to help you use tablets to teach content vocabulary.
10. Please describe the training you have had with the integration of tablet technology in the classroom.
11. Describe the benefits and challenges you have had with the training.

The purpose of questions one and two was to gather information about teachers' attitudes about using technology for vocabulary instruction and what strategies they have used and are using to teach vocabulary. Baker and Nosratirad (2013) stated that learning vocabulary is not easy and may be frustrating for some learners. Text-based academic vocabulary teaching can improve adolescents' vocabulary and comprehension (Lesaux et al., 2010). Sonbul and Schmitt (2010) found that incidental learning coupled with detailed and explicit follow-up activities can be as effective as a strict explicit method of learning. These two questions identified the

techniques that teachers use that affect the progress students make in vocabulary learning as well as the benefits and challenges teachers face when using tablets to teach vocabulary.

Questions three through six were created to describe the methods and time that the participants use to teach vocabulary with tablets. Savas (2014) asserted that the number of studies done regarding connecting mobile devices with learning is not increasing as quickly as the number of technological developments. More research needs to be done "to understand the nature of the coexistence of technology and pedagogy" (Savas, 2014, p. 217). It is not enough that teachers are using tablets. The question is, are teachers using tablets as a teaching tool to create learning opportunities for students, or are they using them as organizational tools for their teacher duties (Greer et al., 2017)? Young people are becoming increasingly dependent on mobile technology to communicate, create, gather information, and socialize. Therefore, it is now essential that our educational system changes so that it can welcome and support a 21st-century definition of what it means to be literate (Spires et al., 2012).

This study is rooted in the constructivist theory, which emphasizes that students learn through connecting new knowledge with their past experiences. Teachers can create activities that require students to work cooperatively or individually to build upon their own knowledge. Tablet technology has the capability to bring the world to the classroom. As Stevens and Brown (2011) put it, "Technology provides experiences that . . . would not [otherwise] exist for students" (p. 39). Tablets allow students to read, research, communicate with other classrooms, and participate in learning environments from around the globe. Using this new and growing technology motivates students to participate in the learning process.

Questions seven and eight addressed the areas of student motivation and teacher motivation and why teachers think tablets encourage and help students to learn new vocabulary. Current research indicates the importance of teachers' use of tablets and understanding of how to

integrate tablet technology into lesson plans (Greer et al., 2017). These two questions allowed me to see what motivates teachers to adjust their pedagogies or to integrate technology into their pedagogy to teach students vocabulary with tablets. Many students have access to tablets at home but use them largely for social media and not for academic purposes. Therefore, teachers need to help students learn how to use applications and programs for the academic activities (Ditzler et al., 2016). These two questions helped me understand what teachers think keeps the students motivated to use the tablets to learn new vocabulary.

Questions nine through 11 were developed to help me understand the resources and training teachers use to work with tablets and what the challenges and benefits are of integrating tablets into the classroom. In order to be effective with technology use, teachers need to have technology knowledge (Ditzler et al., 2016; Greer et al., 2017; Varol, 2013). Unfortunately, there is often not enough, or any, training or professional development provided even when the tablet technology itself is present and ready for use (Blackwell, 2013; Cristol & Gimbert, 2014; Hu & Garimella, 2014; Liu et al., 2016; Sangani, 2013). These three questions helped to explore what motivates and prepares the participants in this study to use tablet technology to teach their middle school students vocabulary lessons. All interviews were audio recorded and then transcribed for data analysis purposes (see Appendix E).

Observations

Another data collection method was observations of the teacher participants during class instruction. Saldana and Omasta (2018) defined participant observation as “the researcher’s method for watching and listening to people act, react, and interact in natural social settings” (p. 29). Teachers plan activities and lessons that address vocabulary instruction in the content-area classroom. The purpose of the observations was to observe and take notes on what teachers said and did in the natural classroom setting while they instructed students before and during an

activity that involved vocabulary and tablet technology. Using all five senses, I wrote down details relating to the research questions (Creswell, 2013). I was a nonparticipant observer, visible to the participants but not interacting with any participants or activities (Creswell, 2013). Over a two-week period, each of the 12 participants was observed once for a minimum of 15 minutes. During the observations, I collected field notes of what I saw. Saldana and Omasta (2018) stated that field notes are mostly for "the researcher's private data base of observation experience . . . for reflection and analysis" (p. 39). My notes were handwritten in an observational journal that listed the date and participant's pseudonym as the title. Under the title, I wrote down what the teacher said and what was visually displayed on the board regarding instruction of vocabulary with tablets. Each observational session was prearranged with the participants after receiving Institutional Review Board approval and participant consent. I used a timer to keep track of the time spent on vocabulary and tablet instruction (see Appendix F for Observation and Reflection Notes form).

Focus Groups

Focus groups are designed to have two to 12 participants that engage in an open discussion and may remember things that they may not have thought of mentioning if interviewed alone (Saldana & Omasta, 2018). I conducted one focus group with teachers and a second focus group with a blend of teachers and a school administrator. I chose to hold a focus group with only teachers to create a nonthreatening environment that excluded administrators or others that may have a supervisory role over the teachers. Participants may feel more relaxed and may therefore speak more freely when in a discussion group of only peers. The second group was comprised of teachers and school administrators. Including these different members of a school staff may create a variety of responses because of the different viewpoints the participants may have on the use of tablet technology in the classroom. Participants were chosen

based on convenience sampling and availability of teachers, technology specialists, and administrators to meet in one of the two groups. During both focus groups, I asked three open-ended questions to give the participants an opportunity to provide information about using tablet technology in the classroom (Creswell, 2013):

1. How do teachers in your school incorporate tablet technology into their lesson plans?
2. How are the school, administration, or teachers challenged with using tablet technology?
3. How does tablet technology benefit student participation and progress in the content-area classroom?

Memoing

According to Creswell (2013), memoing "becomes part of developing the theory as the researcher writes down ideas as data are collected and analyzed" (p. 85). Throughout the process of collecting and analyzing the data, I took descriptive notes and wrote down reflections of my notes and observations of review of documents, participant observations, face-to-face interviews, and focus groups (see Appendix F: Observation and Reflection Notes).

Data Analysis

The methods of data collection were used to produce substantive data for analysis to provide an understanding of the instructional methods middle school teachers use to teach vocabulary with tablets. Saldana and Omasta (2018) stated that "qualitative analysis is an active process with one's mind and body to find patterns in data" (p. 3). Through my analysis of documents, interviews, observations, focus groups, and memoing, I "synthesized the various facets" of what I observed, and re-sorted them into "new formulations of meaning" (Saldana & Omasta, 2018, p. 3). First, I looked at the detailed descriptions of each individual case (see Appendix G for Individual Case Analysis form). Second, I did a cross-case analysis of all the cases to identify several patterns that arose from repeated words and statements (see Appendix H

for Cross-Case Analysis form). Next, I merged the patterns based on similarity of words and phrases to identify the themes that emerged. Finally, I placed the data in a table to create meaning from the patterns and themes (see Appendix I for Emergent Themes form). Creswell (2013) asserted that "establishing patterns" and "developing naturalistic generalizations" from the data will help to create meaning (p. 199).

Individual Case Analysis

Documents were collected and read multiple times to identify codes or categories in the data (Creswell, 2013). I looked at the lesson plan documents, interview and focus group transcripts, and my journaling notes to find repeated words and statements as well as profound statements from each individual case. As I read, I wrote marginal notes and annotations to emphasize what I found interesting, relevant, or profound regarding teaching vocabulary with tablets. These annotations contained hints or clues that revealed some answers when scrutinized at different times and from different points of view throughout the study and during the analysis stage. Saldana and Omasta (2018) stated that synthesis is the process of combining information from several pieces to form a new whole. I synthesized the individual cases by taking the marginal notes and organizing them in a table to show similarities that appeared in each individual case in relation to values, beliefs, attitudes, and teaching practices of the participants regarding this study (see Appendix G for Individual Case Analysis form).

Cross-Case Analysis

Creswell (2015) stated that interpretive data are composed of the researcher's observations and notes that can be analyzed and coded to point out emerging themes related to a study's questions. After creating a table that listed the patterns I saw amongst individual cases, I looked across all 12 cases to find recurrent keywords or patterns. I searched for codes in the cases that emerged out of the observations and analysis of the data (Stake, 2010). Creswell

(2013) discussed in vivo codes, which are created from participants' exact words or phrases. I used in vivo codes to identify common themes among the 12 cases in this study. As I was analyzing across the cases, several themes began to emerge that connected each individual case (Creswell, 2013; Denzin & Lincoln, 2013; Ezzy, 2002; Gerring, 2007; Stake, 2010). I created a table to display the recurrent themes that I found across the 12 cases (see Appendix H for Cross-Case Analysis form).

Data Representation

Yin (2014) suggested looking at data in different ways. Arranging the data differently, tabulating the frequency of different events, putting information down chronologically, and placing evidence into categories are some of the different strategies that will be used while analyzing the data. Using a coding process, I pulled out and identified these recurring themes and then created a word table to display the data from each individual case according to one or more themes or categories (Yin, 2014; see Appendix I for Emergent Themes form). I used an ontological approach by looking at the multiple realities present in each case to find common themes (Creswell, 2013).

Member Checks

I conducted member checks by providing participants with an opportunity to look at the data, analytical categories, and conclusions that I collected and formed. Participants were able to determine if their contributions to the study were valid and accurate. These checks provided an avenue to test theories and interpretations of incoming data noted from interviews and focus groups (Ezzy, 2002). The member checks also helped to ensure the validity of the data and credibility of the research.

Trustworthiness

It is necessary for this study to be trustworthy to provide readers and future researchers with an in-depth understanding of the context and phenomena of this project as well as the data gathering procedures, analysis, and findings of the research. Four areas of validity were addressed through the methods, procedures, and analysis of this research study: credibility, dependability, transferability, and confirmability (Creswell, 2013; Creswell, 2015; Denzin & Lincoln, 2013; Marshall & Rossman, 2011).

Credibility

Credibility in a study ensures readers that the study and analysis were conducted in an effective and trustworthy manner (Saldana & Omasta, 2018). Prolonged engagement and persistent observation in the field were used to establish trustworthiness (Marshall & Rossman, 2011). A relationship of trust was established as the researcher gained an understanding of the organization without becoming too immersed in the culture (Creswell, 2015; Marshall & Rossman, 2011). When seeking participants, qualified persons were given the option to refuse to ensure that data were collected only from those participants who were genuinely willing to take part in the study. Participants were encouraged to be frank and honest, and I attempted to establish trust and rapport with the participants by emphasizing that there were no right answers to any of the questions.

Using multiple sources of evidence in this collective case study allowed me to triangulate the findings. Yin (2014) stated that "case study findings or conclusions are likely to be more convincing and accurate if based on several different sources of information" (p. 120). Documents were collected and analyzed, teacher participants were observed, and participant interviews and focus group discussions were recorded and then analyzed. According to Denzin

and Lincoln (2013), "The use of multiple methods, or triangulation, reflects an attempt to secure an in-depth understanding of the phenomenon in question" (p. 9).

Trust was built with the participants, and all forms of data collection were checked for misinformation. Member checks were used throughout the study to ensure that all procedures were followed and all data collection was accurate. Observations and interviews provided visual methods of data collection. Denzin and Lincoln (2013) stated, "A distinctive capacity of visual methods is to improve the quality and trustworthiness of data and findings by drawing on participants' own resourcefulness and ingenuity" (p. 197).

Dependability and Confirmability

The biases, assumptions, and limitations of this study were described and acknowledged in detail to allow for the study to be repeated (Creswell, 2015). The processes of this study were explained in detail and "methodological descriptions of the procedures" (Creswell, 2015, p. 258) were provided so that other researchers will be able to duplicate the methods and procedures. Future researchers may come up with similar or different results but will be able to replicate the research as a result of repeating the proper research steps followed in this study.

Throughout my data collection and analysis procedures, I have carefully documented the data both on paper and electronically to ensure that my findings were accurate, dependable, and transferable to current literature and future studies. I have saved consent forms, emails with administrators and participants, and all field notes in a safe and secure place to show that my study does not have any personal bias. By admitting biases and assumptions and acknowledging limitations in the study's methods, the researcher can emphasize the credibility of the study (Creswell, 2015).

My bias was clarified at the beginning of the study so that the reader understands my position and any biases or assumptions I may have that may affect the interpretation and

approach to the study (Creswell, 2013). Using triangulation will provide additional support for trustworthiness because multiple methods were used to provide corroborating evidence for the findings of the study (Creswell, 2013; Marshall & Rossman, 2011). Denzin and Lincoln (2013) asserted that "reports should be transparent, making explicit the logic of inquiry used in the the project" (p. 530). The transparent reports will produce data and findings that have "external validity; confirmability, or objectivity" (Denzin & Lincoln, 2013, p. 530).

Transferability

A detailed description of the procedures of this study and the context of this study was provided to show that the findings can be applied to other situations and settings (Creswell, 2015). Rich, thick descriptions were given about the setting and phenomenon of this study to enable future researchers to have a proper understanding of the study's purpose and be able to apply the results to the phenomenon in their own situations (Creswell, 2013). The location, timeframe, environment, and environmental factors were described in detail to provide the reader with an in-depth understanding of the context. Information about the number of participants, the data collection methods, and the time period over which data were collected were described in detail (Creswell, 2015).

Ethical Considerations

No contact with any persons or school bodies was made until full Institutional Review Board and full district approval was given. The school and all participants were given pseudonyms. Information associated with participants was stored according to pseudonyms or code names. Any personal data that might be embarrassing or secretive in nature were electronically stored and encrypted. Throughout the study and during data analysis, all information gathered and analyzed was stored in locked filing cabinets. Any electronic data were and will remain password protected (Creswell, 2013; Ezzy, 2002). All electronic and paper

data will be destroyed after a period of five years. Paperwork will be shredded; digital files will be deleted, and electronic storage devices such as USB keys will be physically dismantled and destroyed.

Summary

This chapter provided an overview of the methods and procedures that I followed to complete this study. This collective case study was designed to provide understanding of the instructional methods that middle school teachers use to incorporate tablet technology to teach vocabulary. The participants were 12 middle school teachers and one administrator from a suburban middle school in northern Maryland. Data were gathered through documents, interviews, observations, focus groups, and memoing. The data were triangulated and then cross-analyzed to identify recurring themes across the cases. Trustworthiness was established through prolonged engagement and member checking.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this collective case study was to provide understanding of the instructional methods of teachers who use tablet technology in middle school classrooms to teach complex content vocabulary. Chapter Four focuses on the findings gathered through document analysis, interviews, focus groups, and observational notes. A description of the participants will be given with the use of pseudonyms. The research questions will be addressed using the five themes that emerged during data analysis.

Participants

The Sage County Public School system in Maryland gave me permission to conduct my study in three different middle schools in their district. However, only one of the schools was available during the time frame of my study, Russell Stover Middle School (RSMS). My goal was for my study to involve 12–15 participants, and my actual study involved 13 participants. The participants' perceptions and use of technology in the classroom were the groundwork of the data collection process. I collected data over a three-week period from 12 teacher participants and one administrator. The administrator participated in one of the focus groups. All 12 teacher participants attended one of the two focus groups, but only 11 teachers were interviewed. Five of the 11 teachers interviewed could not find a time to meet with me one-on-one. I gave them the option to email their responses to the interview to me. One teacher was unable to meet with me to participate in the interview and did not send responses through email. Four of the 12 teachers sent me their responses through email, but one teacher was not able to meet with me and did not respond to my emails. The teacher did speak at length to me after the second focus group to explain her inability to respond. She did contribute to the focus group discussion. All 12 teacher participants were observed teaching a lesson with technology, and all 12 submitted

lesson plan documents. Participants' quotes from individual interviews as well from the focus groups were used to provide a rich description of the emergent themes found through data analysis. In order to maintain anonymity, all of the 13 participants, one assistant principal and 12 classroom teachers, were given pseudonyms to protect their identity.

Ms. Watch

The administrator that participated in one focus group has been in education for over 20 years. This was her first year as an assistant principal at RSMS, but she had been an assistant principal for over five years. She brings more than 15 years of classroom experience into her role as an administrator. Ms. Watch expressed her concern for student safety and academic growth. She strives to meet the needs of her teachers and has an open-door policy. Her staff is welcome to visit her at any time during the school day. Outside of the school day, she continues to tend to students, teachers, and parents through email, phone conversations, and text messages. She has a genuine love for students and for her staff and wants to help both work together to help students achieve academic success and teachers reach their classroom goals.

Ms. Neighbor

Ms. Neighbor has two years of teaching experience and has been a world languages teacher at RSMS for the past two years. She holds a bachelor's degree in Spanish language teacher education and a master's degree in secondary education and teaching. She became a teacher to help students embrace the diverse populations in America. She explained that her own experience with diversity as a student has helped inspire her to be a teacher who strives to meet the learning needs of all students. She shares her personal experiences with learning a different language with her students and finds that this helps students connect with her. Her favorite part about using technology in the classroom is the ability to show students the world without ever leaving the school building. Ms. Neighbor frequently uses videos and pictures to allow students

a glimpse into other cultures that they may not be able to experience in their daily lives. She says that she cannot imagine teaching without technology. However, she also enjoys giving students multiple opportunities to complete hands-on assignments such as creating posters and collages as well. For Ms. Neighbor, technology is not the teacher of the classroom; rather, it is medium she prefers to use to engage her students.

Ms. Whiskey

Ms. Whiskey has been teaching English for over five years. She teaches several eighth-grade English classes and is also an instructional specialist, providing support for other teachers in the school. She has a special connection to RSMS because she attended RSMS during her middle school years, and she is thrilled to be teaching alongside some of her former teachers. She discussed at length how a program called Rock and Soul helped her come out of her shell in seventh and eighth grade. The confidence that she gained from the social event helped her academic performance to improve as well. She attributes this to the emphasis that RSMS places on Rock and Soul participants maintaining high grade point averages and excellent behavior reports throughout the school year. The program, as Ms. Whiskey explained, puts on a rock and roll show for the school and community during the month of May. Dozens of students get involved as musicians, set designers, and stage hands. Several RSMS teachers organize and participate in this event, which has been running since the late 1990s. Ms. Whiskey says that students in her classes today are gaining the same social and academic benefits from participating in this event. Events such as Rock and Soul are some of the reasons she came back to RSMS as a teacher.

Ms. Apple

Ms. Apple has over 10 years of teaching experience and is currently a math teacher at RSMS. She holds a bachelor's degree in international business and a master's degree in

mathematics. She has taught math at every level from prealgebra to precalculus from eighth grade through the college level. She enjoys making real-world connections to math concepts to show students the relevance of math to their lives. Teaching is her passion, and she cannot imagine doing anything else for a living. Despite the fact that she does not have a stationary classroom, she brings her cheerful personality and creative lessons to whichever classroom she is assigned. Her students use technology to practice math problems and to study for standardized math tests. All of her classes take standardized tests on computers and do not fill out Scantron sheets as they have done in the past. Ms. Apple says that she may like to teach high school in the future. One of her favorite courses to teach is algebra, a class that she can teach in middle school or in high school.

Ms. Libra

Ms. Libra has been teaching for over 25 years. She has taught Grades 1–5, and this is her first year at RSMS and her first year teaching middle school. During her time in elementary school, she taught all the content areas: math, English, science, history, and social studies. After teaching elementary school for 25 years, she thought it was time for a change and decided to give middle school a try. Her love for creativity and bringing history alive to the students led her to teach world studies for sixth grade. Ms. Libra enjoys working with sixth graders and tries to provide students with multiple ways to learn new material. She believes that each child learns differently. Some may be auditory learners, while others learn better with a visual approach. She says that technology has given her new ways to ensure that she meets the needs of all students. She did not have such fancy technologies when she first began her teaching career in the 1990s. She is looking forward to teaching sixth-grade world studies for many more years.

Mr. Eagle

Mr. Eagle has been teaching for over seven years. He began his teaching career in another Maryland county, where he taught high school freshmen. This is his first year teaching middle school. One of the main reasons he came to RSMS was the opportunity to teach a class that combines film and literature to teach literacy. His love for technology and reading drives his teaching career and helps him create technology-driven lessons for his reading classes. He is very passionate about using technology to keep the parents of his students informed of their child's progress in class. He said that he really likes the family atmosphere of the faculty and staff at RSMS. Whenever he has a question, there are always other teachers that are willing to lend an ear and offer a word of advice. He hopes to continue teaching middle schoolers but would not mind returning to a high school environment. Regardless of where he teaches, he is certain that he will continue incorporating technology in the classroom as one of his major teaching tools.

Mr. VanDyke

Mr. VanDyke has been teaching for over 15 years, the majority of time at RSMS. He went to college to study social studies and education. He holds a bachelor's and master's degree in secondary education and social studies. He is also certified as a science teacher and administrator. He said his motivation to become a teacher stems from observing and learning from really great and really bad teachers. Mr. VanDyke said that "both types of teachers motivated me to do the job." He enjoys teaching science because it is not "debatable or based on opinion." His favorite piece of technology in the classroom is the Promethean board because it helps bring science to the classroom when it is not otherwise possible to see certain things from around the world. Currently, he serves as both a science teacher and a content specialist for RSMS and strives to bring science to the students' lives through any means necessary.

Ms. Pierre

Ms. Pierre has over five years of teaching experience in middle school. She is a seventh-grade math teacher who wants to help students understand math concepts so that they remember them for future classes. She is a new mother and works diligently during the school day to plan lessons, grade papers, and evaluate students so that she can spend as much time as possible at home with her baby. One of the things that helps her balance family and teaching is technology. Ms. Pierre is able to plan lessons and create activities from any Internet-connected device. She enjoys using tablets in the classroom because it increases her ability to create and grade assignments from anywhere. While she thinks technology is great, she feels strongly that teachers must still teach students vocabulary directly or they will be less likely to understand important math terms.

Mr. Charmin

Mr. Charmin has been teaching middle school English for over 10 years. His passion for the English language and for student success are motivators for him to teach young minds. He is state certified to teach English, and he holds a bachelor's degree in adolescent education and English, secondary education and teaching, and a master's degree in instructional design and technology. He strives to incorporate technology into his lessons "that cater to different learning styles and skill levels." Mr. Charmin thinks it is important for students to stay informed of current events and centers his writing assignments around issues that are active in the local, national, and international headlines. His expertise in instructional design and technology helps him design interactive lessons that promote creativity and active learning through the use of tablets and access to an online environment inside and outside of the classroom. He emphasizes that technology enables him to teach his students how to find scholarly research about local and global topics. Mr. Charmin is also a content specialist at RSMS. He oversees the English

department and is responsible for "building the capacity of the department to analyze achievement data for improved instruction." He enjoys his position and wants to continue teaching middle school English for several years.

Ms. Michelle

Ms. Michelle has been teaching for over 20 years. She has a bachelor's degree in education and a master's degree in teaching. She has taught many different grades. This is her first year at RSMS, where she tries to help struggling readers and writers meet and exceed grade level reading standards in the Read 180 class. She is thinking about getting her doctorate in education but is busy teaching at a new school and raising her children. She made the decision to transfer to a new school that is closer to her home for the next school year. While RSMS has a great family atmosphere, it takes her over an hour to drive to work. Ms. Michelle stated, "Telling my students that I will not be returning next year was difficult. The kids started crying, and I started crying. It reminded me why I love teaching so much." She hopes she is able to build the same strong connection with her students in her new placement. Her favorite part of teaching is building a relationship of trust with each student. Her main philosophy of education is that the students will not learn from her if they do not believe that she cares about them and about their academic goals.

Ms. Shrub

Ms. Shrub has been teaching at RSMS for over three years but has been in education for over 14 years. She has spent her time in the field as a teacher, team leader, literacy coach, and content specialist. Her love for students drives her desire to help below-grade-level students improve their reading and writing skills by more than one grade level. Her reading classes are comprised of students that are performing two or more grade levels lower than where they should be. She enjoys creating lessons that push the students to go beyond their comfort zone.

She teaches students a skill and then gives them the power to choose the form of presentation they with which feel most comfortable to show their application of the skill. For example, given a topic to research, students may choose to present their information through a paper, a poster, or a video. Whichever method they choose, Ms. Shrub monitors their research during class and ensures that each student is using the skills she has taught them to complete their assignment. She enjoys implementing cooperative learning and independent practice in her lessons. It enables her to foster group work and emphasize the importance of learning how to work together and how to solve problems independently. In the future, she would like to become an assistant principal at an elementary or middle school.

Ms. Montgomery

Ms. Montgomery has been teaching for more than 10 years. The majority of her experience comes from high school, but she has been at RSMS for two years. She holds a bachelor's degree in business and a master's degree in teaching. She is certified to teach business, technology, and special education. She teaches a computer applications class that helps students connect technology with academics. She enjoys using computers, laptops, and tablets in her classroom because they give students access to resources and information from around the globe. She started teaching middle school because RSMS is conveniently located closer to her new home. However, she has come to enjoy creating fun, innovative, technology-driven lessons for her middle schoolers. She plans to continue teaching at RSMS and engaging students in project-based assignments to help prepare them for the technology-saturated world.

Dr. Rivers

Dr. Rivers has been teaching for over 30 years. This is her second year at RSMS. She has taught elementary, middle, and high school in Maryland and in two other states. She holds a bachelor's and master's degree in the education and teaching of individuals with hearing

impairments, including deafness. She holds a second master's degree in educational leadership and a doctor of philosophy in educational leadership and administration. She was an elementary school assistant principal for five years and a school principal for two years, but her true passion is being an active classroom teacher. She believes that it is the responsibility of educators "to provide students with the best quality education possible, starting at an early age." She believes that quality begins with "knowledgeable practicing staff and their ability to analyze and use student data to make informed decisions about academic programming." Her vast experience and love for children keeps her in the classroom doing what she feels she was born to do—teach.

Results

I identified five themes that emerged during data analysis. Using these five themes, I addressed the three research questions in this study.

Theme Development

During my first perusal of the data, I looked at each individual case, reading and highlighting words and statements that were pertinent to my research questions. During my second read-through, I focused on writing marginal notes that coded the highlighted text. I looked for repeated words or statements and similar and opposing statements, as well as any responses that were profound statements about vocabulary instruction using technology. I conducted a third review to analyze any portion of the transcribed interviews and focus groups that was not highlighted or coded. I looked for repeated words and phrases as well as similarities and differences in the statements across the transcribed interviews and focus groups (see Appendix H). I identified numerous open codes (Table 1) that originated from the individual and cross-case analysis through repeated words, profound and contradictory statements, and significant reflections of vocabulary instruction with tablet technology. I immersed myself in the data and patterns numerous times. From these open codes, five overarching themes emerged:

differentiation of instruction, collaboration, tablet advantages, tablet challenges, and unintentional vocabulary instruction.

Table 1

Perceptions of and Interaction With Tablets to Teach Vocabulary

Theme	Open code	Number of appearances across data sets
Differentiation of instruction	Varying abilities	38
	Personalized learning	16
	Increased opportunities	24
	Multiple intelligences	9
Collaboration	Colleague sharing of ideas	25
	Internet interaction with peers	10
	Student cooperative learning	18
Tablet advantages	Grading and planning	25
	Not losing paperwork	8
	Access in and out of classroom	23
	Global reach	9
	Digital dictionary	7
	Student comfortability	11
	Multiple exposure to vocabulary	15
	Games and other activities	12
	Communication with students and parents	22
Tablet challenges	Google as a cheat sheet	14
	Student boredom	11
	Copy and paste (plagiarism)	9
	Lack of digital etiquette	3
	Distraction from academics	18
	Not enough tablets	11
	Teacher accountability	4
	Broken and uncharged tablets	15
Unintentional vocabulary instruction	Google slide shows	6
	Electronic projects	5
	Content area projects using vocabulary	14
	Student research online	21

Differentiation of instruction. Meeting the needs of the multiple types of learners in the classroom was a common theme that arose in all 11 interviews, both focus groups, and in my analysis of lesson planning documents. All participants stressed the importance of being able to provide a variety of activities and supports for visual, auditory, and tactile learners. For example, Ms. Libra stated that

> whether they're visual or, you know, auditory . . . you have to try and meet all of those levels. The technology is helpful because you can, you know, break it [a vocabulary word] down into so many different pieces than just me standing up and giving the definition.

This sentiment was repeated throughout all the interviews and through the responses emailed to me. Ms. Shrub, a reading teacher, emphasized that using tablets gives her "an avenue in which I'm able to meet multiple levels of intelligence because every child learns a different way. So, like one group chooses to perform a skit and another a video." During both focus groups, comments were made about how tablets helped the participants to differentiate the instruction quickly and efficiently. There was an immediate resounding of agreement among the focus group participants. Ms. Neighbor stated, "It gives students more opportunities and for us to differentiate the instruction as well. And they get to explore the world beyond what we can offer them. The Internet sometimes shows them things we cannot." After she made this statement in the focus group, the other participants began to chime in on their experience with tablets and how they could use them to work with the different abilities in their classrooms.

The statements about differentiating instruction were seen and heard multiple times in my observations of the participants' instruction and in their lesson plan documents. Ms. Whiskey, an eighth-grade English teacher, walked around the room and gave visual cues to students while talking about the vocabulary terms displayed on the Promethean board. The students worked on an activity on their tablets while Ms. Whiskey continued to comment. Visual learners were able to see the vocabulary terms on the screen, while auditory learners focused on Ms. Whiskey's voice. Following this observation, I moved to Ms. Michelle's seventh-grade reading classroom to see her play a video on YouTube that used the vocabulary terms discussed at the beginning of the class. After the video, the teacher held an open discussion with the students to test their

understanding of the information conveyed in the video. Students were then given a brief writing assignment requiring the use of vocabulary terms referred to in the video. I noticed that the teacher also referred the students to a short story they read earlier in the week that contained the same terms. While they worked on the assignment, students could watch the video and look back at the short story on their tablets. Both Ms. Whiskey and Ms. Michelle used different methods to ensure that students received multiple exposures to the vocabulary terms. All 12 participants demonstrated differentiation in their instruction and activities during my observations in their classrooms. Students were given oral and written instructions and were encouraged to use their tablets or notebook paper to complete assignments. Students were also allowed to work independently or in groups.

Differentiation of instruction was evident in all the lesson plans. Participants' lesson plan documents included a section specifically for differentiation. In this section of the plan, participants outlined how they would accommodate different needs in their classroom. For example, Ms. Libra wrote in her plans that students could choose to complete an assignment in Google Classroom and turn it in before midnight or complete a paper copy of the assignment and turn it in at the beginning of the next class. During my observation of the participant, she gave these explicit instructions orally to the students and showed them where they were written on the whiteboard. Another participant's long-range monthly plans included a brief indication of what activities would require alternate methods of assessment rather than the mainstream multiple-choice questions. Her documents revealed her plan to perform informal oral and visual assessments as well as some written assessments on the tablets. Her example of differentiated instruction was evident in all areas of data collected.

Collaboration. During my discussion with Ms. Watch, she explained that all teachers at her school planned individually and with their grade-level content teachers. For example, on a

weekly basis, the two sixth-grade social studies teachers met and planned together. Likewise, each set or group of teachers in the same content and grade level would meet to plan their long- and short-range lessons. Mr. VanDyke explained that he would meet with his colleague every week:

> We would plan regularly together where we would be bouncing ideas off of each other; it would be sharing ideas—we tried this last year, the kids didn't like it. The kids liked it, let's do more of it. Our lessons were identical, and we would just deliver them in our separate rooms.

Mr. VanDyke emphasized the importance of working with colleagues for planning lessons to ensure that all students receive the same information regardless of which teacher they have.

Throughout the duration of my study and data collection and analysis, I saw evidence in documents, interviews, and observations of collaboration in creating lesson plans and activities. Participants met formally once a week but often spent several minutes during informal, unplanned meetings in each other's classrooms or in the hallway discussing ideas and sharing teaching tips. While this was a strong reason the theme of collaboration emerged during my data analysis, there was another pattern that repeated itself throughout all forms of the data that illuminated a different angle on the theme of collaboration.

Many teachers said that they did not receive any formal training for their tablets or Google Classroom. Mr. Eagle said, "Official training, in the school? None." Ms. Apple echoed his statement: "No official training." However, Ms. Apple stated that training for technology use occurred "through conversation, teacher feedback, and the Internet." Dr. Rivers said she would get ideas from fellow colleagues as well as suggestions of what they did that worked with the structured reading program Dr. Rivers was teaching. Both Dr. Rivers and Ms. Michelle said they did Google searches for new ideas on vocabulary activities and games on the tablets. Most of the

teachers explained in their interviews and in the focus groups that they learned how to do things on their tablets by asking their fellow teachers for help. Mr. VanDyke laughingly said,

> Yes, so trainings in general, the county doesn't provide it. There's obviously experts in-house. But what's been most valuable for me in my learning is simply trying and exploring it. Going to colleagues that understand it. And I will not lie, at 38 years old, you find somebody who's about 33 or younger, there isn't a piece of technology out there they can't tell you what to do with it. So, I rely on colleagues.

Each individual interview was conducted in isolation, yet every participant explained that his or her training for tablets in the classroom came from their discussions with colleagues or their personal research online. Ms. Michelle and three others shared that they would go to Google or YouTube and search "vocabulary and tablets," "reading strategies," or another phrase to find activities and ideas for their classroom. They would share their ideas with their colleagues during formal or informal meetings. Collaborating with colleagues was the most common method of training for tablet usage.

Tablet advantages. This theme arose after many incidents of positive statements and observations of participants' experience with Google Classroom, YouTube, and numerous online vocabulary and reading applications and activities. Participants said that the tablets came in handy for drafting lesson plans and collaborating with colleagues when face-to-face meetings were not possible. They could easily access Google Classroom to grade student papers, submit grades, and communicate with parents through email or apps such as Remind or ClassDojo. Ms. Shrub stated, "So I try not to do anything paper and pencil because I don't like carrying around papers. I don't like the thought of losing any papers, but when it's only Google Classroom I can grade it anywhere." Five other participants praised the capability for students to be held

accountable for tracking their grades and missing assignments on their tablets through Google Classroom. Mr. VanDyke summed up the value for students when he said,

> Once they share it [an assignment] with me, no matter what they accomplish, I have it. I can access it. So that is a benefit I think, not only for the students but definitely for a teacher. That way, there's a common online receipt if you will.

Mr. VanDyke emphasized the decrease in excuses for lost or missing assignments. If students submitted the work online, it would remain there.

Dr. Rivers and Ms. Michelle teach a class called Read 180 that is aimed to help struggling and below-grade-level readers increase their reading comprehension by more than one grade level during the school year. The two Read 180 classes I observed included students who were reading two or more grade levels below the their grade. The teachers were working on word parts and vocabulary that ranged from third- to sixth-grade content. Both teachers described the challenges of helping their students learn and expand their vocabulary. Between the two of them, they have over 50 years of experience teaching reading and writing. They reflected on the vocabulary instructional methods they have used over the years. Dr. Rivers commented that in her day, the fanciest piece of technology available was an overhead projector. She cannot imagine going back to that after becoming so accustomed to tablet technology. The possibilities are endless given the ability to search Google for activities and ideas. Dr. Rivers explained how she uses the tablets to help students learn new vocabulary:

> I can provide it in a game form where . . . they're firing at asteroids and getting points for getting the right word part or whatever. Or it can be more simplistic where they have to match a word to go into that open sentence. So, technology is kind of giving me a variety of ways of providing, well, presenting the vocabulary to them and not just one way.

She continued to explain how she uses tablets to find alternate methods of illustrating a vocabulary word: “Technology allows me to either find a video or pictures of it too, so that they can put that into their knowledge base.”

Ms. Michelle explained how she has used the technology of tablets to help find activities for the classroom. She declared,

> I use YouTube a lot! So, when I first started, I was looking up videos on it. I’ve looked up “middle school” on YouTube, “how do you teach vocabulary,” I’ve Googled that. “Middle school language arts lessons” on YouTube, “PBIS,” “behavior,” everything.

Many of the other teachers described the advantage of using tablets to search for different activities to help students learn new vocabulary. “In World Languages, Kahoot and Quizlet are games we have been using for a really long time,” stated Ms. Neighbor. She explained that when students partake in these tablet activities, they are excited and have fun and do not even realize that they are learning.

One of the greatest advantages to using tablet technology is the comfort students have with these devices. According to the teachers and administrators I encountered in my focus groups and interviews, the majority of students in this school have smartphones and tablets of their own or through their parents. They are used to using them. That eliminates the element of surprise when teachers say they are going to use tablets in the lesson for the day. Ms. Michelle said, “In this generation, it’s what they are used to. It’s a part of their lives. They, they’re so used to technology. It’s almost like a part of their hand.” Ms. Apple, who uses tablets in her math class to help students prepare for standardized testing on the tablets, stated, “Technology is their area of expertise and comfort. It allows them to be able to explore on their own, at their level.” Learning becomes more student centered, and students can explore and find new ways to interact with vocabulary.

Tablet challenges. Participants frequently spoke about challenges of tablet technology when teaching vocabulary. Students find ways to open nonacademic games or music when they are supposed to be focused on class assignments. A classroom may contain 30 students, and the teacher cannot see what individual students are doing every second they have the tablets. I observed one participant telling students to close out all unrelated applications and focus on their assignment while walking around and helping students. Another teacher began the lesson by reminding students of the rules of tablet usage, including using only the teacher-permitted sites for research. Ms. Apple said, "There are times where students can be distracted or want human interactions and responses." Furthermore, students could get bored with the same tablet activity, just as they might with any paper-based activity.

Although students are used to using tablets, there are instances when they do not know how to use them for academic purposes. Mr. Charmin expressed,

> Like a lot of our students have never actually taken a typing class. Or we assume that they're going to open that [the tablet] and they're going to know, bing-bang-boom, how to do what we need them to do. They have no idea.

He went on to explain that students are adept at using tablets for accessing social media like Instagram or Snapchat. Often, out of habit, the students try to use them in that manner during class.

Another challenge of using tablets is the quick access students have to Google or to online dictionaries. Students Google terms and use the definitions they find without properly discerning between meanings. Instead of using context clues in the surrounding text, students immediately go to Google and plug in an unknown word. Their impulse is to read the first definition or example that pops up and use that in their paper, answer, or discussion. They do not try to determine if they found the correct denotation of the word needed for their assignment,

nor do they check for self-understanding of the word. They simply use the first thing they see. Ms. Michelle said that her students do not think critically or dive in deeper to figure out more about a word than the surface responses that Google or another dictionary site might pull up. Before tablets were being used in the classroom, students used to focus more on context clues to figure out word meanings. During his interview, science teacher Mr. VanDyke said,

> They tend to go to the Internet and search for an answer. . . . They will tend to just ask Google what the answer is to a question. And the response that I get is not related to whatsoever. Or, the terminology used [in their papers] is at such a high level that not even a science teacher talks like that!

While some teachers expressed the joy of having Google or online dictionaries so close at hand, others, like computer application teacher Ms. Montgomery, explained that "some students do not apply context when just Googling for a term. When teaching coding, we use the word 'bug.' Students will say 'small insect' instead of relating it to computer science." Participants acknowledged in their interviews and in the focus groups that Google was both a blessing and a curse because students were taking advantage of the tablets as an easy way to find an answer. Many times, this results in students using vocabulary incorrectly and not learning how to use vocabulary words in context.

Perhaps the most notable challenge of having the tablets is that when teachers excitedly planned tablet-based lessons and activities, they often found out the morning of a lesson or minutes before class that there are no tablets available for the day, the tablets are not fully charged or working properly, or there are not enough tablets for a class set. Administrator Ms. Watch emphasized this disadvantage during the second focus group. She said,

> There are not enough tablets, or they are often damaged. I mean, you know when you have over 800 students that want to have access and you know you have a limited number

> of tablets on a regular basis, but there just are not enough classroom tablet carts for every teacher. And with many kids using the tablets from time to time, they get damaged or you lose a key.

Several other participants agreed and discussed their personal experiences with tablet issues. Ms. Pierre said, "You can have a plan for the day for them to go online, and then 15 minutes into the lesson, they [the tablets] shut down and kick them out." When I observed Ms. Pierre, I watched her change her lesson plan because the wireless signal was down in her classroom, and the students could not do the Internet-based activity on their tablets. She had to improvise and ended up giving students an abbreviated version of the activity for homework and classwork for the next day. Another teacher expressed her frustration during the second focus group when she said, "There's also like teacher accountability. How are you holding your kids accountable for not breaking the tablets? How are you monitoring that? I get it [the cart] back and the keys are missing or the cart's damaged."

Administrator Ms. Watch explained that the school does not have enough carts for each teacher, or even a pair of teachers, to share one cart. Therefore, carts are signed out and borrowed. Sometimes one person signs out a cart and lets someone else use it. When it is returned and there is something wrong with the cart, no one is sure who was the cause. The teacher that initially signed for the cart claims that he she was being nice in allowing other teachers to use the cart. The others claim that they did not sign out the cart, so they do not know if other teachers used it before it was returned. Although teachers may plan ahead to sign out the carts for the day, there are situations that arise, often at the last minute, that make it impossible for them to access the carts. It may be that the carts are damaged, someone else checked them out first, or administration has signed them out for standardized testing.

Unintentional vocabulary instruction with tablets. While reading through the interview and focus group transcripts, participant lesson plans, and my observational notes and journaling, there was one recurrent and dominant theme that emerged outside of the words directly spoken. During my first focus group, Mr. VanDyke said something that resonated with me when I initially heard it, but it did not seem significant to my study until I reread his statement while conducting my data analysis. He said,

> I'm a science teacher. We do focus on vocabulary but these two teachers [points to an English and reading teacher], their content is strictly, well, much more geared to that. They don't have to walk around and pick up rock samples and try to identify what they are by, you know their color and their size. Vocabulary is in my classroom, but it's not as prevalent I guess, or as poignant as what these two work with.

Mr. VanDyke was convinced that teaching vocabulary or anything related to language learning was not part of his role as a science teacher. Several other content-area teachers tilted their heads to the side and echoed Mr. VanDyke's thoughts, that they did not teach vocabulary directly as much as the English teachers. However, when I observed the teachers and looked at their lesson plans and heard the things they said during instruction, I noted that they were doing just that. They were using the tablets to teach vocabulary, they just did not know that was what they were doing. For example, one teacher discussed what she was doing with the tablets for a research paper. However, when I asked her how she used the tablets to teach vocabulary, she said she was not sure she was doing that. Administration specifically suggested teachers for my study who were known to them to use tablets to teach vocabulary, reading, and writing strategies in their classes. However, the teachers in my study often said they may not be doing instruction of vocabulary. The same teacher who said she was unsure if she was teaching vocabulary was having the students use context clues to find research articles applicable to their topic. Students

had to understand what context clues were and what the other terms were that were essential for them to understand in order to complete their assignment. I watched as this participant delicately yet confidently showed the students how to skim and scan a research article to determine if it fit their needs. As she demonstrated the process on the Promethean board, the students practiced this skill on their tablets. Unbeknownst to her, this activity was an example of indirect instruction of vocabulary.

Throughout my data analysis, I saw numerous instances of this unintentional vocabulary instruction. Mr. VanDyke's and Ms. Libra's students were working in groups to create Google slideshows to demonstrate their understanding of key science terms or world study terms. The students had to include images and written descriptions in their own words about each term. In addition, they had to prepare oral presentations that showed they understood the terms and how these words could be applied or related to the world around them. For example, in Mr. VanDyke's assignment, the students had to give three examples of mechanical weathering and two examples of chemical weathering. One part of the directions read,

> Each example must be identified correctly, have a picture or drawing of the actual rock/weathering/erosion, and have a brief description of how the rock formed or weathering/erosion occurred. In addition, you must complete a map of the school property where all examples were found around the school with a proper key.

To complete this assignment, students had to understand all the underlying scientific terms such as *erosion*, *chemical weathering*, and *mechanical weathering*. They had to know what a map key is. These are all examples of direct and indirect instruction of vocabulary. Similarly, Ms. Libra's world studies students were completing projects on their study of the history of China. Students had to create a Google slideshow on their tablets of several of the ancient Chinese

dynasties. Students had to understand the terminology used to describe the dynasties, and they had to demonstrate this visually on each side and verbally during their oral presentations.

Mr. Charmin, an English teacher, told me that during the time I was scheduled to observe his classroom, the students would be conducting research on their tablets for their final research paper. He was concerned that I would not get to observe something essential for my research study. I assured him that if I did not see anything concerning vocabulary and tablet integration in his lesson, I would reschedule another time for observation. As the lesson progressed, Mr. Charmin gave verbal instructions, displayed written instructions on the Promethean board, and walked around the classroom providing one-on-one help as needed for each student. Their objective was to pick their topic for their group to research. There was a list of current events and issues displayed on the Promethean board, such as immigration, Black Lives Matter, the NAACP, and the Trevor Project, to name a few. As students began chattering, shouting out that they did not know what the Trevor Project or other topics were, Mr. Charmin referred them to their tablets. He told them that their objective for the day was to go to SIRS or another reliable site to find articles on the topics to figure out what the topics meant and which topic they would find interesting to research. Indirectly, Mr. Charmin was using the tablets to encourage students to work on vocabulary strategies such as using context clues to figure out the meaning of terms.

During the focus group discussions, I asked the participants to describe how they used tablets to teach vocabulary in their classroom. They were hesitant in their responses to my question because, as one participant said, “I’m not sure if I’m using tablets to specifically teach vocabulary, but I do use them a lot in my classroom.” So, I encouraged them to share their tablet experience. As they began talking, the participants were inadvertently and unknowingly describing how they used the tablets to teach vocabulary. They discussed activities that centered around Google Classroom, Google slides, research sites such as SIRS, and different websites and

applications such as Kahoot, Quizlet, and YouTube. Without realizing it, these participants were teaching their students to use vocabulary strategies, such as context clues and breaking down word parts, to figure out the meanings of words and then apply them in their projects, papers, and other assignments. The indirect instruction of vocabulary, getting students to define and apply words correctly on their own, can help increase vocabulary retention (Gallagher & Anderson, 2016).

Research Question Responses

RQ1. How do teachers use tablet technology in a middle school classroom to teach complex content vocabulary?

Based on participant interviews, focus group discussions, lesson plan documents, and my observations of the participants, the teachers at RSMS use tablets to access Google Classroom, reliable online sources, and interactive applications to teach complex content vocabulary. Many teacher participants put most, if not all, of their assignments in Google Classroom. This enabled students to work on and submit their assignments on their tablets. It also allowed students to continue working seamlessly on their assignments at home, school, or anywhere with Internet connection. Ms. Montgomery stated that "completing assignments on Google Classroom reduces paper waste." Not only can students keep track of documents easily, but teachers can find lesson plan documents, students' papers, and other essential academic paperwork. When teachers ask students to take out their homework, rough draft, or other assignment, students can grab the tablet, log onto Google Classroom, and pull it up. Mr. Eagle emphasized this benefit when he said,

> It's something they can take everywhere, so if they don't finish it here, they can turn work in at home, versus you opening up the chance for them losing some of the papers

going home or traveling to and from school, saying, “My dog ate the homework,” that old adage.

With the use of tablets, there is less opportunity for students or teachers to lose papers or make excuses about leaving their assignment at school or at home.

One of the major patterns that emerged during data analysis was the myriad of resources and activities that teachers were able to use on the tablets to teach vocabulary. Students clicked just one or two buttons to look up a definition or look at images or videos of vocabulary words. Teachers were able to assess students’ vocabulary knowledge through activities like Google slides, Kahoot, Quizlet, or Edpuzzle. Mr. Charmin said that “websites such as Flocabulary and Google Translate have been helpful.” Dr. Rivers also commented, “Sometimes they come across words and vocabulary that they have totally no experience with. Technology allows me to either find a video or pictures of it.” Each participant mentioned several different resources or applications they use to help their students, all acknowledging that the World Wide Web provides an endless amount of ideas; they only need to sift through them to find the ones that work best for the students in their classroom.

RQ2. How do the teacher participants perceive the use of tablet technology impacts student learning of content vocabulary?

Teacher participants at RSMS agreed that the tablets allowed them to provide multiple exposures to vocabulary words, giving students a greater chance to connect with a word so that they could understand it. This leads to increased retention of vocabulary. Ms. Montgomery stated, “It makes learning more interactive and provides students with multiple sources for the definition and usage of a term.” Ten out of 11 teachers interviewed concurred with Ms. Montgomery in regard to tablets’ ability to provide multiple ways for students to see or hear a vocabulary word or definition. In regard to her world studies class, Ms. Libra said, “You can do

a lot of visuals with it. Show the word, or the application of the word in a video. Students can get it in so many different avenues than just 'the definition is,' like a teacher lecture."

While the majority of teachers positively perceived the tablets as a great advantage for students to find and interact with vocabulary words and definitions, two of the teachers felt more strongly that the tablets prevented students from learning new words. Students could get to a word quickly through Google or some other website. However, too often, students do not try to learn meanings, but rather copy definitions straight from Google. Mr. Charmin said that "students are less inclined to study the root word, prefix, or suffix to determine meaning and more likely to search for the definition and copy and paste the definition." Mr. VanDyke expressed the same sentiment when he said that working with tablets "enables [students] to continue to not break past their comfort level or be challenged. They let the [tablet] give them the answer, and then they regurgitate that to me, not fully understanding what they're saying." These two teachers were using the tablets during my observation in the classroom and told me that they use them frequently throughout the school year. Students use them for research, writing papers, and designing and completing projects. They are a great way for students to interact with vocabulary terms, as long as they practice critical thinking and paraphrasing skills to avoid plagiarizing.

Vocabulary knowledge is an important part of the reading comprehension process. Ms. Apple stated, "The use of tablets has helped students with reading comprehension because they do not have to stop reading to go get a dictionary. Students are able to get the definition and move on with reading." Throughout the focus groups and interviews, other teacher participants made similar statements about the positive impact tablet technology has made in their instruction of vocabulary. This is also evident in their lesson plans. Eight of the teacher participants' lesson

plans had activities that used the tablets to teach vocabulary. Students were either researching terms or including them in assignments to demonstrate understanding of the terms.

Giving students a variety of ways to work with vocabulary words enables teachers to differentiate their instruction. Mr. Charmin said that the tablets "allow for personalized learning and student ownership of their learning because they can control the pace, process, and sometimes the product." Teachers learn what the students' needs are and figure out the best tablet activities that will help students to learn new terms. Teachers can select different activities so that students do not get bored with the same approach to learning terms, such as copying definitions from a dictionary or completing a crossword puzzle. In a classroom of over 30 students, some may need more practice with a set of vocabulary terms, while others may need more challenging activities. Some may work better with timed or untimed activities. The tablet makes it possible to do all those types of activities during the same lesson.

RQ3. How does the teacher participants' appreciation of tablets to teach vocabulary affect their lesson planning and instructional methods in middle school?

Data analysis showed that all 12 teacher participants included tablets in their vocabulary lessons on a weekly basis. However, 10 of the 12 teachers I observed and interviewed felt that tablet technology could be a distraction to students. Two of the teachers said that students sometimes get bored with the technology or cannot fully understand concepts without teacher explanations. Mr. Charmin commented that "the biggest challenge is keeping students on task . . . and not social media." Students try to go to entertainment or game sites when the teacher is not looking. Every teacher participant mentioned that middle school students were tempted to open nonacademic websites, look at music videos on YouTube, or play games on the tablets instead of doing their work. However, despite this negative perception of tablets in the classroom, the

teacher participants emphasized that as long as the tablets do not drive the instruction, they can an asset in the classroom.

The middle school students can use tablet technology as a supplement to learning vocabulary, but not as a replacement to the teacher's direct instruction. Ms. Apple said that "there are times where students can be distracted or want human interactions." Middle school students are not self-driven to learn vocabulary straight from tablets. Teachers must describe and explain directions for using the tablets, and then follow up tablet activities with oral interaction to assess students' learning progress. Dr. Rivers stated that her students' reading comprehension has improved because she "combines tablet activities with her instruction and explanations."

Intertwining tablet technology with teacher instruction is a critical part of the process of using tablets to teach vocabulary. The participants pointed out that these middle school students were born into a world of computers, smartphones, and tablets. Their lives center around mobile technology—this is their world, and we are just living in it. They key is, as Mr. Eagle explained, to "talk to them on their level so that they can learn where they are, versus where I am. They seem to be more into the technology." The reality of the technology-saturated middle school world encourages the teacher participants to include tablet technology in their vocabulary lessons. The goal is to use what students are comfortable with to help them increase their content-area vocabulary. Overall, despite teachers saying that the tablets can be distracting, all 12 teacher participants used them on a weekly basis, while at least seven of the participants used them two to five times a week, depending on availability of classroom sets of tablets.

Summary

For this collective case study, 11 of 12 teacher participants were interviewed, and all 12 were observed and participated in a focus group along with one administrator. I also collected and analyzed lesson plan documents from the 12 teacher participants. A brief description of the

12 participants was given in this chapter. I have described the five themes that were identified during data analysis and answered the three research questions using quotes and observational and memo notes. The five themes discussed were (a) differentiation, (b) collaboration, (c) tablet advantages, (d) tablet challenges, and (e) unintentional instruction of vocabulary.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this collective case study was to provide understanding of the instructional methods of teachers who use tablet technology in middle school classrooms to teach complex content vocabulary. In this chapter, I provide a conclusion to this study through a discussion of my findings and their relevance to the literature, implications of this study for the field of education, limitations of the study, and finally, my recommendations for future research.

Summary of Findings

After a thorough analysis of my data, I was able to provide responses to my three research questions.

Research Questions

RQ1. How do teachers use tablet technology in a middle school classroom to teach complex content vocabulary?

After my analysis, I found that teachers use the tablets as a supplement to their own direct teaching of complex content vocabulary. The participants all felt that tablets helped them to differentiate their instruction by using a variety of activities available on the tablets. They described ways students were able to pace their own learning and teachers were able to meet the learning needs and abilities of all students below, at, and above grade level. Ms. Apple described her students' experience in the classroom: "Technology is their area of expertise, which allows them to be able to explore on their own on their level." Learning becomes more student-driven, allowing teachers to tailor the activities to meet the varying needs of students in the same classroom. Students can explore more, go deeper, or use more assistance if necessary. All these things are possible to do with the use of tablets.

Teacher participants also explained that the tablets are quite handy for keeping track of student paperwork and grades. Students are less likely to lose their papers and cannot use excuses such as, "I already turned it in; maybe you, the teacher, lost the paper." Using the tablets, students can submit their work in Google Classroom and can work on it on any device that has Internet access. It is convenient for teachers to carry around just a tablet to grade papers instead of files and boxes of student work.

Teachers also use the tablets to plan their lessons. They meet face-to-face at least once a week and type their lesson ideas into Google documents. Then, when they are not able to meet face-to-face, they can continue to share or edit each other's plans. The tablets increase and enhance collaborative planning time and effort. Ms. Neighbor said, "We all like collaborate, and we're all looking for something new and different." Through face-to-face communication and Google Documents, teachers share their innovative vocabulary lesson plans and give each other new ideas to use in the classroom.

Many teachers learned about Kahoot or Quizlet from other teachers. Teachers use both of these activities to integrate tablets into their vocabulary lessons. Kahoot is often used to informally test students' knowledge of vocabulary terms. Given the term, students have four options from which to choose the synonym, antonym, or definition. The students race against each other to see who can get the correct answer the fastest. Kahoot is just one of many word activities available through tablet technology. Ms. Apple says that in her classroom, the students "play review games [and] scavenger hunt activities . . . to learn at their own pace." She continued to say that the tablets "help students prepare for standardized tests" that they must take on the tablets or on computers. The teachers who use tablets often incorporate these types of vocabulary-building games and informal assessments into their lessons on a weekly or monthly basis.

One other way teachers use tablets is to enhance communication with parents and students. Teachers can update their classroom assignments in Google Classroom and email parents in a timely manner through the tablet. Parents can be less frustrated because the teacher is easier to reach and returns messages much sooner than if they were only using a phone. Use of a tablet also allows teachers to maintain their privacy by not giving out their personal cell phone number to parents or students. Instead, they can use apps like Remind or ClassDojo to keep students and parents up to date with pertinent class or school information. All of these communication methods can be used on the tablets. It becomes easier for teachers to meet one-on-one with students to discuss their progress in the class. Using the tablets, students can quickly pull up their grade, and the teacher can speak with them and point out areas that need improvement or that warrant praise.

RQ2. How do the teacher participants perceive the use of tablet technology impacts student learning of content vocabulary?

Many of the teacher participants felt there were a few challenges when using tablets in the classroom. They can be a distraction to learning when students to use them for entertainment purposes. If students are only focused on playing games or viewing music videos or memes, then learning will not occur. Mr. Charmin emphasized that teachers often "throw technology in front of the students thinking it's all going to be good, but they've got a totally different perception of what technology is used for." Mr. Charmin's point is important to note. Whatever teachers' perceptions are of tablet technology, they are not the same as the students' perceptions. Students consider tablets as their access to fun games, current music, and communication with their friends.

However, the advantages of using tablets to teach vocabulary far outweigh the challenges. Tablets provide more diverse methods to teach vocabulary and use technology that

is familiar to middle school students. Mr. VanDyke explained a teacher's responsibility to monitor the use of tablets is "no different than having them use the textbook properly." It is up to teachers to instruct students on the value of tablets to help improve reading, writing, and math skills.

When teachers use and monitor tablet usage in the classroom, students' vocabulary can increase. Dr. Rivers said that her students' reading comprehension has improved because of the vocabulary activities she does on the tablets. Students are more likely to use the tablet technology to look up a word and apply the meaning right away than they might if they had to use a paper dictionary across the room. Dr. Rivers said that she has "a few students that have gone up in Lexiles quite a bit." She also mentioned that this happened because she uses tablets in conjunction with her own direct instruction.

The flexibility that tablets bring helps teachers meet the needs of the varying abilities of students in the classroom. For example, reading teacher Ms. Shrub says that tablets help to increase comprehension and vocabulary because "students are able to find articles at their Lexile level and so what research shows is that, in order to increase the child's reading comprehension, you have to give them articles or work at their instruction level." The tablets enable each student in a classroom to find articles that are appropriate for him or her.

Combining tablet activities with the instruction of the teacher is essential for the tablets to be effective teachers of vocabulary. Tablets alone cannot be the vocabulary teachers for middle school students. Also, most schools do not have a set of tablets for each teacher, so they are not available all the time. Even when teachers do not think they are teaching vocabulary with the tablets, they are doing so by having the students research and use vocabulary words in their tablet assignments and projects.

RQ3. How do the teacher participants' appreciation of tablets to teach vocabulary affect their lesson planning and instructional methods in middle school?

Teacher participants expressed the convenience of using tablets to plan lessons and to grade student work. The tablets made it much easier for teacher participants to collaborate with their peers to create lesson plans and share ideas on how to best use tablets to teach vocabulary. The collaboration takes place in formal content-area and grade-level meetings as well as during informal face-to-face meetings or online through Google Docs.

The teacher participants I interviewed ranged in age from 25 to 58 years. The teachers who were 35 and younger grew up in a generation of computers and cellphones. However, every teacher participant in this study, regardless of age, expressed their affinity toward tablets and their intent to use them in the classroom as often as possible. The oldest teacher participant used the tablets every day both because her class's reading program requires it and because she enjoys using them and believes they help students' vocabulary improve. The youngest teacher participant said she loves the tablets and uses them to plan and create lessons daily. She collaborates with her peers and creates tablet activities to help her students learn the vocabulary in her class. All the participants in my study perceive that the tablets can enhance vocabulary learning if the teachers properly instruct students how to use them for academic gain.

Discussion

The purpose of this collective case study was to provide understanding as to what teachers do to incorporate tablet technology to teach complex content vocabulary in a middle school classroom. This study is built on the theory of constructivism, which states that students learn by building upon what they know (Piaget, 1947/2003). Students in middle school were born after smartphones and tablets were invented. By the time they were in elementary school, many schools were using laptops and tablets. I wanted to study multiple cases to see what

teachers did to use tablets to teach content-area vocabulary and how teachers' perceptions of tablets affected their lesson planning and instructional practices.

Empirical Literature

The data in the 12 case studies of middle school teachers showed evidence that middle school teachers use tablets to teach complex content vocabulary and that their appreciation of tablets drives their efforts to plan with them and to use them in the classroom. Literature shows that these mobile devices are being used more frequently in the classroom to teach vocabulary (Cristol & Gimbert, 2014; Ditzler et al., 2016; Greer et al., 2017; Jackson & Ain, 2015; Neville et al., 2009; Pilgrim et al., 2012). Carter et al. (2016) asserted that middle school teachers think that vocabulary instruction is the responsibility of English teachers. One teacher participant, Mr. VanDyke, said during a focus group discussion, "I'm a science teacher. We do focus on vocabulary, but these two teachers [points to two English teachers], their content is strictly, well, much more geared to that." During my observations and discussions, I was not surprised to see other teachers express the same opinion about teaching vocabulary. They questioned whether they were intentionally teaching vocabulary. Initially, they were hesitant to answer my questions during the focus group, concerned that they may not have been the right fit for my study. However, after I told them to describe what they do to get students to learn the words that are essential for learning in their respective content areas, they could not stop telling me about everything they do with tablets to teach technology.

Many teachers said they use the tablets for vocabulary activities because they can engage the students in fun activities. Their students are more likely to learn new words when they are involved with enjoyable, interactive activities and when they are exposed to a new word numerous times in multiple ways. This might mean seeing the word in isolation or in text, hearing the correct pronunciation, or reading or listening to characters use the word in context.

These fun and multiple exposures to words help students understand and remember their meanings (Gallagher & Anderson, 2016; Larson et al., 2013; O'Connor et al., 2017; Scott, 2015; Vacca et al., 2016). Tablets provide many opportunities to get students involved with learning vocabulary words in enjoyable ways. For example, many teachers in my study used Kahoot or Quizlet on the tablets. Through these applications, students can play games or build their own flashcards to test their knowledge of vocabulary words and definitions. Ciampa (2014) suggested that students are likely to be engaged in the process of learning when using tablets, partly because of the competitive activities and recognition of achievement.

During my second focus group discussion, one teacher mentioned Kahoot, and then all the others chimed in about how engaged the students were whenever the tablets were being used for Kahoot. After each question, students select their response on their tablet, and then the classroom screen presents the leaderboard with the top five or six scorers. The focus group consensus was that the students were so excited because they all wanted to race to get to the top of the leaderboard. While the students are focusing on playing a game and winning, they are practicing their knowledge of content vocabulary words.

During my observations and interviews, I saw teachers using tablets to keep the students motivated and on task. Whether it was with Kahoot or with other websites or activities, the students were focused on their assignments. They also used Google Documents and Google Classroom. One of the teachers in my study, Ms. Apple, emphasized that the tablets "let students work at their own pace." Kee and Samsudin (2014) found that students prefer working with tablets because of their screen size and the ability to work independently on the devices and pace themselves. The students' ability to pace their own learning is important because it enables teachers to reach students where they are and to meet their distinct learning needs in one classroom at the same time (Jackson & Ain, 2015). Throughout the discussions, interviews, and

observations, the teacher participants said that trying to meet the different learning needs of each student is one of the main reasons they choose to use tablets to teach vocabulary. Students learn differently; they may be visual, auditory, or kinesthetic learners. Using different applications on the tablet, teachers can have students work on learning the same words but with an application that suits each student's learning style. Also, teachers can let students pace themselves so that students do not feel rushed, overwhelmed, or bored. I found this theme of tablets assisting with differentiation to be consistent with my review of the literature (Cuban, 2001; Greer et al., 2017, Kee & Samsudin, 2014, Suwantarathip & Orawiwatnakul, 2015; Vacca et al., 2016). World studies teacher Ms. Libra said that at any given time, the

> multi-levels that you have in the middle school classroom, you know, you can have students that are reading anywhere from a first-grade level to an eighth-grade level, you know, in a sixth-grade classroom. So, the ability to be read like that or some of the students with accommodations, have it where they can speak into it and it writes it for them. So, it just gives that access.

Tablet technology gives teachers more activities to help all students learn the same material at the pace or intensity that works best for each individual.

Another aspect of my review of literature that was confirmed in my study is that human interaction and direct vocabulary instruction are key factors in the learning of new words by middle school students (Dalton & Grisham, 2011; Hamedani & Yazdanimoghadam, 2016; Vacca et al., 2016). The interactive, fun, and exciting applications and websites available through tablets should be used in conjunction with the teacher's direct instruction of vocabulary. For example, science teacher Mr. VanDyke explained how he uses the Promethean board and an electricity light machine organization camera to display a crystallization of salt crystals through a microscope. He shows students how to dissolve the salt in water, and then "using a hairdryer,

how to force the water to evaporate and then see the crystals regrow." Mr. VanDyke emphasized that students "can Google pictures of minerals and find videos on YouTube of it, but when they see it happening right here in class, that's more hands-on." Now when his students use their tablets to look up crystallization, they have some prior knowledge of it because of the teacher's class instruction and demonstration.

In addition to direct instruction, I found the literature emphasized the importance of indirect or unintentional learning of vocabulary. Ghanbaran and Ketabi (2014) said that multimedia games can help middle school students learn new vocabulary. This was evident throughout my study. Teacher participants included activities in their lessons that required students to use the vocabulary terms in projects and assignments. Many of these assignments were completed on their tablets through Google Documents or Google Classroom. Students had to understand the complex content terms in order to properly include them in their work. Furthermore, participating in tablet activities such as Kahoot or Quizlet increased students' exposure to content vocabulary and indirectly encouraged them to learn the meanings of the vocabulary words to complete the tablet exercises. One of my teacher participants, Dr. Rivers, said that she used the interactive vocabulary tablet activities in addition to her instruction.

When I began my recruitment of teachers, I spoke with the administration of RSMS and told them I was looking for willing teachers who used tablets to teach content vocabulary. Mrs. Watch thought carefully and recommended certified teachers in her building that she knew met the needs of my study. The 12 teachers that volunteered all use the tablets to supplement and enhance their direct instruction of vocabulary. Not one of them used the tablets in isolation to teach their complex terminology.

While completing my literature review for this study, I located some studies about the growth of BYOD culture (Cristol & Gimbert, 2014; Sangani, 2013), where students bring their

own device into the classroom for assignments. During the second focus group, the topic came up, and the teacher participants mumbled and looked around the room. One teacher, Ms. Pierre, finally clarified and said, "I think it's supposed to be here, but not so much." Another participant added, "If students pull out their iPhone or smartphones, it may be more of a temptation. They're more likely to check texts or social media." The school district came out with a plan in 2015 to have MLDs in all schools by 2018. This eliminated the need for BYOD in middle schools. Some of the participants in my study did say that when the tablets were not available, they had students use their smartphones to play Kahoot or use the dictionary app. However, since the BYOD program is not officially being implemented in the school, not all students in middle school have their own device; therefore, teachers seldom go this route. I discovered that BYOD may not be as popular in middle school as the literature suggests.

To participate in my study, teachers had to have a minimum of one year of teaching experience and had to be active users of tablets to teach vocabulary in their classroom. RSMS is part of a large school district in Maryland. To become a teacher in this district, one must be state certified prior to applying for a position. Every one of my participants is highly qualified to teach middle school in their content area. Therefore, before I observed the teachers, I was made aware by administration that the teachers at RSMS were qualified to be in my study. Through observations, interviews, and discussion, I was able to see conscientious teaching of the content. I was also able to see teachers actively using tablets to teach content vocabulary, whether it was direct or indirect instruction.

However, there was one piece of information I gathered during the interviews that was not prominent throughout my literature review. Teacher participants were not fully trained on the capabilities of the tablets to help them teach vocabulary in the content areas. Many of the participants were unaware that they were even teaching vocabulary. They strongly believed that

they were teaching their content, but not vocabulary specifically. When I asked the participants how they learned to use the tablets to teach vocabulary, they responded that they learned from their colleagues. Mr. Eagle said he "just came across [useful tablet apps] just by asking teachers." Likewise, math teacher Ms. Apple said she learned how to use the tablets "through conversation, teacher feedback, and the Internet." These same experiences were expressed by all the other teacher participants. Collaboration was the unofficial training they received on the tablets. The district-level training taught them how to use the tablets to access the district online classroom, but not how to use them for instructional purposes, and definitely not how to use them to teach vocabulary. I believe that this is the area where my research can contribute to the literature. Collaboration is a positive method for teachers to learn how to use tablet technology to teach vocabulary. However, my study reveals that teachers would benefit from more purposeful, structured training on how tablets can be used to teach complex content-area vocabulary.

Theoretical Literature

My collective case study was based on the educational learning theory of constructivism. The work of Dewey and Piaget suggests that students learn by building upon what they know and being active in the learning process (as cited in Mooney, 2013; Piaget, 1947/2003). Taking this theory into consideration, teachers should create lessons that involve both a direct and indirect approach to teaching content vocabulary with tablet technology. Additionally, teachers should engage students in the learning process so that they become self-driven when it comes to learning new vocabulary words.

Dewey (1916/2008) asserted that an individual's initial vocabulary is formed in everyday life. Teachers do not have blank slates to build upon. Rather, students come into the classroom with a bank of vocabulary words and meanings already formed. These words and meanings may

be correct or incorrect, small or large, simple or complex. Nonetheless, they have some type of prior knowledge that teachers can build upon. Teacher can then come up with activities to strengthen this preformed foundation of vocabulary knowledge and build on top of it, expanding students' vocabulary banks.

While gathering my data, I saw teachers activating students' prior knowledge to find out what they knew about a word or topic. Then the next activities would build upon this knowledge. For example, in Ms. Shrub's reading class, I observed her begin the class with a motivator or warm-up which included the content vocabulary that students needed to know for their class assignments. The teacher enthusiastically engaged the students in a call-and-response review of the terms and definitions before explaining the follow-up assignment that used the tablets. The students responded to the teacher's excitement and demonstrated prior knowledge of the terms. When given directions, they turned their attention to the tablets and began their research for their project. I observed Ms. Shrub as she interacted one-on-one with the students, assessing their understanding of the directions and vocabulary. When a student was unsure of one of the terms, Ms. Shrub did not provide the definition. Instead, she activated the student's own prior knowledge by asking questions to jog the student's memory. I was watching constructivism in action as Ms. Shrub helped the students build upon their own knowledge to create a stronger understanding of the content vocabulary.

Another component of constructivism is that students use what they know and are comfortable with to gain new understanding or knowledge. Madden et al. (2013) stated that over 90% of middle school students use or are familiar with tablet technology, whether at school or at home. Administrator Ms. Watch assured me that all the students in her school have used the tablets several times throughout the school year. She guessed that 100% of students have tablets in their household, and close to 100% of her students bring smartphones or tablets to school.

When I interviewed the teacher participants, they all emphasized that tablets were part of their middle school students' worlds. In fact, one teacher, Mr. Eagle, went so far as to say his students did not own many, if any, paperback books because most of their books were electronic. In his classroom, he did not have any books because he only used the electronic version that students pulled up on their tablets during class. Mr. Eagle said he uses the tablets mainly because they are "something that they can understand, and they actually care about; maybe that's why I do it." Middle school students are comfortable with tablets, so the teachers did not have to explain how to use them. During one of my observations, the teacher was trying to expand a window on the tablet while the students were watching on the Promethean board. Within seconds of realizing she was struggling, the students quickly helped her by telling her to click this button and that button. The teacher laughed and thanked the students for their assistance as she continued with the vocabulary lesson.

The confidence of understanding the technology helps the students when they try to do vocabulary activities on the tablets. I observed Mr. Eagle as he had his class participate in a vocabulary activity using Kahoot. I decided to play along in the back corner of the classroom since my participation would not disrupt the class or involve any interaction with the students. Given that this was a sixth-grade reading class reviewing vocabulary words from a novel I was quite familiar with, I was sure that my prior knowledge of Mr. Eagle's vocabulary was greater than the students' prior knowledge of the vocabulary. However, because my knowledge of the tablet technology was not as vast as the students', I ended up taking much more time to answer the vocabulary questions on Kahoot than the students. Sitting in that classroom, at that very minute, I began to ponder constructivism and how the students were using their knowledge of tablet technology to help them with the vocabulary activity. Learning inside and outside of the classroom should be continuous and overlapping (Dewey, 1916/2008). Students learn about

games, entertainment, and even school subjects through online sources on their phones, tablets, and computers at home. Likewise, they are continuing to learn in the same manner in the classroom through tablet technology.

Implications

The findings of this collective case study have theoretical, empirical, and practical implications for administrators and teachers in the educational community.

Theoretical

Dewey (1916/2008) described the inside of a classroom to be strikingly different from the outside world and the inside of a child's home environment. Dewey (1916/2008) stated, "The physical equipment and arrangements of the average schoolroom are hostile to the existence of real situations of experience" (p. 120). Therefore, when curiosity arises in a child's mind about the classroom environment, the questions are different than the ones the child would have about the outside world, where the child lives. Dewey (1916/2008) asserted that no matter what skills the teacher has or works to develop, he or she will never be able to reach and teach the children fully. The only way to bridge this gap in learning is to have "more actual material, more stuff, more appliances, and more opportunities for doing things, before the gap can be overcome" (Dewey, 1916/2008, p. 120). Piaget (1947/2003) stated that students learn by building upon what they know. If students are knowledgeable about or comfortable with something that can be used in the class to help them learn, then whatever it is that they are connected with should be used in the classroom for learning. Dewey (1916/2008) stated that teachers need to bring the world into the classroom. During the early 20th century when Dewey and Piaget wrote their theories, they did not know about tablets and mobile devices. However, they understood the need to bring the outside world that students see, touch, feel, and reside into their learning

environment. Couple that with direct teacher instruction, and students can become engaged in active learning:

> And where children are engaged in doing things and in discussing what arises in the course of their doing, it is found, even with comparatively indifferent modes of instruction, that children's inquiries are spontaneous and numerous, and the proposals of solution advanced, varied, and ingenious. (Dewey, 1916/2008, p. 120)

My research study centers around this aspect of the theory of constructivism. Children are naturally curious about their surroundings, and teachers activate their prior knowledge about their thoughts, ideas, and questionings. Using this information, the teacher plans lessons to build on this knowledge and help students search for answers to both the questions in the standard required curriculum and the questions in students' own heads.

The theoretical implications for both teachers and administrators are that lessons and activities must center around activating students' prior knowledge and helping them to make real-world connections using what students are familiar with. Middle school students are familiar with tablet technology. This is an avenue that teachers can use to bring the outside world into the classroom in a way that is comfortable for students to engage in active learning of new vocabulary words. The teacher participants in my study used the tablets to create lessons that made vocabulary learning fun and incidental. As students created projects that reflected the meaning of content vocabulary, their comfort with the tablets and excitement to use their personal technological skills to do academic assignments kept them focused and on task. They were able to search for answers to vocabulary questions using methods they were accustomed to using at home.

For administrators, my findings may inform them of the importance of giving teachers and students frequent or constant access to classroom sets of tablets. The benefits of using the

tablets to build content vocabulary in students' word banks may outweigh the cost of acquiring enough tablets.

Based on my findings, I would recommend that teachers use tablets to teach complex content vocabulary to middle school students because of the variety of activities that can keep students focused and engaged. Additionally, students may be more interested to learn complex terms because they are comfortable and excited to use tablets.

Empirical

In several areas, the observations of teacher instruction and planning added to the existing knowledge of middle school teachers do to teach complex content vocabulary with tablet technology. Teachers must have a firm grasp on their subject matter. RSMS only employs teachers that are state certified in Maryland. To become state certified, the Maryland State Department of Education requires candidates to hold a teaching degree from an accredited education program and to have current passing scores on state educator's exams in content and pedagogy for the grade and subject where the candidate will teach (School Improvement in Maryland, n.d.). Therefore, all the participants in my study were highly qualified to teach in their content area.

The state curriculum also includes standards about teaching with computers and mobile devices. The school district began an initiative in 2014 to provide every school from elementary to high school with classroom sets of laptop or tablet computers by 2018 (St. George, 2014). The district's goal was to provide students with real-world experiences with technology and to meet the state technology standards that require the use of current laptop and tablet technology. However, there are no certification requirements for teachers to be able to use tablet technology in the classroom even though the school district has provided tablets for the school to use. I believe that one implication from my study is evidence of the need for administration to provide

formal training for teachers on how to use tablet technology to teach content-area vocabulary. Learning content vocabulary will help students to understand the complex texts of secondary textbooks (Larson et al., 2013; Vacca et al., 2016; Weiss et al., 2016). Therefore, if teachers are properly trained to use the tablets to teach vocabulary, the students will be better prepared to learn and understand the complex content-area material.

Practical

The practical implications of my study are directed toward district officials and other stakeholders who may contribute to or have say in funding for the classrooms. During my study, teacher participants and one administrator spoke to the benefits of tablets to teach content vocabulary. Students were more engaged in working with vocabulary words and were more likely to retain vocabulary knowledge when using the tablets. However, there are not enough tablets for teachers to use as often as they would like or as often as necessary to help students learn content vocabulary. The literature and my findings support the use of tablet technology to teach content-area vocabulary. Students need multiple and different types of exposures to new and complex words to understand and retain their meanings (Vacca et al., 2016). Currently, this school district has close to 100,000 laptops and tablets in their schools. However, given that this large district has over 150,000 students, that impressive number is still not enough for teachers to use tablets on a daily or even weekly basis. Providing more class sets for middle school teachers or implementing a BYOD program in middle school would give teachers the opportunity to use the tablets more frequently to teach vocabulary, giving students numerous and engaging experiences with new words.

Another implication for school administration is the need to provide in-house training for teachers to use tablets to teach vocabulary. During my study, all the participants said they learned new applications and programs the tablets had to offer by talking to colleagues and

sharing ideas amongst themselves during official planning meetings and informal conversations in the school hallways or through email and Google Documents. If school administrators harnessed this wealth of knowledge within their own school and created a forum where teachers could present their tablet ideas with the entire faculty, more students would benefit from this sharing of knowledge. For example, according to Russell Stover's administrator and the teacher participants, there are some teachers in the school who do not use the tablets to teach vocabulary. One of the main reasons for this lack of use is that the teachers are unsure how to use the tablets and how the tablet activities could benefit their students. Hearing how their fellow colleagues are using the tablets and how they benefit their students could encourage the teachers to use them.

Delimitations and Limitations

This study has a few delimitations that defined the parameters of the investigation. The limitations were influences that were beyond my control that may have had an impact on the results of this study.

Delimitations

The delimitations for this study included the selection of school and teacher participants. The school selection was narrowed to only those schools that have classroom sets of tablets. This was done to ensure that participants selected would already have access to tablets and have been actively using tablets this school year. The second delimitation was that the participants were required to be state-certified teachers of middle school students and to have been using tablets in the classroom for a minimum of one year. I did not want the participants to be paraeducators, substitutes, or part-time teachers. The main reason for this delimitation is that that only full-time, certified teachers are allowed access to classroom sets of tablets and are certified to teach in the content areas they are assigned.

The final delimitation was the number of participants chosen for this study. For this study, I had 12 teacher participants and one administrator. Having multiple cases increased my chances of identifying similar findings (Creswell, 2013; Yin, 2014). Multiple cases can lead to both literal and theoretical replication to understand what middle school teachers do to use tablet technology to teach content vocabulary.

Limitations

This study was limited due to the time constraints for conducting interviews, observations, and focus groups. Once I received Institutional Review Board approval, it was close to the end of the school year. My choice of schools in this large district was limited to the three schools approved by the district. After receiving approval from the principal of one school, I was only allowed two and one-half weeks to collect my data because there were only three weeks left in the school year. End-of-year assessments, field trips, and assemblies affected the time length of some of the observations and availability of teacher participants for interviews and focus groups. As a result, the quality of the data collected may be limited and not as detailed or comprehensive as it may have been otherwise.

Recommendations for Future Research

The findings of my study contribute to the larger body of knowledge regarding teaching vocabulary in middle school in new and creative ways with tablet technology. I recommend that this study be replicated at an earlier time in the school year, about a third of the way into the year. During this time, teachers who intend to use tablets will have trained their students on classroom rules, and the tablets will be a common classroom tool. A collective case study could be done to gather data through observations, interviews, and focus groups with fewer interruptions and time constraints.

Another recommendation stemmed from the data from interviews and focus group discussions. There is a need for formal training for teachers on how to better use tablets for academic purposes within separate content areas. For example, science teachers may need training specifically on applications geared toward science vocabulary and scientific topics. A math teacher could use training on the different applications and websites to help students with multiplication, division, algebra, and other mathematics topics. Training may be done in-house or district-wide by teachers or administrators that are familiar with, and frequent users of, tablets in their classrooms. Further research should be done to determine what types of training can encourage other middle school teachers to use tablet technology to teach content-area vocabulary. More qualitative research is needed to observe and investigate the types of formal training districts and schools already provide for their teachers on how to use tablet technology for academic purposes.

Further research should also be conducted to see how teachers monitor tablet usage in a middle school classroom. Throughout my study, several teacher participants said that the disruption of using tablets for entertainment purposes during class time was a deterrent for using the tablets. However, there were several teachers that said they did not have this problem. Some of them suggested that it was their classroom management style that made the difference. A multiple case study could be done to include observations of teachers who do not have problems with tablets as distractions to determine what they are doing similarly or differently.

Summary

The primary purpose of this collective case study was to provide understanding of what middle school teachers do to effectively use tablets to teach complex content-area vocabulary. Based on the data collected from the study, it was determined that tablets provide teachers with engaging and exciting ways to teach vocabulary. Using tablet technology to teach vocabulary

keeps students focused and on task and helps them retain the meaning of complex content words because of the multiple and fun exposures to the vocabulary. The middle school teachers that do use the tablets to teach vocabulary collaborate with each other to get ideas on how to use tablets effectively to teach vocabulary. These teachers emphasized that the students are excited to use the tablets and participate in tablet activities that have them work with complex content vocabulary, learning new words even if they do not realize they are learning. Teachers in this study who had no formal training with tablet technology said their students' reading comprehension and vocabulary knowledge improved with tablet usage. If given formal training on how to use tablets in the classroom for academic purposes, more middle school students could benefit with improvement in vocabulary and reading comprehension.

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Appendix A: IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

May 9, 2018

Annie Raney
IRB Approval 3183.050918: Using Tablet Technology to Teach Secondary Content Vocabulary: A Collective Case Study

Dear Annie Raney,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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Appendix B: Request to Conduct Research in District

October 1, 2017

Dear School Board,

My name is Annie Raney and I am a doctoral candidate at Liberty University in Lynchburg, Virginia. The research I am conducting for my dissertation involves the exploration of the use of tablet technology to teach content vocabulary in middle school classrooms. The research will only involve teachers and administrators. I will be interviewing and observing teachers and school administrators during department meetings, focus groups, and one on one interviews. There will not be any interaction with students. Furthermore, no student data or personal information will be observed or collected.

I am hereby seeking consent to approach one to two schools in your county to provide teacher and administrator participants for this project. If approval is granted I will follow up with a phone call and will be available to answer any questions.

Sincerely,

Annie Raney

Doctoral Candidate

Liberty University

CC: Dr. Tracey Pritchard

Appendix C: District Level Approval Letter

Office of Shared Accountability

May 9, 2018

MEMORANDUM

To:

From:

Subject: Approval of Request to Conduct Research

In compliance with , the attached request to conduct research has been reviewed and approved by the . The request is recommended for approval by the Chief of Staff. Mrs. Annie Raney, doctoral student, Liberty University, requests permission to conduct a dissertation research study titled *Using Tablet Technology to Teach Secondary Content Vocabulary: A Collective Case Study*. The purpose of this study is to investigate strategies, activities, and attitude related to middle school teachers' use of tablets in teaching academic vocabulary.

Participant Recruitment and Participation

Twelve to fifteen middle school classroom teachers who are state certified with at least one year of experience in the classroom and use tablets to teach in the classroom will be invited to participate in the study. The researcher will work with leadership teams from and , to determine an appropriate method for recruitment of teacher participants. In addition, one or two administrators from each of the schools will be invited to participate in the study. Prospective participants will receive a consent letter that details the study purpose, data collection activities, and protocols to maintain confidentiality of collected information. Teachers and administrators who agree to participate will be contacted by the researcher to schedule data collection activities. Participation is voluntary.

Participation and Data Collection Activities

Data collection activities will take place between May and June 2018. Data collection activities include interviews, focus groups, and classroom observations. Each teacher participant will be asked to participate in a 15-30 minute interview with the researcher regarding their experience and perspective of using tablets in teaching academic vocabulary. Participants will also be invited to attend a 20-30 minute focus group. Interviews and focus group discussions will be audio recorded with participants' permission.

Classroom observations will be conducted with permission from the school principal and study participants. The researcher will observe teachers when they involve tablets in vocabulary activity for about 15 minutes. The observations will focus on teachers' instruction and the researcher will not observe or record students' behaviors and responses. The researcher is required to complete the mandated online training on Child Abuse and Neglect Prevention and submit a completion confirmation document to the principals of participating schools. Teacher participants will be asked to submit the portion of their lesson plans relevant to their teaching vocabulary using tablets.

All collected information will be kept confidential. Participation will be completely anonymous and no personal, identifying information will be collected. Participants will be entered in a raffle contest to receive a small-amount gift card.

The Liberty University Institutional Review Board has conditionally approved the research study. All data will be reported in summary format. The names of participants, schools, and the school district will not be used in the summary of results. The study is supported by

The approved study and associated data collection activities must be consistent with what is included in this memo. There can be no changes to the scope and objectives of the study. Any proposed changes in data collection activities, must be communicated to for review and approval. If you have questions regarding this request, please contact coordinator, Applied Research Unit, , at or via e-mail at

JSW:hw

Copy to:

Approved:

Appendix D: Request to Principals

May 11, 2018

Dear Principal,

My name is Annie Raney and I am a doctoral candidate at Liberty University in Lynchburg, Virginia. The research I am conducting for my dissertation involves the exploration of the use of tablet technology to teach content vocabulary in middle school classrooms. The research will only involve teachers, and administrators. I will be interviewing and observing teachers and school administrators during department meetings, focus groups, and one on one interviews. There will not be any interaction with students. Furthermore, no student data or personal information will be viewed, observed, or collected.

I am hereby seeking consent to approach six to 10 teachers in your school to interview and observe for this project. If approval is granted I will follow up with a phone call and email, and will be available to answer any questions.

Sincerely,

Annie Raney

Doctoral Candidate

Liberty University

CC: Dr. Tracey Pritchard

Appendix E: Participant Consent Form With LU Stamp

CONSENT FORM

Using Tablet Technology to Teach Secondary Content Vocabulary: A Collective Case Study

Annie Raney
Liberty University
School of Education

You are invited to be in a research study on what teachers do to effectively use tablet technology to teach academic vocabulary. The purpose of my research is to provide an understanding of what middle school teachers do to effectively use tablet technology in their classrooms to teach academic vocabulary. You were selected as a possible participant because you are a state certified teacher with at least one year of experience who uses tablets in the classroom. Please read this form and ask any questions you may have before agreeing to be in the study.

Annie Raney, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to provide an understanding of the instructional planning, classroom activities, and teacher appreciation of tablets to teach vocabulary in middle school classrooms. Research questions include the following: How do teachers use tablets? and Does a teacher's personal use of or feelings towards tablets impact their planning and teaching?

Procedures: If you agree to be in this study, I would ask you to do the following things:

1. Participate in a one-on-one interview. The interview would take approximately 15 to 30 minutes. I will audio record the interview.
2. Be part of an observation during a team-planning session at your school. I will observe a team-planning meeting to see how tablets are included in lesson planning. Observation will occur for the duration of time that vocab and tablets are discussed, approximately 15 to 30 minutes.
3. Lesson plans will be collected and used during observation to further investigate how middle school teachers are implementing tablets to teach vocabulary.
4. Be part of a classroom observation. I will observe you as you teach your lesson that uses tablets. Each observation may take 10 to 20 minutes.
5. Participate in a focus group. The focus group would take approximately 20-40 minutes. I will audio record the focus group discussion.
6. After interviews have been transcribed, participants will be asked to read the interviews for accuracy and to correct any misunderstandings. This procedure will last approximately 10 minutes.

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study. However, as a benefit to society, the results of this study may inform other middle school teachers how to use tablets in the classroom to teach academic vocabulary.

The Liberty University Institutional
Review Board has approved
this document for use from
5/9/2018 to 5/8/2019
Protocol # 3183.050918

Compensation: Participants will be entered into a raffle to win a $10 gift card to a place such as Target, Chipotle, or Starbucks.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participants will be assigned a pseudonym. I will conduct the interviews in a location where others will not easily overhear the conversation.
- Data will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.
- Interviews will be recorded and transcribed. Recordings will be stored on a password-locked computer for three years and then erased. Only the researcher will have access to these recordings.
- I cannot assure participants that other members of the focus group(s) will not share what was discussed with persons outside of the group(s).

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or your local school system. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Contacts and Questions: The researcher conducting this study is Annie Raney. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at and/or by email: You may also contact the researcher's faculty advisor, Dr. Tracey Pritchard, at .

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio-record me as part of my participation in this study.

Signature of Participant Date

Signature of Investigator Date

Appendix F: Observation and Reflection Notes

Case	Descriptive Notes	Reflective Notes

Appendix G: Individual Case Analysis

Cases	Keywords	Reflections
Case 1		
Case 2		
Case 3		
Case 4		
Case 5		
Case 6		
Case 7		
Case 8		
Case 9		
Case 10		
Case 11		
Case 12		
Case 13		
Case 14		
Case 15		

Appendix H: Cross-Case Analysis

Patterns	Case 1	Case 2	Case 3
Pattern 1			
Pattern 2			
Pattern 3			
Pattern 4			
Pattern 5			
Pattern 6			
Pattern 7			
Pattern 8			
Pattern 9			
Pattern 10			

Appendix I: Emergent Themes

Themes	Cases	Reflective Notes