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The Perceived Effectiveness of One-to-One Technology in Smallwood High School

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The Perceived Effectiveness of One-to-One Technology in Smallwood High School

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Education in Educational Leadership

by

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Abstract

Administrator, teacher, and student perceptions of one-to-one technology were studied in a single case study approach at one rural Midwest high school. Interviews were conducted with six teachers, two administrators, and a survey was given to 185 student participants. The data collected indicated that while participants perceived success with the one-to-one initiative, there were differing opinions on why they perceived the one-to-one initiative to be successful. Teacher and administrator participants discussed implementation strategies, professional development, community and parent involvement, and pedagogical changes in teaching practice. The student participant survey was designed around student perceptions of one-to-one technology and teacher usage of one-to-one technology. Smallwood High School has utilized three different devices in order to find the one that best suits their needs and expectations. Common themes appeared in effective implementation strategies, professional development, and community involvement. Results also revealed that while all participants viewed the one-to-one technology as successful there are areas of improvement that could be made to allow for continued and advanced success.

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I would like to express my gratitude to my dissertation chair Dr. Ed Bengtson, for his support throughout the years of my program and through the dissertation process. The time spent in ensuring I completed the process is very much appreciated. I would also like to thank my dissertation committee for their time and their recommendations throughout this process. Thank you to the members of my cohort group as well as the staff at my school of employment who were flexible and understanding while I was away from the building conducting my research. I would also like to thank my parents Janice Cameron and Brett Clemensen who always instilled in me that I was capable of doing anything I put my mind to and my mother in law Uealene Pingree who helped look after our three sons while I was working through this degree. I would also like to thank my Grandpa Vahl who is a retired school administrator who always stressed the importance of education to me, as well as my Uncle Donnie and Aunt Pam for their continued support over the years.

Dedication

I would like to dedicate this work to my wife, Pam, and our three children Cameron, Landon, and Easton. I cannot express how much your love and support was appreciated throughout this adventure. You continually pushed me to continue on through this degree. You were understanding in the amount of time and effort it took to get to this point. Many late nights were spent on classwork, research, and writing, which was all time taken away from you. Thank you for your love and support now and always.

Table of Contents

CHAPTER ONE – INTRODUCTION.....	1
Problem Statement	1
Purpose Statement.....	2
Research Questions	3
Overview of Methodology	3
Rationale and Significance.....	4
Role of the Researcher	5
Researcher Assumptions	5
Definition of Key Terms	6
Organization of the Dissertation	6
CHAPTER TWO – REVIEW OF THE LITERATURE	8
Introduction and Overview.....	8
Summary of the Literature	9
Implementation Strategies	9
Professional Development.....	12
Changes in Pedagogy.....	14
Effectiveness of one-to-one.....	19
Conclusion	23
CHAPTER THREE - METHODOLOGY	24

Introduction and Overview.....	24
Goals	25
Research Questions.....	25
Research Approach.....	25
Sample.....	26
Sample Selection	27
Overview of Information Needed	28
Research Design.....	30
Data Collection.....	31
Data Analysis	35
Ethical Considerations.....	38
Identification of Safeguards.....	40
Trustworthiness	41
Risks and Benefits	42
Limitations	42
Timeline	43
CHAPTER FOUR – DATA ANALYSIS.....	44
Research Questions	44
Demographics.....	45
Participants	46

Student Survey Results	50
Research Question One	57
Prior Technology	58
Sustainability	60
Teacher Perceptions.....	62
Community Perception	65
Research Question Two	67
Changes in Pedagogy.....	67
Administrator Expectations	71
Research Question Three	72
Initial Implementation	73
Professional Development.....	76
Research Question Four	77
Teachers Who Excel in Technology.....	78
Teachers Who Struggle with Technology	80
CHAPTER FIVE – DISCUSSION.....	83
Why is the one-to-one initiative perceived to be successful in Smallwood High School?.....	85
What perceived factors influence the success of one-to-one initiatives at Smallwood High School?	87

What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?	88
Are some Smallwood teachers more involved in the use of one-to-one technology than others?	90
Limitations of the Study	91
Recommendations	91
Conclusion.....	92
References.....	94
Appendix A: One-to-One Administrator and Teacher Interview.....	97
Appendix B: Student Survey.....	100
Appendix C: Teacher/Administrator Interview Consent Form.....	103
Appendix D: Student Consent Survey Form.....	106
Appendix E: Parental Assent for Minor Student Form	109
Appendix F: IRB Approval Letter	112

List of Tables

Table 3.1 Types of information needed	29
Table 4.1 Smallwood High School demographics.....	46
Table 4.2 Graduation rate and post-secondary success	46
Table 4.3 Participating teachers	49
Table 4.4 Survey results for number of years involved in a one-to-one school environment	50
Table 4.5 Student perceptions on the number of teachers who utilize one-to-one technology	52
Table 4.6 Technology usage by subject	52
Table 4.7 Technology time utilization	52
Table 4.8 One-to-one technology activity	53
Table 4.9 Top three advantages to one-to-one.....	55
Table 4.10 Top three disadvantages to one-to-one	55

List of Figures

Figure 2.1. Jellisons' Dimensions of Change J Curve (Jellison, 2006)	15
Figure 3.1. Research Design Flow	31
Figure 3.2. Research Design Flow	34
Figure 3.3. Data Analysis Flow	38
Figure 4.1. Survey results for training received by students on using one-to-one.....	51
Figure 4.2. Internet access at school	54

CHAPTER ONE – INTRODUCTION

A one-to-one environment or initiative is one in which all students have direct access to their own digital device, one device to every student. An innovation that is growing as much as one-to-one initiatives must be researched prior to implementation to better understand the significance of one-to-one technology within a school system. Before making significant decisions school districts need to know what works and what does not work. They need to know if they are capable of providing what is needed on top of just providing a computer.

Technology or the introduction of new devices and tools designed to enhance the teaching and learning process has been prevalent in education since the inception of the modern education process. We have grown from the one-room schoolhouse to large buildings housing hundreds to thousands of students. We have gone from chalkboards to whiteboards, pencil and paper to typewriters, and typewriters to computers. We now find ourselves in a digital age in which schools look to put devices such as laptops and tablets in the hands of every student within a school system, commonly known as one-to-one initiatives (one device to one person).

This growing one-to-one initiative provides students with readily available technology resources but also encompasses a substantial financial obligation on a school district. This is a financial obligation that many schools have been willing to make. As schools face many budgetary challenges, they are looking for assurance that one-to-one technologies are worth the financial investment regarding providing students with an educational advantage versus a non-one-to-one environment.

Problem Statement

School districts are making a significant monetary investment in adopting one-to-one initiatives without knowing the educational effects, positive or negative. Schools implement

one-to-one programs without having a full understanding of how to best implement the technology to better serve the students and accomplish staff buy in to better utilize the new technology. School districts face questions about how they will provide meaningful professional development to ensure quality instructional practices through one-to-one technologies. Finally, school districts lack the knowledge of how teaching pedagogy changes through the incorporation of a one-to-one environment. As teaching pedagogy changes the expectations for what students can do in class change, leading to a more engaged student environment (Downes & Bishop, 2015).

Purpose Statement

The purpose of this case study was to examine the one-to-one technology initiative and its implementation at one rural mid-western high school. It was intended to understand the perceived effectiveness through the eyes of six teachers, one building level administrator, and one superintendent of schools through semi-structured interviews and classroom observations. It also intended to understand student perceptions through the use of a student survey. The information provided will allow school boards and school administrators the ability to make a more informed decision when facing the decision to implement one-to-one. Holcomb (2009) states, “there is no question that one-to-one initiatives have the potential to significantly impact education; schools across the country are reporting improvements in day to day student outcomes” (p. 49). Maine, which began its one-to-one initiative over seven years ago reported a 7.7% increase in attendance after the implementation of one-to-one computing (Lemke & Martine as cited in Holcomb, 2009). Why did they experience a 7.7% increase in attendance? Why do one-to-one initiatives have the potential to improve student learning outcomes and what do we need to do to ensure that the implementation of such initiatives is successful?

Research Questions

There are four research questions proposed in this study:

- 1) Why is the one-to-one initiative perceived to be successful in Smallwood High School?
- 2) What perceived factors influence the success of one-to-one initiatives at Smallwood High School?
- 3) What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?
- 4) Are some Smallwood teachers more involved in the use of one-to-one technology than others? If so, why?

Overview of Methodology

This study utilized a case study approach using semi-structured interviews, student survey, and classroom observations. The design was based around the goals and the research questions of the study utilizing a qualitative data collection method through district administrator interviews, school administrator interviews, teacher interviews, and student surveys. I then used classroom observations to view what is taking place in the classroom compared to what was discussed in the interview process. I utilized follow-up interviews with questions that arose through the classroom observations.

The study began by immersing myself as the researcher into the daily school environment to ensure participant comfort with the researcher in the building. I had informal discussions with administration prior to my arrival and the first day of my arrival on campus. I was also given a tour of the building and observed the overall school environment. These informal discussions were not utilized in the data but were important in gaining access to information needed for the case study. Qualitative data was obtained next through student surveys, district administrator

interviews, school administrator interviews, and teacher interviews. Classroom observations took place to view how the one-to-one technology was being utilized in the classroom. Follow-up interviews took place as needed based on questions from the classroom observations.

After completing the qualitative data collection process, I used first and second cycle coding to interpret the data and explore the different themes that become apparent. I then used the themes to directly answer the research questions of this study.

Rationale and Significance

The rationale from this study derived from school district challenges in implementing one-to-one technologies within their school system. Understanding the challenges in which school districts face through the implementation process of one-to-one programs can provide future insight into best implementation strategies to ensure successful rollout and usage of one-to-one devices and how to make students and teachers more comfortable with their role during the process.

Through my experiences in education I have witnessed teacher hesitation to the adaptation of a one-to-one environment due to their unfamiliarity with the technology and how to best utilize it to meet the needs of their student's. Increasing the understanding of how teachers can better utilize professional development opportunities and how administrators can provide more meaningful professional development can decrease the hesitation of teachers going into a one-to-one environment. The utilization of continued professional development to improve teachers comfort level and changes in teaching pedagogy was utilized in the Richland County School District Two in Columbia, South Carolina. The teacher support and development through the implementation and beyond improved the comfort level of teachers and provided students with more enhanced learning opportunities (Thompson, 2014). As teachers learn more

about how to utilize technology in the classroom as a tool, the results may lead to changes in teaching pedagogy.

Role of the Researcher

As the researcher, I bring prior experiences in implementing a one-to-one initiative that will be taken into account during the design, data collection, analysis, and presentation of results. I currently serve as the high school principal in a small rural southeast Kansas school district. Before this current position, I served as the assistant principal/athletic director within the same school district. My teaching experience was in grades seven through nine in a small rural southwest Missouri school district that was not involved in a one-to-one initiative.

I possess a high-interest level in how technology affects the educational process. My experience in implementing a one-to-one technology environment gives me valuable insight into the challenges school districts face throughout the process. I understand that my prior experience could also serve as a disadvantage providing bias to my judgment of my research and findings. The participants of this study and all subjects and research gained through this study were from outside of my school district to limit any influence on the participants.

Researcher Assumptions

Through my experience with technology in education and the implementation of a one-to-one initiative, I have two assumptions regarding this study. First, technology placed in the hands of students can provide students with an advantage that most may not have in a low socio-economic area. This is based on my experience within a low socio-economic school district and seeing the capabilities students have gained through technology such as organizational skills, collaboration with peers, and an enhanced curriculum with new course offerings. Second, teachers are provided with endless resources and teaching opportunities through the readily

available technology in the student's hands. Through conversations with teachers and observation, I have seen the changes in pedagogical strategies that teachers have made.

Definition of Key Terms

Many key terms will be used throughout this study, the following terms have been defined:

Implementation - Implementation is the process in which a new program is introduced and given to students and teachers. It entails how the device was rolled out, stake holders who were utilized in the process, the training given to students, and the professional development provided for teachers.

Laptop - Laptops are portable computers often folded up for easy portability.

One-to-one technology - A one-to-one environment or initiative is one in which all students have direct access to their own digital device. One device to every student.

Pedagogy - Pedagogy is the method or practice of teaching.

Professional Development - Professional development is the training given to educators to enhance their professional knowledge and/or skills.

Tablets – Tablets are handheld devices in which students can access internet and software programs.

Technology - Technology for the purpose of this study refers to hardware such as computers, laptops, and tablets. It also refers to software and web-based programs such as Microsoft and Google.

Organization of the Dissertation

The next chapter is designed to give an overview of current literature that is relevant to this topic. Chapter three provides an in-depth overview of the methods and procedures used

throughout the study. Chapter four presents the findings of the research and chapter five provides my interpretation of the findings and conclusions, as well as recommendations for further study.

CHAPTER TWO – REVIEW OF THE LITERATURE

Introduction and Overview

The purpose of this case study was to examine the one-to-one technology initiative and its implementation at one rural mid-western high school. It was intended to understand the perceived effectiveness through the eyes of six teachers, one building level administrator, and one superintendent of schools through semi-structured interviews and classroom observations. It also intended to understand student perceptions through the use of a student survey. Students and teachers in school districts across the country are experiencing a dynamic change in the way of one-to-one technology initiatives. School districts are implementing one-to-one technology in the form of laptops, Chromebooks, I Pads, and other devices. Penuel (2006) explains, “the increasing popularity of laptop initiatives with a wide variety of stakeholders in education-policy makers, administrators, teachers, parents, and students- makes the need for sound research-based evidence of effectiveness especially critical at this time” (p. 342). These initiatives have led to changes in pedagogy for teachers and learning styles for students. Teachers are faced with challenges in changing their teaching pedagogy to better utilize this technology. One-to-one programs in schools have been introduced within the last ten years. Due to the early stages of implementing this technology some teachers may have gone through their careers and teaching programs having not been introduced to the challenges and changes that come with a one-to-one environment. Administrators are finding best practices to implement these devices and deliver professional development to teachers to better utilize this one-to-one technology.

This study sought to answer the following research questions:

- 1) Why is the one-to-one initiative perceived to be successful in Smallwood High School?

- 2) What perceived factors influence the success of one-to-one initiatives at Smallwood High School?
- 3) What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?
- 4) Are some Smallwood teachers more involved in the use of one-to-one technology than others? If so, why?

Exploring these questions will lead to a better understanding of how administrators and teachers can better utilize one-to-one technology to provide students with an academic advantage over students in a non-one-to-one environment.

Summary of the Literature

This study is designed around teacher, administrator, and student perceptions of what a successful one-to-one learning environment looks like. The literature was obtained using ProQuest, Ebsco, and Google Scholar. In reviewing the literature I was interested in familiar topics discussed around one-to-one technology. Those topics were: issues of implementation, changes in pedagogy, and professional development. What follows is a review of the literature based on the relevance to the research questions above.

Implementation Strategies

A significant challenge in implementing one-to-one technology is choosing a device that meets the goals of your school district. Schools looking to use devices for writing, research, and online activities will benefit from laptops and Chromebooks. Chromebooks rely on internet connectivity and web-based applications. For a district that relies on Windows or Mac-based programs, this is not the best option (Warschauer & Tate, 2015). iPads or tablets are popular amongst schools for their light weight and touch screens but do not provide ease with writing

capability (Duran & Aytac, 2016; Warschauer & Tate, 2015). A bring your own device program is the least expensive but also the least reliable option. A bring your own device program works well in a more affluent district where students and parents can afford the cost to provide their students with devices (Thompson, 2015; Warschauer & Tate, 2015). Districts must set goals for what they would like their program to be prior to choosing a device. The device needs to be capable of meeting the goals of the district. Upon implementation districts will want to start small and grow their program as it develops while getting input from stakeholders such as teachers, students, parents, and support staff (Warschauer & Tate, 2015).

Immediate failure in a one-to-one program is the lack of appropriate infrastructure to handle the usage. Technology infrastructure can enhance or ruin the usage of one-to-one within your school from both teachers and students. Infrastructure must meet the needs of the district to ensure functionality across the one-to-one network. Slow network capability leads to frustration amongst students and teachers (House, 2013; Cuban 2002; Li, 2010; Warshauer, Zheng, Niiya, Cotten, & Farkas, 2014).

In implementing technology allotting funds that allow the district to provide a device to all students is a monetary commitment the district must commit too. Providing a one-to-one device for students enables equity among students, between the students who readily have access to technology device at home compared to those that do not. To better serve students, you must have an understanding of who readily has access to technology while off campus. Providing internet access in the home of students who do not readily have it can help eliminate the achievement gap amongst students (Thompson, 2014).

The goals of implementing one-to-one must be realistic and achievable. In the Pascack Valley Regional High School District leaders agreed that standardized test scores would not be

tied back to the laptop program. In order to set and accomplish this goal, you must have buy-in from stakeholders, in the case of standardized test the school board must realize that a laptop program is not going to enhance student performance on standardized tests. The Metropolitan School District of Wayne Township, Indiana had overseen lots of construction and launched their one-to-one initiative by creating a blueprint for digital learning. A technology committee was formed to make broad recommendations to district leaders. Through these recommendations district leaders worked one aspect at a time in using technology within the curriculum. This digital blueprint gets modified each year to focus on the goals of the district (Schaffhauser, 2014).

In Henrico County Public Schools, Virginia they hold informational meetings each year to explain the complexities of the one-to-one program emphasizing benefits to students. As the district has evolved and parents have become more familiar with the districts one-to-one program, they have backed off of these meetings and now focus on the parents of eighth-grade students who have not been trained in the district before. Parents can now choose to take the training online instead of face-to-face (Shaffaser, 2014).

Leadership within the building and the district will have a major impact on how successful a building or district is when rolling out one-to-one devices and their effectiveness within their school system. Leaders who empower their teachers and their students have the most positive effect on faculty buy-in and the successful implementation of one-to-one technologies. Leadership plays a pivotal role in communication with parents and students to ensure commitment from all stakeholders (Li, 2010).

Teachers factor into the implementation process by alleviating strain on the student's capabilities to access specific information to be used in the classroom. Teachers who gain prior

knowledge of the technology before it is put into the hands of the students can quickly troubleshoot problems that could arise in the classroom. Providing students with direction on challenges that may come allows students to promptly troubleshoot their problems and continue with their classwork. To more quickly enable students to access applications they need for their classwork; teachers have viewed it useful to allow them access of more control over what applications can be downloaded and used within their classroom, alleviating wasted class time of having a technology director approve needed applications (Varier et al. 2017).

Professional Development

Professional development has come in many forms throughout the history of education. While research is limited on one most effective professional development strategy, it is abundant with what is effective compared to what is ineffective. With 21st-century education being geared towards technology and one-to-one usage, the value of technology has not gone unnoticed by principal actors in education (Lawless & Pellegrino, 2007). These major actors are discussed by Lawless and Pellegrino (2007):

These include federal, state, and local education agencies; professional organizations; and institutions for higher education. For example, over the past decade, the federal government has invested heavily in numerous initiatives to assure that schools keep pace with technology developments. These initiatives include (a) improving the capacity of schools to use technology, (b) training the next generation of teachers to use technology in their classrooms, (c) retraining the current teaching workforce in the use of technology-based instructional tactics, and (d) minimizing inequitable access to technology (p. 576).

The challenge surrounding professional development with the advancements of technology in education and the restructuring of schools is that it is still widely accepted that staff development takes place at a series of workshops or conferences with the help of a long-term consultant. Professional development needs to separate from traditional in-service training towards long-term continuous learning designed around models such as professional learning communities or

reform in-service approaches (Lieberman, 1995; Penuel, Fishman, Yamaguchi, and Gallagher, 2007; Slavit, Sawyer & Curley, 2003).

When encountering technology in education professional development, however, it is important to take into account the level of experience the teacher has with the usage of technology. Teachers who are relatively new to technology may have a more difficult time implementing it into their classroom and be more hesitant to change. Professional development that is subject-specific can ease the change. Teachers who are not familiar or feel they are not “tech savvy” become afraid to use it for fear of failure. Taking a slow, detailed approach with these teachers will allow them to see better how technology can lead to student achievement in their subject-specific classroom. A teacher who is more experienced with technology will more easily adapt to a one-to-one environment. Teachers will often have concerns about the implementation of technology, but those concerns can be for various reasons, which is why the one shoe fits all approach to professional development does not work (Slavit et al., 2003; Towndrow & Wan, 2012). Successful professional development needs to be derived to create sustained professional learning communities. One such design is a Plan for Learning and Teaching with Technology (PLATE) model, a model designed to incorporate faculty development leaders who work with teams to derive goals for individual teachers. Professional development is then derived from the created goals and sustained throughout the school year (Slavit et al., 2003).

A more traditional in-service approach can be used to create immediate results within the classroom. Activities are designed over a three day period to immerse teachers into technology content and provide practical experience. Results show at the end of the three-day professional development experience teachers were better able to express their ideas and students report

enjoying the classroom activities while teachers felt more confident in their approach to technology (Stein, Ginns, & McDonald, 2007). While this study shows improvement in teaching pedagogy immediately following the in-service approach, it does not show continued sustainability. While traditional in-service approaches can be taken as opposed to reform in-service approaches, the importance lies in localizing the professional development to suit the participants own district goals, as well as promote student inquiry. With this also comes allowable time at the teacher level (Penuel et al., 2007).

Changes in Pedagogy

Negative changes in pedagogy. The common theme in the literature of one-to-one environments is the effectiveness of the program is not viewed in terms of what the technology can do or what students can necessarily do with the technology but how the technology changes the pedagogy for teachers. In simple terms, how does it change how teachers teach to better reach all students and get students more involved in their learning process? Slow changes have taken place throughout the history of education and teaching pedagogy. Technology implementation is nothing new in the world of education. The film was introduced to the classroom (1910s-1940s), radio (1920s-1940s), and instructional television (1950s-1980s). With each of these, a slow revolution was seen in how they changed the landscape of teaching and learning. These innovations were slow to be adapted and took time for teachers to adapt and change the way they used these technologies to better enhance the learning environment. Eventually they would be used as common practice within the classroom on a regular basis. It would take time, leadership from administrators, and professional development (Cuban, 2002).

Minimal changes have taken place in teaching pedagogy in one-to-one environments. Most teachers are still using traditional classroom approaches to teaching. Changes that have

taken place caused by one-to-one in schools are more effective planning, better communication with parents and colleagues, less lecture, and more readily available access to online materials. Investment is not warranted based on lack of change in classroom pedagogy (Cuban, 2002). We are beginning to see more and more usage as students are required to take keyboarding classes and usage of software classes. However, it is not yet known if computers are just being used to merely meet program requirements or if we will see a mainstream shift in pedagogy practices.

These changes in teaching pedagogy may be seen over time. Change takes place in phases shown in figure 2.1 Jellisons' (2006) dimensions of change J curve.

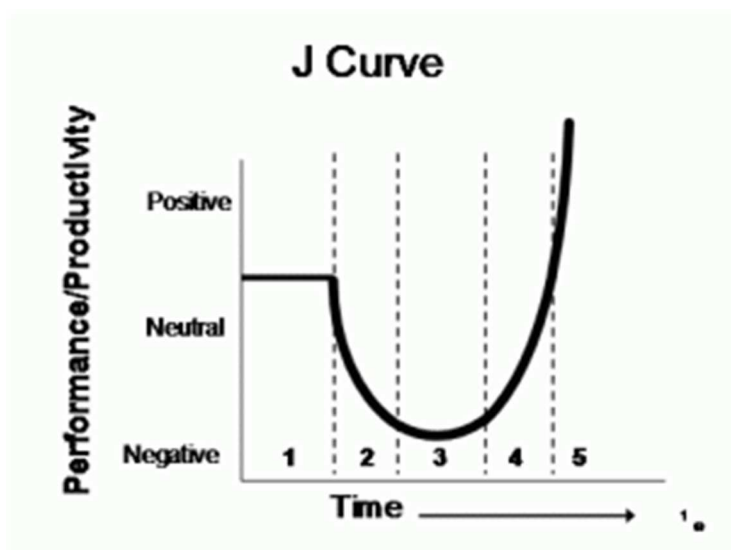


Figure 2.1. Jellisons' Dimensions of Change J Curve (Jellison, 2006)

The initial stage is the year one plateau. In this stage, teachers take an active role in implementation and preparing students. The time and effort paid off for teachers as Jellison's participants saw an immediate increase in efficiency and productivity from students. Year two of implementation saw the cliff or decline. The issues arise with student responsibility and teachers losing sight of the primary purpose for wanting laptops. Teacher complaints about

spending more time putting out fires than addressing the goals of the program lead to frustration. The valley at the end of year two found a lot of mistakes and negatives that took place within the one-to-one environment. This short period was identified by all participants of Jellison's study.

The short period of time in the valley began to change as teachers and students began to figure things out at which point they entered into the year three ascent. During the ascent the participants of Jellison's study began to see changes in the way teachers and students were utilizing technology and the ways in which teacher pedagogy was changing. Teachers began to align curriculum around the usage of one-to-one technology. Teachers changed from a more teacher-centered environment to students driving their own learning. The usage of one-to-one technology became common practice; students no longer were forced to learn to use the machines as they were now as common practice as a pencil in class.

In years four and five enter the mountaintop period. The performance begins to climb, and errors are virtually eliminated. Teachers started finding ways to best teach students by using the technology as a tool. The teachers took control of the one-to-one technology and geared it to better suit the needs of their students. Students felt they were given the freedom and choice to direct their own learning. While the students felt this was happening the teachers still controlled how the technology was being utilized to meet the needs of the students (Jellison, 2006; Swallow, 2015).

Positive changes in pedagogy. The Maine Learning and Technology Initiative (MLTI) is one of the most significant one-to-one laptop initiatives implemented as the first statewide one-to-one initiative in the United States. The second high profile initiative is the Texas Technology Immersion Pilot (TIP), a one-to-one program in 22 schools across the state. The reason behind failed attempts or the historical lack of change in one-to-one initiatives is likely caused by non-

collaborative and non-differentiated teaching practices. One-to-one initiatives are often singled out on a higher scale compared to other changes to improve education due to the high cost of implementing one-to-one initiatives. They become the focal point of future educational changes (Weston & Baine, 2010). When a one-to-one initiative fails to deliver results the truth about the causes often takes a back seat. It should be more of a debate about how change is being implemented than the one-to-one initiative itself. Many factors play into a successful one-to-one implementation such as professional development, support, and teacher attitude toward technology (Penuel, 2006). Weston and Bain (2010) suggest, “The widespread availability of laptop computers can be a driver for the more expansive efforts that must happen in order for schools to meet the educational needs of all students” (p. 14). These more expansive efforts are discussed in a six component process. One, the community having a set of beliefs and rules drives the design of the school. Two, the school community uses those rules to form big ideas and commitments. Three, all stakeholders are fully engaged in the process. Four, the design is generated from the feedback from all stakeholders. Five, the interactions of the created rules and how they work together towards the overall goal of learning. Six, a systematic use of technology implemented to drive the overall goals. When these six components are in place, a self-organized learning environment will emerge (Weston & Bain, 2010).

One-to-one initiatives provide more readily available access to formative assessment and self-reflection. Online assessments became more easily attainable in a one-to-one initiative allowing teachers and students more immediate feedback on strengths and weaknesses. One-to-one laptop initiatives allow students the opportunity to work more fluently together whether at school or home. Teachers are capable of providing differentiated instruction utilizing several media outlets available on student devices. No longer are students in rows listening to the

teacher. Instead, they can work together at any time (Warschauer & Tate, 2015). These findings supported a transformation of the learning environment by creating a more personalized learning environment, changing the relationship between students and teachers, and facilitating school-community connections. While initially it was thought that the introduction of technology would hinder the student/teacher relationship, it has been seen that laptops or one-to-one environments are actually facilitating the relationship between teacher and student. Teachers and students are more in touch through software programs such as email, Google Docs, and other mediums that lead to collaboration amongst teachers and students. Not only have these software programs lead to increased communication between teacher and students, but it has also improved the communication and relationship between the teacher and parents. Parents are taking a more active role in monitoring student schoolwork and grades while being in constant communication with the teacher. (Zheng, Warshchauer, Lin, & Chang, 2016; Light & Pearson, 2012).

Classrooms are becoming more student-centered with an emphasis on project-based learning. Teachers are able to provide more individualized instruction and more readily meet student needs through the use of one-to-one technology. Students are also able to work more independently of their teachers due to resources obtained from one-to-one technology and internet connectivity. Through technology, students have more availability to work in small collaborative groups within project-based learning. Access to the instructor has also increased due to the capabilities of contacting the teacher via technology and gaining a response later (Zheng et al., 2016; Varier et al. 2017).

A study done in Vermont in a town of 10,000 people at a school scoring near the bottom in reading, writing, and math on the statewide standardized test compared to other schools in the county found successful changes in pedagogy by allowing students the opportunity to work at

home through the one-to-one program. One student using Google Sketchup, 3D did his entire project at home, informing the teacher that he uses it all the time at home. This opportunity opened the teacher's eyes to a new approach in having the technology drive the curriculum instead of the curriculum driving the technology. The teacher saw this as getting out of the usual framework of school and using it as an opportunity to use something that students are already using outside of the classroom, leading to an inspired student and a path to a more purposeful learning environment (Downes & Bishop, 2015).

Effectiveness of one-to-one

Benefits. Students in a one-to-one laptop environment are exposed to more frequent technology usage. Writing, editing, and gathering information from the internet are the most common forms of technology usage. Students also learn to take notes, search and organize information, complete assignments, and homework, reading from electronic textbooks, and conducting research (Zing et al., 2016). Through one-to-one programs, students have more opportunity to work with empirical data as opposed to students in a non-one-to-one environment. Data is created through internet research in which students use data that was previously obtained by prior research. Students also collect their own forms of data based on teacher requirements or self-interest. Teachers have the opportunity through readily available computer access to allow students to delve deeper into the research, data collection, and analysis process leading to more in-depth student learning (Warschauer, 2006).

Students and teachers not only report an increase in research ability and more exposure to online activities, but they also report an increase in writing activities as well as an overall improved quality of writing. The one-to-one technology has allowed students to work more efficiently in composing drafts and rewrites along with using different editing and revising

software. This ability of improvement in writing is also seen in students who are English Language Learners (ELL). ELL students often face significant challenges in education especially in the content area of reading and writing. One-to-one technology has allowed ELL students more opportunities to communicate more efficiently as well as practicing different skill sets through writing and online discussions (Warschauer et al., 2014). Through digital technology, the ability for students to rewrite and recompose drafts is prevalent. Teachers have the opportunity to provide more clear and concise instructions due to the readability of work done on a computer as opposed to pencil and paper. Students are better able to utilize the feedback given by the instructor and make the required changes without rewriting the entire paper. The efficiency of this process is not only beneficial for the ease of the students, but it also benefits the instructors allowing more feedback and ability to provide guidance at a higher rate and to a more substantial number of students (Warschauer, 2006; Warschauer et al., 2014).

The effects of one-to-one environments are not always seen immediately in the classroom environment. Benefits can also be seen in how technology usage in school affects students after they have graduated. Digital skills that are learned in school help students become more digitally efficient after they have graduated and entered college or the workforce. Literacy skills learned in school through programs such as Word, Excel, and PowerPoint lead to better understanding of technology upon entering the workforce, providing the necessary skills to succeed (Light & Frieman, 2016).

Positive impacts have been seen regarding student engagement and motivation. Students have the capability to collaborate, and problem solve on their own through readily available research capabilities. Students have taken responsibility in their own learning. Through the use of technology, more students who did not consistently make an attempt to finish work are now

turning in assignments. Students are also showing increased focus after the implementation of technology. Students have also shown an increased interest in learning (Varier et al. 2017).

Disadvantages. While one-to-one programs are beginning to take hold rapidly in the educational system, the sustainability of the program will be an issue that districts will face. The infrastructure costs, high student and teacher turnover, updating devices, and the cost of teacher professional development are all major factors in the sustainability of a one-to-one program. This is especially relevant in low-SES communities and schools where financial stability is always in question (Warschauer et al., 2014).

Students involved in one-to-one programs have experienced headaches, eye strain, and eye fatigue due to the amount of time spent looking at a digital device. The eye fatigue has been reported to improve as the school year progresses but leads to a concern that traditional textbooks will still need to be purchased for home usage as students cannot be expected to stare at a computer screen all day. There is also a perceived lack of communication between the student and teacher in a one-to-one environment, lack of eye contact due to the usage of a device is one of the reasons for this lack of communication (Duran & Aytac, 2016; Spanos & Sofos, 2013). There is a discrepancy in the research as some advantages are the increased communication with the instructor while a disadvantage is also lack of communication. This could be attributed to face to face communication with the instructor versus online communication.

The lack of internet access and parental permission has affected the instructional practice of teachers negatively. Students who have no internet access at their residence must search for outside sources of internet. Parents have also denied permission for students to take devices home. These factors have caused teachers some strain as they make adaptations to assignments

to meet the needs of students. These factors have caused teachers to change lesson plans causing a negative correlation to classroom instructional time (Varier et al. 2017). Not only do teachers struggle with students who have been denied access to the device, but they also struggle with classroom management of the devices as well as their own insecurities about using technology in the classroom. Teachers have found that students who have direct access to one-to-one technology also have direct access to media and games that can keep students off task. Teachers often find themselves frustrated and reminding students they are off task, which in turn leads to discipline issues when students become argumentative. Teachers have had to completely rearrange classrooms to better view each student's device while they are working. This change in classroom also changes the comfort level within the classroom. The comfort level of teachers with technology plays a factor in how well the technology is used within the classroom. A teacher who does not have the comfort level of using the device within the curriculum is more likely to continue using the same tools they have always used (Zuber & Anderson, 2012).

Mathematics is an area of struggle when it comes to the incorporation of one-to-one technology. No matter which type of device is used, there is difficulty in expressing problems in the form of numerical equations. Mathematics learning is still accomplished best through the use of pencil and paper. Students must have the ability to accurately show their work throughout the multiple step process that most math equations require. While most of your technology devices that are used in one-to-one classrooms have access to a calculator, students still need to gain an understanding of how to use a scientific calculator when facing certain tests in their future. While there are many applications and software available, using one-to-one devices for math teachers is still time consuming (Zuber & Anderson, 2012).

Conclusion

While one-to-one initiatives are becoming more common, the research has begun to grow. However, the research is still limited in terms of how an effective one-to-one program is defined. The research falls into three main categories: (a) the type of device being used and the purpose it serves, (b) how schools have implemented the devices, (c) changes that have been made in the classroom due to increased computer access. A majority of the research focuses on the technology itself and how teachers who are unaccustomed to technology have had to adapt to the change.

The research still focuses mainly on the early stages of a one-to-one program. This could be contributed to the fact that one-to-one initiatives are still in the early stages the long-term effects have yet to be seen. The gaps of the research lie in the effectiveness regarding student achievement. While most all studies depict a common theme that technology is beneficial to the classroom and one-to-one environments provide more technological opportunities, the question is still raised as to whether or not there is an educational advantage based on student achievement.

CHAPTER THREE - METHODOLOGY

Introduction and Overview

Each year schools face the challenges of what the newest and greatest initiatives in education will be. They must make decisions on what initiatives will best meet the needs of their students and determine if the return will be worth the investment. One-to-one initiatives are no different. Schools are beginning to adopt one-to-one initiatives at alarming rates. The growing number of schools implementing one-to-one technology calls for increased research on the implementation strategies of one-to-one technology in education. The purpose of this case study was to examine the one-to-one technology initiative and its implementation at one rural mid-western high school. It was intended to understand the perceived effectiveness through the eyes of six teachers, one building level administrator, and one superintendent of schools through semi-structured interviews and classroom observations. It also intended to understand student perceptions through the use of a student survey. The information provided will allow school boards and school administrators the ability to make a more informed decision when implementing one-to-one technology. Holcomb (2009) states “there is no question that one-to-one initiatives have the potential to significantly impact education; schools across the country are reporting improvements in day to day student outcomes” (p. 49). Maine, which began its one-to-one initiative over seven years ago reported a 7.7% increase in attendance after the implementation of one-to-one computing (Lemke & Martine as cited in Holcomb, 2009). Why did they experience a 7.7% increase in attendance? Why do one-to-one initiatives have the potential to significantly impact education and what do we need to do to ensure that?

Goals

The goal of this study is to provide school boards, superintendents, and schools the information needed prior to making a monetary investment on a growing initiative. If school districts are going to dedicate a significant portion of their school budget towards a one-to-one initiative they must know why the program is going to work. Holcomb (2009) states, “few modern educational initiatives have been as widespread and costly as the integration of laptop initiatives into education” (p. 49). School leaders must not only know why financially this investment is going to work; they must also know what advantages the students are going to have in a one-to-one environment. In order for students to gain an educational advantage school boards and administrators must have an understanding of what effective implementation and usage is and be able to apply it in the classroom.

Research Questions

There are four research questions that I propose to address in this study:

- 1) Why is the one-to-one initiative perceived to be successful in Smallwood High School?
- 2) What perceived factors influence the success of one-to-one initiatives at Smallwood High School?
- 3) What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?
- 4) Are some Smallwood teachers more involved in the use of one-to-one technology than others? If so, why?

Research Approach

The theoretical lens that I used was the constructivist lens. I have chosen this lens because I seek to understand the world within a one-to-one environment. As I entered my

research, I was not starting with a theory, but rather developing a theory about the information provided within the study. Creswell (2013) states, “in social constructivism, individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences, meanings directed toward certain objects or things” (p. 24). I wanted to understand the one-to-one world in which the participants of the study are involved to better apply it to the practices of my school system.

Phenomenology is the grand theory that supported my research approach. I utilized a case study approach to examine the participant's experience within the school and how they are perceived by the participants of my study. A phenomenological approach seeks to explore, describe, and analyze the meaning of individual lived experience: Patton (2002) explains, “how they perceive it, describe it, feel about it, judge it, remember it, make sense of it, and talk about it with others” (p. 104). I want to know the participant's perceptions within a one-to-one initiative. I want to understand from the participants what makes a one-to-one initiative work or not work for all students.

Sample

This study took place at Smallwood High School in the Smallwood School District. Smallwood School District is a district that has gone from a traditional learning environment to implementation of a successful one-to-one environment. Success in a one-to-one environment is defined as providing an educational advantage for students in a one-to-one environment as opposed to a non-one-to-one environment. An educational advantage is described as an improvement in student performance on classwork and homework, teacher's ability to effectively provide feedback in a timely manner, the teacher and student's ability to access and deliver information at a faster and more effective rate, and improved student attendance. I selected this

site because it offers access and information towards each one of my research questions. It is valuable to be at a site that has gone from non-one-to-one, implemented the one-to-one, and is perceived as successful. A site such as this offered me insight on effective implementation strategies, changes in learning, changes in teaching, the involvement of teachers, and what effective teachers do to make one-to-one successful.

Sample Selection

In choosing my case, I used a maximum variation of sampling, a subcategory of purposeful sampling in which individuals are selected because they represent the broadest possible range of the characteristics being studied (Bloomberg & Volpe, 2012). I had six teacher participants, two administrator participants, and 185 student survey participants. In my case study, I do not only want to talk to the most successful teachers at utilizing one-to-one but also the teachers who have not been as effective in utilizing one-to-one. I employed the principal of Smallwood High Schools help in selecting participants who could fill those roles. I needed both the positive and the negative involved in the implementation of one-to-one. While I anticipated having a more extensive range of teacher experience utilizing technology, this area was limited.

I used stratified purposeful sampling; Marshall and Rossman (2011) state “stratified purposeful sampling illustrates subgroups and facilitates comparison” (p. 111). I sampled different subgroups which include, administrators, teachers, and students. This strategy allowed the opportunity to compare different subgroups and their interaction within the one-to-one environment. Marshall and Rossman (2011) also state, “opportunistic sampling follows new leads, takes advantage of the unexpected” (p.111). This allowed me the opportunity to delve deeper into the research as my findings are lead down different paths. I chose purposeful sampling because it gave me the greatest opportunity to effectively address my research

questions. Purposeful sampling has a purpose or reason for selecting specific participants, events, and processes (Bloomberg & Volpe, 2012). Within the realm of purposeful sampling, I used criterion sampling which is a type of purposeful sampling. Bloomberg and Volpe (2012) state that criterion sampling, "works well when all the individuals studied represent people who have experienced the same phenomenon" (p. 135). The criterion in my study was participation from all subjects in a one-to-one initiative. My reasoning for selecting specific participants is their involvement in the implementation and usage of one-to-one in their current school. In selecting specific participants, I chose a range of experience within a one-to-one environment, a teacher in their first year of a one-to-one environment may have a different perspective than a teacher who has multiple years of experience. It will be important for this study to view a multitude of ranges in experience within a one-to-one environment. Purposeful sampling works well with my methodological approach of a case study.

Overview of Information Needed

The information needed for this case study is the perceptual information, contextual information, and demographic information (see table 3.1).

Bloomberg and Volpe (2012) describe perceptual information as, "participants' perceptions related to the particular subject of your inquiry" (p. 136). This research study is based on the perceptions of the administration, teachers, and students as to the successfulness of the one-to-one initiative. Bloomberg and Volpe (2012) state:

perceptual information relies, to a great extent, on interviews to uncover participants' descriptions of their experiences related to such things as how experiences influenced decisions made, whether participants had a change of mind or a shift in attitude, whether they described more of a constancy of purpose, what elements relative to their objectives participants perceived as important, and to what extent those objectives were met. (p. 136)

Table 3.1***Types of information needed***

Type of Information	What the Researcher Requires	Method
Perceptual	The thoughts and attitudes of administrators, teachers, and students about one-to-one technology	Interviews, Observations, and Surveys
Contextual	Rich description of school – its history, size, academic performance, etc.	Existing data, Interviews, Observations
Demographic	Race, SES status, Teaching force characteristics, etc.	State Report Card, Existing data from Student Information System

Success, in this case, is a perception from the participants within the one-to-one initiative in Smallwood High School. What is perceived as success within Smallwood High School might not be perceived as success in another school.

The contextual information of Smallwood High School is needed to gain a better understanding of the size of the district, the traditions of the school district, and the academic performance of the school district both before implementation of one-to-one and post-implementation of one-to-one. The contextual information will allow the reader to understand better how one-to-one works within a school district of this size compared to studies done in larger or smaller school districts. Understanding the academic traditions of this school district will lead to a better understanding of how one-to-one has affected the academic performance of the school district. This data was obtained from existing data, interviews, and observations.

The demographic information of Smallwood High School will also guide the study to a better understanding of the background the students are coming from. It was important to note the socio-economic background of the students in Smallwood High School to obtain information on how the one-to-one initiative works as compared to other types of socio-economic

backgrounds. Racial demographics of Smallwood High School were also important to note to gain a better understanding as to how the one-to-one initiative works in different racial demographics.

In obtaining the following information, I will be able to address each of the four questions around which my research is based:

1. The implementation process that was used in Smallwood High School;
2. The teachers' perceptions of how well the implementation process went;
3. Professional development and instruction the teachers were given prior to the implementation process and continuing professional development;
4. Technology usage in the classrooms;
5. Teachers perception on the benefits of one-to-one technology for the students;
6. Teachers perception on the benefits of one-to-one technology for the teachers; and,
7. Administrations perception of teachers and student usage of one-to-one technology.

Research Design

The research design was based around my goals and research questions presented for this study. I used a case study with semi-structured interviews. The conceptual framework guiding this study was my own experiences within the implementation of a one-to-one initiative as well as current literature surrounding one-to-one initiatives. In order to establish validity of this study, I used multiple interviews with each participant and in-depth comparisons between groups. Those groups being district and building level administrators, teachers, and student surveys.

Figure 3.1 depicts the interactive research design (Maxwell, 2013) in which this study will function:

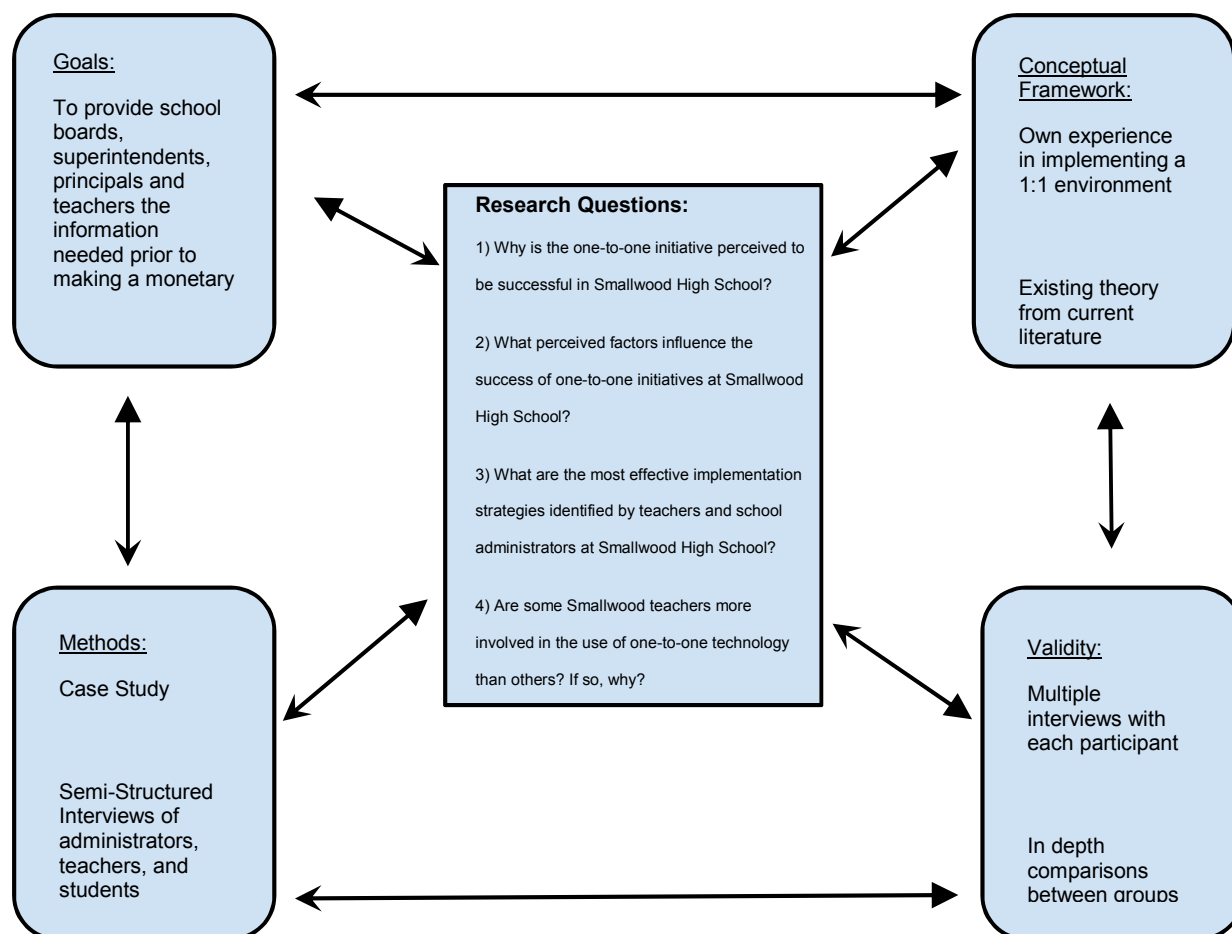


Figure 3.1. Research Design Flow

Data Collection

The method I utilized for my data collection is a case study with semi-structured interviews of district administrators, school administrators, and teachers (See Appendix A). I also surveyed students on their perceptions of the one-to-one environment (See Appendix B). These surveys included minor students in which I needed parental consent and student assent prior to their participation in the study. In addition, observations served as a third data collection strategy.

My data collection began with my immersion into Smallwood High School. I became familiar with the school district by making one visit to the school district before the data

collection phase. I toured the school, visited with the administration, and met staff members. I became familiar with the day-to-day operations of the school district.

The first step of the data collection phase was to submit consent forms to all students (See Appendix C). This was done utilizing an online signature. A link was placed on the school website allowing parents to consent for their children. The school has had success in the past utilizing this method, and the administrators made that recommendation to me. These consent forms provided parental permission for the students to be surveyed as part of the research. Student participants also signed an assent form in order to participate. This form was a paper version collected by the student's seminar teacher. I also obtained a consent form from the six teachers to be interviewed and all administration to be interviewed (See Appendix D). This was the first step before any further data collection took place.

I then delivered a survey to all students who have consented to the study and whose parents have assented for them to be a part of the research process. This survey was created electronically using Google Forms and shared with the principal of Smallwood High School. During the seminar period, the survey was shared with all student participants via their Chromebooks. Student responses were collected immediately upon them hitting the submit button. I was in the building during the survey should any issues have arisen. The next phase was interviewing the superintendent of schools and the Smallwood High School principal who have consented to be a part of the research study (See Appendix E). These interviews took place at a location of the administrators' preference to ensure the participants' comfort and capability of performing any job-related task that may arise during the interview process.

Upon completion of the administrator interviews, I began my interviews of the six teachers who consented to be a part of the study. These interviews took place in a comfortable

location for the participant. The interview process was kept at a length of one hour to ensure the participants' comfort and their ability to stay focused on the questions being asked.

The third phase of the research process will involve my observations of the classroom environments of the teachers who have been interviewed. This will allow me the opportunity to conduct field notes and view whether information that was given in the interview is actually taking place during the instruction process of the classroom. I will view all six classrooms of the teachers who participated in the interview process.

The final phase of the data collection was follow-up interviews with the six teachers who were interviewed prior. This interview process allowed me the opportunity to ask questions based on what was viewed in the classroom visits and recorded in my field notes. These interviews were also limited to one hour in length. It was then time to organize and analyze the data that was collected.

I then grouped the data into categories based on my research questions. These strategies were applied to my case study approach and my research question. The information used from this approach led directly toward answering the four questions around which my research was based. Administration interviews guided me towards effective implementation strategies. Teacher and student interviews guided me towards why some teachers are more involved in the use of one-to-one technology than others and whether the technology is the provided advantage or the teachers' use of the technology. All of the subgroups guided me towards the answer of why one-to-one initiatives are perceived to be effective at Smallwood High School.

Figure 3.2 depicts the design of the data collection process:

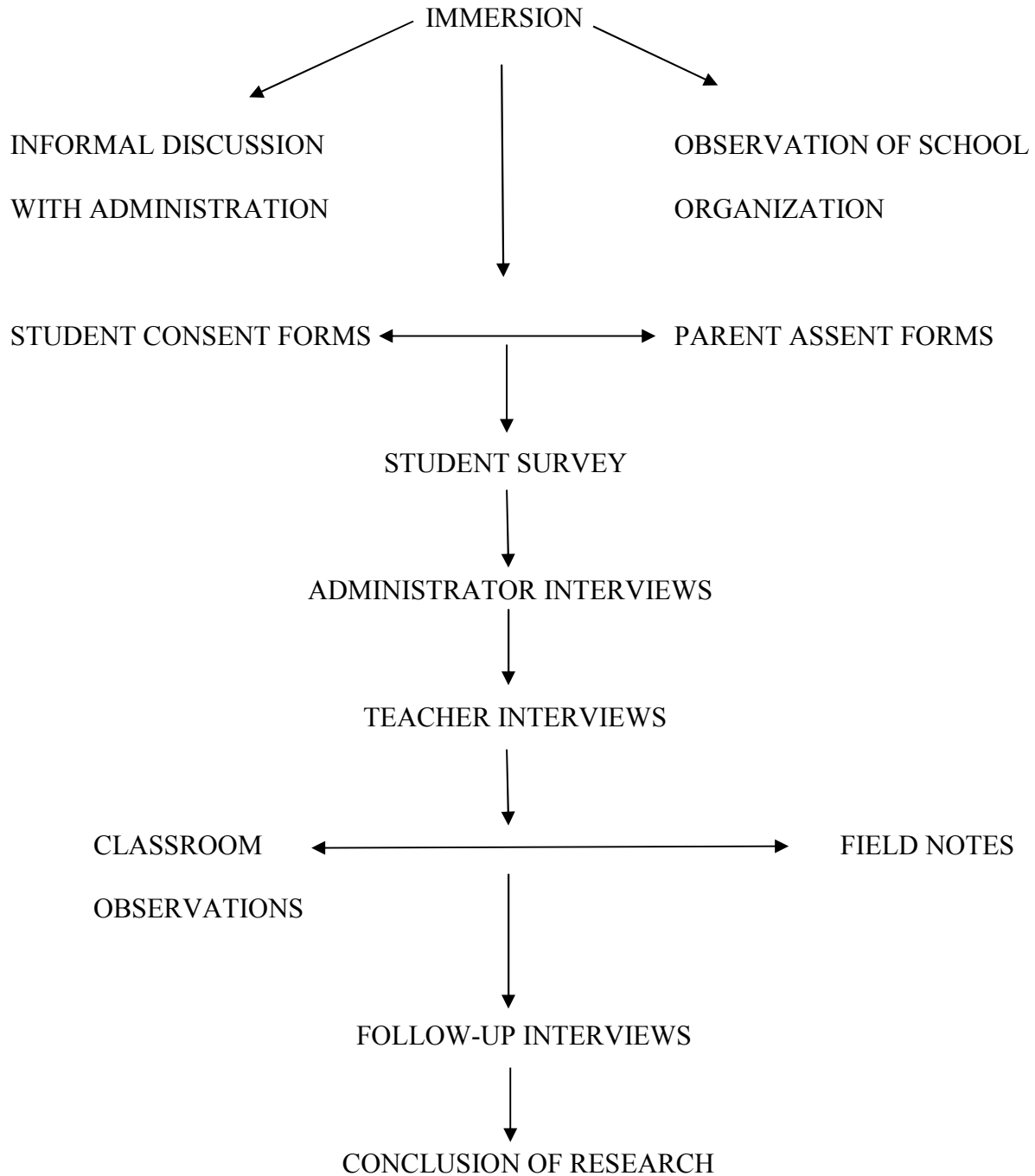


Figure 3.2. Research Design Flow

Data Analysis

The challenge of the research study was analyzing and organizing the collected data. Bloomberg and Volpe (2012) state, “your goal in conducting analysis is to figure out the deeper meaning of what you have found” (p. 202). The first step in analyzing the data was to group my interviews and surveys. I had two groups of interviews, administrators and teachers and one group of surveys from students. I also used field notes as I observed interactions within the classroom environment. I hired an outside source to transcribe the interviews before beginning the next step of coding the data.

Once I separated the interviews and surveys, I began coding the different sets of interviews. I began my preliminary coding by coding manually. As I become familiar with nVivo software coding program, I utilized it as I got deeper into the data analysis process. I used what Saldaña (2013) describes as initial coding for my first cycle coding. Initial coding allowed me the opportunity to compare the data for similarities and differences. Saldaña (2013) describes this as, “an opportunity for you as a researcher to reflect deeply on the contents and nuances of your data and to begin taking ownership in them” (p. 100). This approach allowed me the opportunity to become familiar with the data as I proceeded in the analysis process. The codes that were assigned were broad in terms and aligned to the overall goal of the study. As I began the second and third cycle coding, my codes were geared towards directly answering each of my research questions.

My study is a case study. The use of initial coding was appropriate as a starting point because of the multiple interviews and transcriptions that took place. Saldaña (2013) states, that initial coding is appropriate for “studies with a wide variety of data forms” (p. 100). Using initial coding for this first cycle of coding allowed me to put the data into an organized format as

I moved forward. Once I established my initial codes, I was able to establish emergent patterns, categories, themes, concepts, and assertions (Saldaña, 2013). I then transitioned into second cycle coding. The transition stage between first and second cycle coding began to take the data from codes to themes. Saldaña (2013) explains, “theming may allow you to draw out a code’s truncated essence by elaborating on its meanings” (p. 205). I utilized nVivo coding software for my second cycle coding.

Theming the data was my start for second cycle coding. Saldaña (2013) discusses theming the data as an approach for first cycle coding; however, theming was appropriate in my study for second cycle coding as an approach to narrow down the data to directly answer each research question. Saldaña (2013) discusses theming in studies as follows, “theming the data is appropriate for virtually all qualitative studies, and especially for phenomenology and those exploring a participant’s psychological world of beliefs, constructs, identity development, and emotional experience” (p. 176).

The themes that I used during second cycle coding took my initial codes and themed them into codes that directly led to answering my research questions. Each theme was labeled in terms that relate to each of the research questions. The benefit of using theming after my initial coding was the themes derived from the codes began to link the data back to the research questions.

Once I completed second cycle coding, my codes and themes led to answering my research questions. At this point, I used codeweaving (Saldaña 2013). Saldaña (2013) recommends, “codeweaving the primary codes, categories, themes, and/or concepts of your analysis into as few sentences as possible” (p. 248). Saldaña (2013) continues, “search for

evidence in the data that supports your summary statements, and/or disconfirming evidence that suggests a revision of those statements” (p. 248).

Codeweaving was beneficial as I began presenting the data in written form. Saldaña (2013) recommends, “use the codewoven assertion as a topic sentence for a paragraph or extended narrative that explains the observations in greater detail” (p. 248). Codeweaving was beneficial in my study in transforming the material from data to written form.

Once the coding process was complete, the organization of the research into written form was the next step. I obtained initial codes, transformed them into themes through theming, and developed topic sentences through codeweaving; it was then important to focus on one thing at a time. Saldaña (2013) explains, “if you have constructed several major categories, themes, concepts, or theories from your data, start by writing about them one at a time” (p. 257). At this point, the organization of the research took form. Using my first and second cycle coding methods, I organized that data into topics to be discussed within the research. Topics were discussed in their relationship to answering my research questions. After addressing each topic and its relationship to answering the research questions, Saldaña (2013) states, “after you have discussed each element separately, then you can begin your reflections on how these items may connect and weave complexly together” (p. 257). This process will allow me as a writer to maintain organization and not jump from topic to topic.

The design of the data analysis is depicted in Figure 3.3:

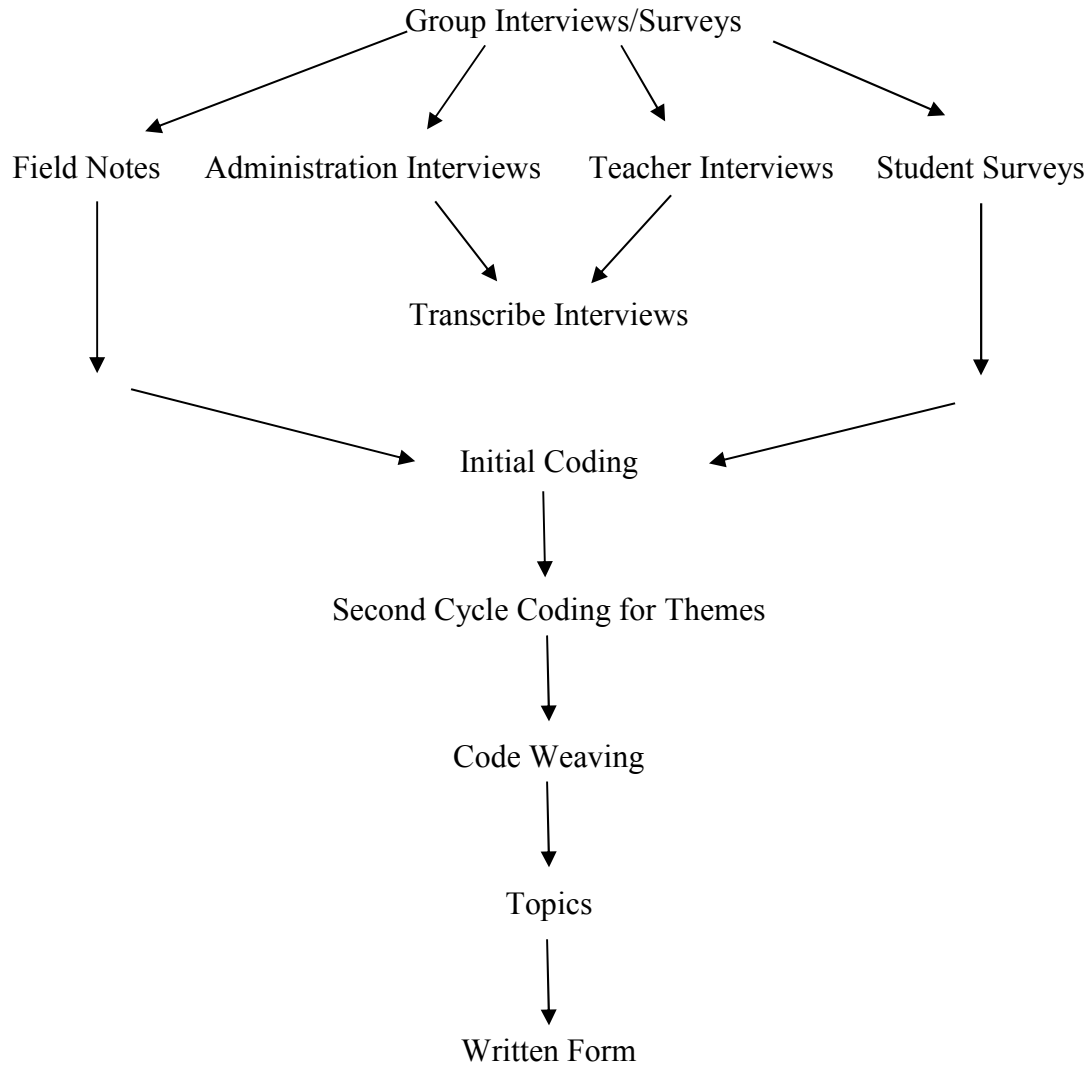


Figure 3.3. Data Analysis Flow

Ethical Considerations

Whenever we enter into the realm of qualitative research, there are always ethical considerations that must take place to ensure trustworthiness and safety of those involved within the study. Bloomberg and Volpe (2012) state, “As researchers, we are morally bound to conduct our research in a manner that minimizes potential harm to those involved in the study” (p. 205). The ethical consideration of my study is the safety of the participants involved. Participants must be safe from employers holding information against them and from being identified by

outside readers. I interviewed six teachers, two administrators, and surveyed 185 students. I also observed classrooms to gather data based on interviews compared to classroom practices.

It is important for me to convey to the reader that these ethical issues have been considered (Bloomberg and Volpe, 2012). In order to produce a quality research project, I explored the positive and negatives that the teachers perceived within the one-to-one initiative. Teachers may have been hesitant to give negative information on the initiative in fear that it will be read by an employer. The same is the case for administrators who may have differing perceptions from that of the superintendent. I consider this an ethical issue because the participants must feel safe for them to be truthful in their responses which provide the data that is needed for a trustworthy study.

The process of surveying minor students presents an ethical challenge for the safety of those students. Protecting the interest of minor students and their identities will be of utmost importance. I worked with the Institutional Review Board to ensure the process will respect the privacy of minor students and work within the consent of their parents. I consider this an ethical issue because of the sensitivity surrounding minor students and their safety, not only within the study but outside of the study as well, meaning no reader of this research will be able to identify any demographic information of minor students with any ability to contact them.

The issue of classroom observations is an ethical issue in two ways. First, my presence in the classroom as a non-evaluator in the district can be viewed as intimidating for both the teacher and the students. An outside person within a classroom of minors is not the norm within the classroom environment. The second issue is the threat the teacher may feel by having an outside person observing his/her classroom and the feelings from the teacher about the researcher being judgmental about practices taking place in the classroom.

In order to provide a trustworthy study, it is important to address these ethical issues and provide safeguards for all participants involved in the study. In the next section, I will provide information for the safeguards I utilized to protect the participants.

Identification of Safeguards

Bloomberg and Volpe (2012) mention, “because protection of human subjects is such an important issue in social science research, the main point is that you acknowledge and convey to the reader that you have considered and taken heed of the issues involved” (p. 206). In this section, I will convey how I safeguarded the subjects of my research.

First, in order to safeguard all participants, the name of the school district that is researched has been changed to Smallwood School District and in particular Smallwood High School. The city in which the district resides was not used. The geographic location of the district “rural Midwest” was used to provide the reader with information as to where the school district is located. The reason for using a geographic location is for the reader to gain an understanding of the demographics of the study. Providing these changes will limit the ability to trace the study back to a specific school or participant of the study.

In order to protect the teacher and administrator participants, names of participants were not used. Instead, I used pseudonyms. Specific subject areas taught were used to provide data as to which subject areas may utilize one-to-one more effectively. Providing this safeguard will not allow participants to be recognized by superiors and readers.

To protect the student participants within the study, I submitted through the help of the building principal a survey to all students who have assented and have had parental consent to participate. I analyzed all surveys that were completed. Students were not asked to submit their name or their age. Their name and age were not used within the study. I was approved through

IRB to ensure the safety of minor students (See Appendix F). In order to protect the participants during the observation portion of the research, teacher and student names will not be used. As a researcher, I spent time getting to know the teachers and the classrooms in which the observations took place to gain credibility with all participants in the classrooms. This provided trustworthiness between the participants and the researcher.

IRB approval was also used as a safeguard for this study. Any approach to this research must gain IRB approval in order to be used. The IRB ensures the safety of all participants involved.

All participants involved were required to assent or consent to the study. Teachers and administrators must assent before being used as a participant in the study. Minor students must assent, and their parents must consent as well. Any person who did not consent was not used nor discriminated against for this research project. Providing these safeguards to the participants of the study will address any ethical issues of the study. The safety and confidentiality of the participants are of utmost importance.

Trustworthiness

To ensure that my study is both valid and trustworthy, I used two interviews with each participant. The first interview was designed with prescribed questions to guide the interview. The second interview was based on data received during the classroom observation period of the study. The first interview took place prior to the classroom observation portion of the research, and the other took place after the classroom observation. I ensured that the study took an adequate amount of time and ensured that I was in the place of study frequently. I used in-depth comparisons between groups of participants. I used “getting to know you” visits and email and phone communication with each group to ensure a positive relationship between myself and the

participants of the study. The amount of time I spent within the study produced trustworthiness and validity to the readers of my study.

Risks and Benefits

With any research study comes risks and benefits. I feel a good research study has a minimal risk with maximum benefits. I provided that with this research study. The foreseeable risk for the participants of my study were teachers possibly being viewed as not effective.

Obviously, I will protect the identity of the participants of the study; however, the participants will read the results of the research. The study may cause resentment amongst staff members.

The benefits, however, outweigh the risks. The benefits of this study will provide school districts more detailed information on the effectiveness of implementation and teacher/student usage in a one-to-one environment. School districts will know the benefits of becoming a one-to-one school system. They will know what works and what does not work. This study will provide information why students in Smallwood School District have an educational advantage in a one-to-one environment. School districts can make effective monetary investments on one-to-one initiatives that work best for them. The research will detail why students will have a more engaging educational experience that provides them with the 21st-century skills they will need to advance to college or into the workforce. This study will provide effective implementation strategies and teaching strategies in a one-to-one environment.

Limitations

The potential limitations of my sample are the willingness of the subjects to participate and the willingness of the participants to discuss the negatives of the one-to-one process. It was important to identify the gatekeepers or the people who could open access to the information I needed to help enable access into the school community. My immersion into the school

environment helped alleviate these limitations. It was important to establish myself as a trustworthy researcher to alleviate any fears. The fact that this was a case study approach is a limitation in itself where at best the findings might inform similar cases but are not generalizable.

Timeline

In September of 2017, I concluded the work on my literature review and continued to edit my methodology and chapter three of this dissertation. In October of 2017, I successfully defended the proposal of this study to my dissertation committee. The Institutional Review Board (IRB) approved my research study on November 17, 2017.

My research took place early December of 2017. I used one day at the beginning of December to immerse myself in the Smallwood High School and to deliver consent forms to teachers and administration participant. I delivered consent forms to the administration for student interviews before my arrival. The administration of Smallwood High School utilized their school website for parents to consent electronically for their students to participate. I utilized one day in December to conduct my interviews with the administration. The following two days I conducted my interviews with the teacher participants. I used two days to conduct my observations and field notes. There was a delay in administering the student survey due to instructor absence in the building. The student survey was collected on my third day in the building during the student's seminar period. By the middle of December, the research phase was complete. I then used the remaining days of December to analyze the data. Once the data was analyzed, I began the writing phase of the research. The research project was completed in dissertation form in March at which point I defended my dissertation in early April. I anticipate my graduation date being May of 2018.

CHAPTER FOUR – DATA ANALYSIS

The purpose of this case study was to examine the one-to-one technology initiative and its implementation at one rural mid-western high school. It was intended to understand the perceived effectiveness through the eyes of six teachers, one building level administrator, and one superintendent of schools through semi-structured interviews and classroom observations. It also intended to understand student perceptions through the use of a student survey. To maintain the confidentiality of all participants, pseudonyms were provided for each teacher and administrator interview participant.

This chapter will review the research questions that drove this study, provide a description and the demographics of Smallwood High School, and present the findings of the study. The chapter will include teachers and administrators responses received from the semi-structured interviews and descriptions from what was viewed during classroom observations. It will also provide the student survey results.

Research Questions

The four research questions for this case study of Smallwood High School are as follows:

- 1) Why is the one-to-one initiative perceived to be successful in Smallwood High School?
- 2) What perceived factors influence the success of one-to-one initiatives at Smallwood High School?
- 3) What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?
- 4) Are some Smallwood teachers more involved in the use of one-to-one technology than others? If so, why?

Demographics

Smallwood High School is located in a rural mid-west town with a population of 3,700 people. It is a single community school in which students are located within the city limits and come from rural areas around the city. The community has several small businesses and a few large companies that make up the employment opportunities, as well as having a large number of patrons involved in farming. The city has a strong public library that was recently voted best small library in the state. There are numerous construction projects taking place on the school campus in conjunction with the local parks and recreation department. There appears to be a sense of overwhelming support and pride for the school as was indicated by the superintendent of schools Mr. Pearce, “there is a lot of support for the schools, a lot of positive support. In some ways the support is, call it, almost unquestioned support.” Smallwood High School was chosen for this study due to the perceived success of their one-to-one initiative. Over the past several years teachers and students have experienced changes in the types of device used. Smallwood High School has been one-to-one with MacBooks, iPads, and now Chromebooks. Having utilized three different devices also will provide more insight into one-to-one technology in education.

Smallwood High School has a student enrollment of 260 students. 80.77% of the student population is Caucasian, 10.38% Hispanic, 3.08% African American, and 5.77% classified as other. Of those 260 students 25.4% are considered to be economically disadvantaged, this number has dropped from 28.7% in 2013. This number is determined by the number of students on free or reduced lunch. Smallwood High School has a student with disabilities rate of 8.08% (see table 4.1).

Table 4.1***Smallwood High School demographics***

Category	Population
Racial Ethnicity	
Caucasian	80.77%
African American	3.08%
Hispanic	10.08%
Other	5.77%
Socio Economic Status	
Economically Advantaged	74.62%
Economically Disadvantaged	25.38%
Disabilities	
Students Without	91.92%
Students With	8.08%

Smallwood High School consistently has a high graduation rate with a five year graduation average of 95%. In the past five years of those 95% of students who graduated, 64% after two years are either enrolled in college, hold a 2 year degree, are enrolled in a vocational program, or hold a certificate in a specific trade (see table 4.2).

Table 4.2***Graduation rate and post-secondary success***

	Population
Graduation Rate	95%
Post-Secondary Success Rate	64%

Smallwood High School does have a two year junior college located in the city limits, a four year college within ten miles, and a major university within 40 miles. A majority of Smallwood High School students who graduate attend one of those institutions post-secondary.

Participants

The participants in this study consist of six teachers, two administrators, and the survey of 185 students. Mr. Pearce the superintendent of schools has served as superintendent for the

past three years. Prior to being named superintendent of schools, Mr. Pearce served as the Smallwood Middle School principal for three years. Mr. Pearce has 17 years of experience in education and Smallwood is the second district he has served with a one-to-one initiative. Mr. Pearce was selected to participate in this study as the only superintendent in the district.

Mr. Hill has served as principal of Smallwood High School for the past six years and served as a health and physical education teacher in the same school prior to serving as the principal. Mr. Hill was chosen for this study as the only high school principal. Prior to my arrival to conduct my study I asked Mr. Hill to help identify six teachers who represented each of the core subject areas, had differing experience levels, and who had different comfort levels and beliefs regarding technology. With Smallwood High School experiencing changes in devices used over the past few year it was important to also locate teachers who had experience with the different devices. Once Mr. Hill identified teachers, I contacted them to obtain their consent to be a part of the study.

Mrs. Kasey is a math teacher at Smallwood High School. Mrs. Kasey is in her eighth year of teaching all at the high school level. She has taught at three different schools ranging from students of 80-400 students. Mrs. Kasey describes her technology comfort level as, “extremely comfortable with any Mac device.” Smallwood High School is the first school that Mrs. Kasey was employed that had a one-to-one school initiative. When she arrived at Smallwood, they were going away from the MacBook Pro and switching to iPads during that time.

Mrs. Gibson is a business/CTE teacher at Smallwood High School. Teaching is a second career for Mrs. Gibson as she started her career in the banking industry. After moving around multiple times for her spouse’s career she began substitute teaching and found a passion for

education and went back to school to get a master's degree and her teaching certificate. Mrs. Gibson describes her comfort level with technology as, "probably on the higher end. I am a teacher that likes to integrate technology as much as possible." Mrs. Gibson has been a part of Smallwood High School before the one-to-one initiative when computer labs were utilized, to the implementation of MacBook Pro's, then iPads, and now with Chromebooks. Mrs. Gibson has a different classroom environment as her classroom is the student center where students run a business inside of the school.

Ms. Gray is a social studies teacher at Smallwood High School. She is in her fourth year as a teacher and Smallwood is the only place she has taught. When asked about being in a one to one environment she responded, "I don't know anything besides being one-to-one." When Ms. Gray started at Smallwood High School they were one-to-one with iPads and now they have Chromebooks. Ms. Gray explained her experience in technology as, "I'm a millennial so to me, it's normal having them around. I use it a lot for organizational purposes." Ms. Gray is early into her teaching career and feels she can relate to the students and their everyday use of technology in the millennial era.

Mrs. Jones teaches English at Smallwood High School. She initially taught physical education for five years in a larger school district before facing a reduction in force due to a cut in school funding. She went back to school and obtained her English teaching certificate. Mrs. Jones has been at Smallwood High School prior to the one-to-one initiative. When asked about her comfort level with technology she responded, "I feel fairly comfortable. I was part of the tech-8 team they called us when we first got the MacBooks. I am comfortable with it (technology) to do what I need to do." Mrs. Jones is comfortable with technology as she mentioned but also feels technology can be a distraction in the classroom.

Mrs. Harris is in her tenth year of teaching all in the Smallwood School District but has served in multiple roles. She is currently the business and technology teacher at Smallwood High School but has served in the past as the technology facilitator for the entire district and was a part of the original one-to-one initiative. In discussing her comfort level with technology Mrs. Harris shares:

I would say, if you would've asked me that three years ago, I would've said extremely comfortable, probably nine out of ten. Now that I'm back in my own little hole and not out and about, and I'm not teaching it to other people, it changes so fast, I feel like I'm kind of back to average.

Mrs. Harris enjoyed her time as the technology facilitator because it allowed her the opportunity to go learn and then come back with tools for teachers to use.

Mr. Scott is a graduate from Smallwood High School and is in his 16th year of teaching science. He is in his tenth year of teaching at Smallwood High School also having taught six years in another small rural school. Mr. Scott was a part of the original tech-8 team mentioned by Mrs. Jones and was a part of the initial one-to-one initiative. Mr. Scott describes himself as comfortable with technology, "science and technology kind of go hand-in-hand, so a lot of times science sort of drives that technology." Table 4.3 provides a snapshot of the teachers participating in the study.

Table 4.3

Participating teachers

	Subject Area Taught	Years in Teaching	Years at Smallwood	Technology Comfort Level
Mrs. Kasey	Math	8	4	High
Mrs. Gibson	Business	20	20	High
Ms. Gray	Social Studies	4	4	Medium
Mrs. Jones	English	20	10	Medium
Mrs. Harris	Technology	10	10	High
Mr. Scott	Science	16	10	High

I anticipated having a more varied technology comfort level within my teacher pool. Through the interview process it became apparent that my pool was more limited in the area of technology comfort as all six participants had a medium to high comfort range with technology.

Student Survey Results

The student survey was presented utilizing a Google Form. The form was shared with Smallwood High School Principal Mr. Hill who shared the form with all students who were eligible to participate based on consent. The students took the survey during their seminar class time utilizing their school issued Chromebooks. The opportunity to participate in the survey was given to all 260 students of Smallwood High School, 185 students chose to participate in the study providing a response rate of 71.2%. The survey consisted of 15 questions in which students were not obligated to answer every question if they did not choose or felt uncomfortable in answering such questions. The student participants break down by 19.5% seniors, 22.7% juniors, 35.7% sophomores, and 22.2% freshman.

The participants of the survey were asked through their elementary, middle, and high school career how many years have you been in a one-to-one environment. 3.9% of students have been a part of a one-to-one environment for 10 or more years, 17.7% 6-10 years, 44.8% 3-5 years, and 33.7% 1-2 years (see Table 4.4).

Table 4.4

Survey results for number of years involved in a one-to-one school environment

Years in one-to-one environment	Population
1-2 years	33.7%
3-5 years	44.8%
6-10 years	17.7%
10 or more years	3.9%

In order to obtain student perceptions on the amount of training students were given by Smallwood High School, students were asked how much training they received by the school on using the one-to-one device. Figure 4.1 shows the response rate for the student perceptions.

How much training did your school give you on using the one-to-one device

184 responses

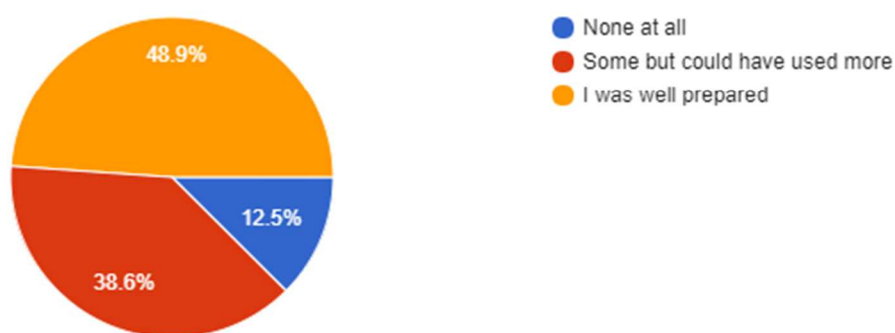


Figure 4.1. Survey results for training received by students on using one-to-one

The students of Smallwood High School typically have between four and seven teachers per semester, with a majority of the students reporting they have seven teachers per semester. Table 4.5 depicts the student's perceptions of the number of teachers who utilize one-to-one technology in their classroom.

When asked what subject area one-to-one technology was used the most, students responded with Social Studies, Science, and English as the top three classes. Students were also asked what class they utilized the one-to-one technology the least. With Physical Education, Elective courses, and English as the top three courses that one-to-one technology is utilized the least. English courses were in the top choices for most usage and least usage (see table 4.6).

Table 4.5***Student perceptions on the number of teachers who utilize one-to-one technology***

Number of teachers who utilize technology	Percentage
None	4.3%
1-2 teachers	6.5%
3-4 teachers	29.3%
5-6 teachers	39.1%
7-8 teachers	20.7%

Table 4.6***Technology usage by subject***

	Technology most used	Technology least used
English	19.6%	21.6%
Math	13.0%	16.8%
Science	24.5%	3.2%
Social Studies/History/Govt.	30.4%	4.3%
Physical Education	1.1%	32.4%
Electives	11.4%	21.6%

When asked how often during a typical class period do students utilize their device, 9.2% of students reported that most of the class period they are utilizing their device. 37.5% indicated that they utilized their device for half of the class period. 48.4% of students indicated they utilized their device of a quarter of the time. 4.9% of students responded as not utilizing the device during a typical class period (see table 4.7).

Table 4.7***Technology time utilization***

Amount of Time	Percentage of Students
Most of the class period	9.2%
½ of the class period	37.5%
¼ of the class period	48.4%
None at all	4.9%

Students were asked what activity they use the one-to-one technology for the most. They were given the following options; word processing, collaborating with peers, receiving classroom instruction, communicating with the instructor, or other. When selecting other, students were given the option to write in their response. 38.8% of students selected receiving classroom instruction, 30.1% report word processing as the activity for the most usage, and 4.4% report collaborating. The 26.7% of students who selected other had a wide range of usage such as notes, research, and assignments (see table 4.8).

Table 4.8

One-to-one technology activity

	Students Reporting
Classroom Instruction	38.8%
Word Processing	30.1%
Collaboration	4.4%
Other	26.7%

The overwhelming majority of students prefer being in a one-to-one technology environment compared to a traditional classroom setting with 79.9% of students surveyed reporting this. 20.2% of students surveyed prefer the traditional classroom setting.

A majority of students report having internet access at home with 97.3% reporting to have access at home. While only 2.7% report having no access at home.

Smallwood High School students would rate their internet access at school favorable when asked to report on a scale of one through five with one being poor and five being outstanding 51.9% rate the internet access at a level of four, 24.9% at a level of three, and 13.5% at a level of five. Few students rate their internet access as not favorable with 2.2% reporting internet access at a level one and 7.6% reporting access at a level of 2 (see figure 4.2).

How would you rate your schools internet access? 1 being poor and 5 being outstanding.

185 responses

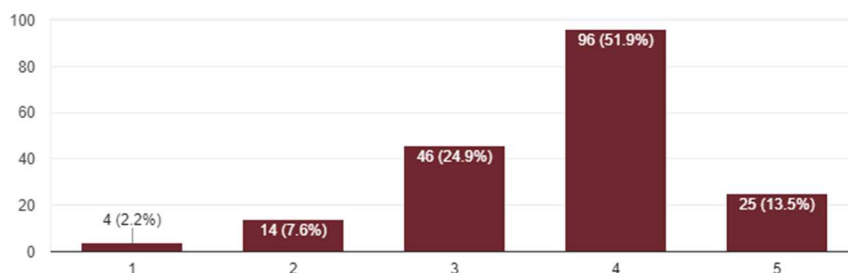


Figure 4.2. Internet access at school

When students were asked to select their top three biggest advantages to a one-to-one environment was, 89.7% report research capability in their top three, 69% report the ability to re-write drafts of paper, 67.4% reported organization as an advantage, and 40.8% report increased computer skills. 25% of students report communications as an advantage, 13% state that instructors using new instructional strategies, and 6% report increased instructor feedback. Less than 4% of students select other as an option (see table 4.9).

When asked to select the top three disadvantages to a one-to-one environment students overwhelmingly report machine breakage as one of the top three reasons with 67% of students claiming this. The ability to stay on task during school was listed by 53% of students. The ability to show their work in math class was also an issue with one-to-one technology confirmed by 40% of the students surveyed. Lack of face to face communication with the instructor was an issue for 36.8% of students. Students also claimed health reasons as a disadvantage with 32.4% claiming that eye strain was a problem for them and 28.1% claiming headaches as a disadvantage (see table 4.10).

Table 4.9***Top three advantages to one-to-one***

	Students Reporting
Research Capability	89.7%
Rewrite Drafts	69.0%
Organization	67.4%
Increased Computer Skills	40.8%
Communication	25.0%
New Instructional Strategies	13.0%
Instructor Feedback	6.0%
Other	<4.0%

The information in table 4.9 resonates with current research in student advantages of one-to-one technology. Writing, editing, and gathering information from the internet are the most common forms of technology usage (Zing et. al, 2016).

Table 4.10***Top three disadvantages to one-to-one***

	Students Reporting
Machine Breakage	67.0%
Ability to Stay on Task	53.0%
Ability to Show Work in Math	40.0%
Lack of Face to Face Communication	36.8%
Eye Strain	32.4%
Headaches	28.1%

Table 4.10 disagrees to an extent with current research. Current research suggests eye strains, headaches, and lack of face to face communication as disadvantages (Duran & Aytac, 2016; Spanos & Sofos, 2013). Machine breakage was not discussed in the research.

Students were asked to briefly explain their thoughts on the impact or non-impact of one-to-one technology in school. They were asked to detail any likes or dislikes. Students had mixed opinions on the effectiveness of one-to-one technology. One student explains, “I have

been working with technology my entire high school career, I can't imagine being able to efficiently do the same amount of work without it."

While another student agrees that the one-to-one technology is effective but also sees issues with it explaining, "one-to-one technology is good in some ways. For example, you're more organized and can research topics but with the one-to-one technology you could start to lack social skills and can't explain questions to people face to face."

Other students are also in agreement that the one-to-one technology has both advantages and disadvantages stating:

I think that the ability for every student to have a computer to use all the time is really good and helpful. It is great when it comes to organization and for people who have bad hand writing. The impact is mostly really good but one thing that is bad about it is the fact that it is a lot easier to get distracted.

Many students claim the ability to work at a faster pace is an advantage to a one-to-one environment stating:

I like being able to have my computer to type notes because it is a lot faster than writing them out. Also, for research papers it's nice to have and be able to take home to work on it and get it done faster.

Another student mentions:

I think having a one-to-one technology ratio in the school has been helpful for me personally because it makes writing papers and speeches a lot easier. I like using Google Classroom and being able to see when assignments are due or what I am missing.

Students also claim utilizing Google Classroom is an advantage of one-to-one technology. One student claims utilizing Google Classroom helps them in getting work turned in, "I like the ability to turn in things instantly online through Google Classroom and I enjoy the access to other tools online that a one-to-one technology setting gives students."

The overwhelming negative that students reported about the one-to-one technology is the durability of the Chromebook being used. The upperclassmen have an older machine while the younger classmen have a newer more durable version of the Chromebook.

One student claims, “I like the one-to-one technology but I do not like how bad the computers are.” While another student states, “I hate these Chromebooks, they are too cheap and they die way too much. Sometimes some of the keys don’t work. Overall the only thing this machine is good for is writing papers while hooked up to a charger.” Another student understands the issues that other students face while they do not experience the same problems stating:

I like being able to easily access work from my teachers on my computer during high school. If you miss you know what to do and how to easily make up the work. I don’t like that some computers don’t work properly for some students but I have never had that problem.

One of the upper classman who was a part of the iPad initiative claims:

I like using it for writing papers and doing research. I don’t like the current technology we have because it’s low quality and doesn’t work right. Our previous iPads worked fine for me though and it is very helpful to have one-to-one technology at our school.

While students differ in their opinions of one-to-one technology a majority of the students understand the purpose. Organizing work and being more efficient in doing their classroom assignments is an overwhelming theme in positive responses. The device itself is the problem for the students who view one-to-one technology negatively.

Research Question One

Interviews, classroom observations, and student surveys all provide detail as to why the one-to-one initiative is perceived to be successful in Smallwood High School. The key topics for the perception of success as a one-to-one program at Smallwood High School are driven by the

lack of technology prior to implementation of one-to-one, sustainability over time within the one-to-one program, teacher perceptions of success, and a community expectation.

Prior Technology

Prior to Smallwood High School implementing one-to-one technology, the overwhelming consensus from each of the teachers interviewed was that Smallwood High school was deficient in the area of technology. Mrs. Gibson would describe it as, “in my opinion we were very far behind, technology-wise. We had labs that wouldn’t connect, we had to sign up for a lab time. You would get in there and sometimes the internet was available and sometimes not.” The frustrations of the deficient technology were felt by others as well.

Smallwood High School Principal Mr. Hill describes it as, “we have these archaic dying machines and we could replace those with other desktop machines, but that wasn’t the trend at that point here. The trend is more mobile devices.” The mobile devices Mr. Hill is describing refer to machines such as laptops and the beginning stages at that time of schools going with one-to-one technology.

With failing technology in the district, teachers became frustrated to the point they were no longer using or attempting to use the technology that was available during that time.

Smallwood High school had computer labs, a writing lab, a business lab, and several desktop machines located around the building. The amount of technology available during that time was not the issue, but more so the reliability and the accessibility of the technology.

Mr. Hill discussed a little bit of the frustration teachers were feeling at that time:

that sounds really cool back in 2008-2009, those years that we had those set up that way, but we were just at the point where nothing worked. Teachers where not using what we had because they knew if they went down there it was just going to be a lesson in frustration.

When moving to a one-to-one program the perceived effectiveness was felt immediately due to the major improvement just in the infrastructure. It was not difficult for Smallwood High School administration to get teachers on board in implementing one-to-one technology, Mr. Hill explained:

that's where it was pretty easy I think to have people on board with the thought of it, even though at that time we're talking about now seven/eight years ago. I don't think it was hard for collectively our staff to get on board because they were frustrated with what we had at that time.

Teachers and students have noticed the overall effectiveness just within the network accessibility with 90.3% of the students ranking the Smallwood High School internet access at a range of three or higher as shown in (figure 4.2). The teachers of Smallwood High School would also agree that major improvements have been made to the network infrastructure. All six teacher participants for this study agreed that prior to the implementation of one-to-one at Smallwood High School the network was unreliable, they have now improved the network to handle every machine in the building at an acceptable rate for educational purposes. Mrs. Harris describes the change as, “extremely reliable now compared to the first year that we had it. Oh my gosh, it was down all the time.” The lack of reliability of the internet prior to implementing one-to-one technology was an issue shared by many of the participants of the study.

Mr. Scott shares the same thoughts as Mrs. Harris, “yeah, it's usually pretty reliable. And that's actually gotten better, I would say, the last five years.” Mr. Scott does not recall one time this school year where the internet has been down and students have complained about failure for information to load.

The perception of success is derived partly from Smallwood High School moving from a technology deficient school to a one-to-one environment. However, the perceived success is

based on more than just making a change in adding technology, it is also based around what the teachers and students are doing with the technology and how sustainable the technology will be.

Through the interview process it became apparent that there is a community expectation for Smallwood High School to provide their students with the best possible education available.

Superintendent Pearce explains:

There is a lot of support for the schools. A lot of positive support. In some ways the support is, call it, almost unquestioned support, where it's like we want people to question some of the things that we're doing, and technology's a good example of that. We invest heavily, so the community's invested heavily in technology and so we want to be held accountable to do it right. We love support but we also encourage people to say, so we're spending this amount of money, what's the bang for the buck here?

With that support comes the expectation that Smallwood High School will utilize the monetary investment in technology to benefit their students. Smallwood High School has continued to develop their one-to-one initiative to better meet the needs of their students, with a balance of being economically sustainable. They have gone from an initial investment in Apple MacBook Pro's, to iPads, and now to the more feasible Chromebooks.

Sustainability

A theme to the perceived success of the one-to-one program at Smallwood High School is the ability to be sustainable over time. In making an initial investment with MacBook Pro laptops, the district decided that was not sustainable within a rural school budget that is ever changing based on the state funding formula to continue to buy the high priced MacBooks.

While they were liked by all, the cost involved could be utilized just as well with a lower priced machine. The district opted at that time to change to iPads. The change to iPads was made due to the familiarity with Apple products as to not cause a shock to the entire system. Mrs. Harris who at the time was a technology coordinator in the district stated, "we cannot switch to Chromebooks. The teachers will just be so mad because we invested so much time and it is a

learning curve to switch to Apple. So, that's why we chose to stay with iPads." The determination of the team to stay with an Apple product was driven by the comfort level of the teachers.

It was quickly determined that the lack of a keyboard was a major setback for high school aged students and the price of an iPad was still considerably larger than that of the new Chromebooks. Mr. Scott discusses the change to Chromebooks, "I think we're probably where we need be with Chromebooks. I think it's probably if you balance out the cost versus what it will do, I think it's pretty good." The Chromebooks were decided upon as a balance between funding and academic capability. The school did not want to invest solely in technology while other academic needs and school based goals were placed on the back burner. The school needed to find a balance between technology and other needs. Mr. Pearce describes how Smallwood High School was able to find this balance:

I was looking at what we were sacrificing so we're investing a million dollars in something new, we're going have to give something up and a lot of that was professional development. Some of the long-standing initiatives we had in Smallwood were put on the side a little bit as we brought in more technology, so the transition to Chromebooks now has really allowed us to reinvest in some of those long-standing initiatives that we've had, like cooperative learning and some of those types of things too.

The biggest complaint the students have with the one-to-one technology with the Chromebooks is machine breakage. This was especially apparent with the upper class students who are utilizing the original Chromebooks. Smallwood High School has made a change to a more durable machine for their freshman students who are not experiencing the same breakage problems. The school will continue to purchase the more durable version of the Chromebook in the future. The teachers were asked how they adapt to issues where students have broken machines or are unable to utilize the device for any reason. Each of the teachers adapted and

found ways to continue to move forward for each of these students. Mrs. Kasey explains in her math classes:

If I have a class of twenty in here, I think at least two of the Chromebooks would probably be broken or not charged or not able to be used in the given day. And so, I let them use their phones because everything that they can do on the Chromebook in my class, they can do on their phone.

Mrs. Gray has also had to make those adaptations in her social studies classroom, “I have one student who doesn't have a device anymore. I try to not depend on it. If it can't be manipulated to be a hard copy of something, then it's really, really hard for those kids.” The ability for teachers to be flexible and find new ways to teach when the technology is broken was identified by each teacher. While the frustration of not having the machine due to breakage is a disadvantage, the students as a majority understand they are fortunate to be given a device by their school with 79.9% of students reporting they prefer a one-to-one technology setting compared to a traditional classroom setting.

Teacher Perceptions

The six teacher participants share the perception that Smallwood High School has an effective one-to-one technology program. However, they each have a different idea about what success is. Mrs. Kasey would agree that Smallwood High School is successful in their one-to-one program because all students have access to a device while at school, she explains, “we have experimented with a wide range of devices but I believe Chromebooks suit the needs of our students.” Students at the high school level having access to a keyboard was beneficial. The Chromebooks provided the students with internet access along with a keyboard that was missing in the iPad setup.

Mrs. Jones has a different perception of what success is. Mrs. Jones is not a firm believer in everything technology and still prefers a lot of traditional methods to teaching English. She

does believe however, “while technology can be a pain at times, for the most part, it has made teaching and learning a bit more efficient.” Mrs. Jones feelings of teaching and learning being more efficient is devised around the organization the technology allows teachers and students to utilize as well as students having immediate access to information.

Mrs. Harris believes that success can be measured in many different ways, “especially when you are talking about the array of things that come with a tech integration program.” However, she would classify Smallwood as successful stating, “as far as one-to-one technical aspects and organization yes, we are successful. Every student has a device, teachers are able to be more efficient”. She also believes however that there are areas of improvement for Smallwood High School:

I believe we have areas we can also be improving in including higher level technology uses of integration such as the creation aspect. We aren't about the latest trend or fad, but instead the meaty components that can be used to increase higher level thinking in a classroom. This is the area I am excited to see us grow in.

Mr. Scott views the success based on his individual classroom and what his students now have the opportunity to explore within a one-to-one initiative. He has had the opportunity to change what they do within the science classroom to allow students to be more efficient. Mr. Scott explains these opportunities:

Let's say in chemistry, a certain set of labs that we physically do, because that's what I can afford in my chemistry cabinet or that's what safety kind of allows. Now, I can do virtual labs that I never would have done before with chemicals or procedures that we couldn't do in a chemistry lab.

Mr. Scott is in agreement with Mrs. Kasey that putting a device in the hands of the students each day in class is an advantage in itself describing it as, “it levels the playing field for the kids. For the kids that maybe they go home and they don't have a computer.” While Smallwood High School does not have a high poverty rate, it is still a financial burden for parents to purchase student technology. The district has taken this financial burden off the parents.

Mrs. Gray refers to herself as, “a millennial” who has grown up with technology surrounding her. Technology to her is not a new thing, it is something she uses to supplement her curriculum. Mrs. Gray feels the success is in the ability for teachers and students to be better organized explaining, “it's just normal having them around. I use it a lot for organization purposes. We use Google Classroom a lot. Anything Google. I mean, YouTube, Google Classroom. Google will run the world.” Along with the media outlets Mrs. Gray discussed, there are many other apps available for teachers to utilize with their students.

Mrs. Gibson agrees that Smallwood High School is successful in their one-to-one initiative; however, she does not feel the success is based on each student having their own machine that the school purchases, it is the capability of having technology in the building and using it. A majority of students at Smallwood High School have cell phones as was indicated by each teacher. The work the students are doing in the classroom could be done on any device, it is not machine specific. The ability to produce work on the spot utilizing any device Mrs. Gibson claims is a success:

Kids now, in the last ten years, since we have introduced this, almost expect to have some kind of device at home. They can work on their phone. We had FBLA tryouts this morning and a girl had created her whole thing and she had it on her phone and she was editing and working on her phone. So, I think that's the most interesting thing is that we carry a device around with us all the time. So, whether it's a Chromebook or whether it's a, whatever it is, I don't know if you're in a MacBook or a MacAir or whatever it is they've gone to.

Mr. Hill as the principal of Smallwood High School has mixed emotions about the success of the one-to-one initiative. He feels that in general Smallwood High School has been successful stating, “I feel like our process with staff and students as we have switched devices has allowed for easy transitions.” Like the other teachers he also feels the organizational aspect of the one-to-one initiative has been a success. He has also observed a number of teachers as he

puts it, “who find great value in the student devices, although that certainly looks different from classroom to classroom.” Mr. Hill would not consider every aspect of the one-to-one initiative as successful as he feels in the last few years they have fallen short in the area of professional development with technology. Mr. Hill claims:

we used to spend more time on it, but have placed greater value (now) on other instructional practices. I would say it is merely a function of priorities and that we have determined there are other things more important that must be in place before a one-to-one program is worth the time and money.

Mr. Hill would like to focus in the future on more professional development to enhance the technology utilized in the classroom.

Community Perception

Smallwood High School has a history of strong community support and high expectations for their schools. As Mr. Pearce stated earlier, the expectation is for Smallwood to provide their students with the best possible means to educate their students. During my research it became apparent that one of the ways the community supports the school is through the community library. When the participant teachers and administrators were asked about internet access at home all of them responded that a majority of students had internet access at home. After conducting interviews, all of the participants had mentioned that the Smallwood Public Library was a place that offered free internet access and that students who did not have internet access at home would often utilize the public library for internet access after school. I decided to go and observe at the public library at 3:20pm about the time school got out.

The library was voted in 2015 as the best small library in the state. The library had six computers set up for public access. The library also offers free math tutoring to students. During my 40 minute visit, approximately 15 students who ranged in ages from elementary to high school age utilized the library. The library staff seemed to know a lot of the student’s

names as they come in. The library has signs posted throughout the library as to what the password to the internet is. The library is also equipped with a coffee bar the students utilize. Students seem to know exactly where they are going and have appeared to utilize the library before. The library staff seems very open to helping the students. The environment in the library is very clean, quiet, and appears to be student friendly. The ability for students to have a place such as the public library for internet access is another perception of success for students in utilizing one-to-one technology outside of school hours.

The support received by the parents was not expected to be so positive according to the teachers interviewed. Most of the parents grew up in a traditional classroom setting and the school staff did not know how the parents were going to appreciate their students now having constant access to technology and the internet. Mrs. Kasey described the anticipation as, “I thought there'd be a lot of pushback, but I'm pretty sure that the parents support it. And I'm pretty sure that they've jumped onto the technology wagon, as you can say.” This feeling was shared by all of the teacher participants prior to implementation. They were unsure what the parent's reaction would be to this new educational setup.

Mrs. Gibson feels a sense of relief for the parents as well, as they do not have to provide their students with a device. A family with two to three students could have a financial burden placed on them if the school was not providing a device. Mrs. Harris would describe it as a sense of excitement from the parents stating she heard parents say, “wow, my kid is going to have this.” As Mr. Scott referenced earlier, the financial burden lifted from the parent's established a level playing field for all students.

All of the interview participants have also heard small numbers of complaints mostly directed towards how their students are accessing the internet at home. The Mr. Hill has had to

have a few conversations with parents about how they can control what their children are doing at home with the device. The overwhelming response from the community and the parents has been very positive.

Research Question Two

The student, teacher, and administration participants all provided input on what perceived factors influence the success of one-to-one initiatives. The first perceived factor that influences the success of one-to-one initiatives is every student having a device. Each student having a device every day levels the playing field for all students. Students as indicated in the survey are more efficient now in research capability, ability to re-write drafts, and organization. Thirty-eight percent of students also indicated that receiving classroom instruction was how one-to-one technology is utilized. This drives Smallwood High School and its teachers to change the way they are teaching in the classroom.

Changes in Pedagogy

The Smallwood High School administration discussed the focus of professional development moving from technology driven back to classroom centered in providing teachers with the tools to change their approach to utilizing the technology in the classroom. One of those changes took place in the technology classroom. The focus shifted from keyboarding based programs to computer applications. Mr. Hill explains the changes made:

because of technology we offer classes we never would have even dreamed of 10 years ago. Our 3D Animation class, that wasn't even on my radar, you know even five years ago that wasn't on my radar to be offering that here for us. I think it's certainly provided some different opportunities.

The teacher participants of this study believe that technology for the sake of technology is not what makes Smallwood High School successful with their one-to-one program. The success comes when teachers are utilizing the technology to be more effective in the class room and

allows the students to create. Mrs. Harris describes it as, “we need to step it up from this it’s not just a way to research on the Internet, but creation aspect.” She continues to explain the changes she saw as the technology coordinator in working with the elementary students with iPads, “we had the iPads at elementary, it was awesome, because there's so many good apps where kids can create and learn in a different way. Instead of writing a paper, I'm creating something to show.”

This creation aspect was seen in observing Mrs. Harris’ Interactive Media class. There were 14 students in the class room, upon my arrival five minutes prior to class starting, there were already eight students working on their Chromebooks. One student in the classroom was working on his own MacBook from home which Mrs. Harris explained was allowed under school policy. Students in this class were all working on different modules. Two students were working on building a robot, another was working on editing photography on the Chromebook, another group of students was designing a web page, and another group of students were working on a coding assignment. The projects being done in this classroom would be much more difficult and time consuming if they were not in a one-to-one program. Mrs. Harris explained to me that the students in this class will all rotate through the different modules throughout the school year so all have the opportunity to complete each module. Students in the classroom have the freedom to move around as some are in groups at desks and others work on the floor in their own comfort space.

Each of the teachers indicated the ability to utilize the devices for organizational purposes utilizing the classroom management tool Google Classroom. Mrs. Jones does not utilize Google Classroom in her English class but instead just has students share documents with her. Mrs. Jones is a believer that technology cannot be the end all be all in the classroom and still utilizes more traditional classroom approaches to teaching admitting she does not use a ton of technology

in her classroom. Mrs. Jones explains, “right now, we're studying Julius Caesar. We're reading out of the book 90% of the time. Now, the kids will take notes on their computers. Some of them still prefer to write down their notes, and so they'll do it that way.” She feels that allowing students the opportunity to utilize whatever means they feel most comfortable with allows them the best possibility to succeed. Mrs. Jones does use the technology with vocabulary assignments she explains:

As an English teacher, I have vocabulary tests throughout the year that we use the computers for. That's a web-based program we use, but it's not like anyone has to have any special skill to be able to do that.

In observing Mrs. Jones class technology was not used. The students began the class period taking a quiz utilizing a pen and paper approach in which Mrs. Jones orally gave the students the questions and they wrote them down and then turned in their paper. The remainder of the class was spent reading *Julius Caesar* out of the literature book. Each student has a certain character they are to read the part of. The students whose character is not in the scene appear to be disengaged with what is taking place in the classroom.

Mrs. Gray is one of the teachers who use Google Classroom in which they can post assignments and students can turn in assignments. Upon entering Mrs. Gray's World Geography class, she has Google Classroom open and projecting on the board. She recaps what the students have been working on and explains that today they will be creating a map. She informs the students if they want to use online resources and their Chromebooks they may. Three students in the class open their Chromebooks and begin looking up different countries.

Mrs. Gray explains how technology has helped her with organization, “I've learned how to better streamline or put together assignments and projects and that kind of thing on classroom and directly link the YouTube clip or the Google drive attachment.” Utilizing Google Classroom

and YouTube has helped Mrs. Gray in keeping students caught up on the assignments when they are absent from class.

Mrs. Kasey is a math teacher at Smallwood High School and realizes the challenges that math teachers have when it comes to utilizing technology but has found ways to utilize the one-to-one technology in her classroom. She also utilizes Google Classroom but explains that through technology students need to learn to dig deeper into the material, “I think it's more about okay, can you problem solve through this problem and show me the steps that you took to get to the answer. So it's not more important of the answer but the process.” Zuber & Anderson (2012) suggested that mathematics was an area of struggle in one-to-one technology. Mrs. Kasey utilizes the technology not only for organization but has also utilized the technology with students to work through the process of different math equations.

In observing Mrs. Kasey's classroom students immediately opened their Chromebooks upon entering and logged into Google Classroom. There was a one question quiz to check for understanding from the previous lesson. The answers were immediately sent to Mrs. Kasey to view. This bell ringer activity is an everyday occurrence in her classroom. After the students finished the quiz Mrs. Kasey asked them to close the lids on the Chromebooks and began reviewing slope intercept form. When it is time for the students to take notes, half of the class takes out their Chromebooks and utilize the device for note taking. Mrs. Kasey controls the slide show from an iPad she utilizes. Students then use individual white boards to present answers to her questions, she checks them for understanding.

Technology has completely changed the classroom approach for Science teacher Mr. Scott. He utilizes the Chromebooks for numerous labs in his classroom allowing the students to experience things they may not have without the devices. Virtual labs have allowed students to

experiment with dangerous chemicals they would not be able to utilize if not done virtually. He also has online books in his classroom that the students have on their Chromebooks. Mr. Scott also utilizes online materials such as an online periodic table. He explains this periodic table, "There's a very good interactive periodic table on the Internet. And I don't even really need to tell them. I say, "Find this information out," and so they're just getting out their Chromebooks and they're just doing that." The immediate access to information, research and data collection was supported in the literature by Warshauer (2006).

Each teacher interviewed has adapted to the technology in their classroom. While all utilize the technology, it is done in different ways. Some utilize it as an added tool in the classroom, while others have changed their entire classroom approach.

Administrator Expectations

Each of the teacher participants of this study agrees that administration has been supportive with the one-to-one initiative. While they feel the professional development has fallen off, they do feel supported with implementing the technology. Each of the teachers feel one of the benefits to implementing one-to-one technology is the administration did not require anything specific from the teachers. This allows the teachers the freedom to experiment with the technology and individualize it in their classroom.

Mr. Hill explains his thoughts on how teachers need to change their approach in the classroom to best utilize the technology:

We've got to be pretty purposeful and explicit on how to use it, when to use it, when not to use it, and why not to use it. I think the teacher skill set on how to manage that has to be different. That's not in us because we didn't grow up with that and so we're changing somebody. We're going to ask adults to change some behaviors that aren't ingrown in them or habitual for them and oh, man that's tough.

As the superintendent of schools Mr. Pearce also sees the potential for teachers to

Improve classroom instruction utilizing technology. He explains:

I think what I see is the ability to connect to what I would call a more authentic learning experience in our classroom. Teachers who can utilize the technology in a way to assess kids in a more real world or simulated environment that's not possible if you're limited to just what happens between the walls of the classroom.

Mr. Pearce admits that not every teacher is utilizing the one-to-one technology to its maximum potential, but he is seeing positive change within certain pockets of teachers. He explains:

I think, with those teachers we see there's an emphasis on assessing kids in a more authentic way using technology and creating that wider audience so the kids can actually apply what they're learning as opposed to they're taking unit tests on paper, and that is an assessment of skills but if it stops there, then do we know if kids can really apply that skill that they've learned or that knowledge that they have. We have those things happening in places. We haven't been intentional about really developing teacher's abilities to do that. But that's, as I talk about the direction that we're going, that's the new conversation that we're having.

While the administration and teachers perceive Smallwood High School as having a Successful one-to-one program, they understand there is more potential that is untapped. As Mr. Pearce suggested, the future of one-to-one technology and the change in pedagogy is a part of the conversation in what the school will focus its professional development on in the future.

Research Question Three

Smallwood High School went through three separate implementation phases with the implementation of the three different devices. Through the interview process with the teacher and administrator participants they shared the most effective implementation strategies used but also what they would change if they had the opportunity to go back and do it again. The first step in the implementation phase was making the determination to go to a one-to-one school environment. The decision to enter into a one-to-one school initiative was made by the administration and a technology committee that helped in making a recommendation. The administrators who made the decision ten years ago are no longer working in the district. When

asked why they felt the district decided to go with a one-to-one initiative the teachers agreed it was how far behind the district was with their technology. One-to-one initiatives were the newest rave in the area of technology. Mrs. Jones would say the decision was made because, “I think we, as a district, like to look on top. Like, we wanna ... like, hey. We're one-to-one, and most of you aren't, sort of thing. I think that's part of it.” The decision was made to enter into a one-to-one initiative with the Apple MacBook Pro laptop.

Initial Implementation

The initial one-to-one device used at Smallwood High School was the Apple MacBook Pro. Mrs. Gibson was a part of the technology team who made the recommendation. She describes the process stating:

we had a team of teachers that was involved and looking for a recommendation. We also looked at budget constraints, we had a technology committee, and they looked at all of our options, and we went to with the Mac Books. I think it was based on the proposal that was given to us (by Apple) and what it allowed us to do.

Mrs. Gibson appreciated teachers having the opportunity to be involved in the decision making and making a recommendation. Mr. Harris served on the technology committee as well and discussed how it was also beneficial for the team to view what other schools were doing prior to making the decision to go with Apple. Mr. Hill served as the administrator representative on the technology committee that made the recommendation. Mrs. Harris also served on the technology committee. During this time she was a technology facilitator for the district. She describes the decision making process stating:

We took our new superintendent, at the time, who was brand new. We didn't even really know each other. Our principals. And then they picked a teacher from each building. So, that's who went to Chicago to tour Apple, and then we brought back and presented to the board several times and they just kept saying, come back. Come back again. We need more information. We did that, then when the decision was made to go for it, which I have to say I was proud of our district for finally just saying, we're going to go for it. We know we're maybe not ready. All the kinks aren't worked out. We're going to go for it.

That also can be scary, and to some teachers, Whoa, we're not ready for this. We did this too fast.

Mrs. Harris continues to explain the decision making process from her perspective:

In my opinion, we were so far behind, if we keep trying to piece together or wait another year while we get this really fine-tuned, we're just doing our kids a disservice every year that they graduate. So, I said, let's push through. We know there's going to be kinks, but let's push through.

Once the decision had been made by the school board, Smallwood then put together a new technology team who would be trained and help with the implementation of the MacBooks to the teachers and the students. This team would come to be known as the Apple 18. Mrs. Harris and Mrs. Jones both served as a part of the Apple 18 team. This team would go through Apple training every couple of months and then come back and teach the rest of the faculty. Mrs. Harris really liked this model describing it as, “we took several teachers from each building for the first couple years, which I thought was really valuable. Then those people go back to their buildings and teach that to their buildings. So, it was a good model.” Throughout the study many of the participants described this teachers-teaching-teachers model as beneficial professional development.

Mrs. Jones describes her role on the Apple 18 team, “they trained us to know how to use things. I was the English representative for the department, I was supposed to be English department go to person to teach them or help them along the way.” Mrs. Jones would return to the building and help teachers implement the new technology and answer any questions from the material learned at the Apple trainings.

The next phase of the implementation process was to put the devices into the teacher’s hands before they ever rolled them out to the students. Mr. Hill describes this process:

we responded to all those questions that people are going to have, the initial piece of information, how is it going to affect me? How do I use this in my class? What's the

benefit of doing it? We spent a lot of time hammering that part of it. I felt really good about that, about how we went about that change, and gave people every opportunity to be informed and have some skill level with the device going into it. Put them in their hands really early. Put them in their hands in the spring before kids were going to have them so they could start using them, and put them through some different training with that so that we were really in advance.

The administration understood that if they did not first get the teachers comfortable with the device, then it would never be utilized within the classroom.

Once the devices were rolled out to the students the participants were asked what type of training the students received. The teachers quickly realized that the students picked up on the technology faster than the adults did. Having grown up in a technology era where students constantly are connected the focus needed to shift less on how to train the students but more on how to manage the student usage of the devices. Mrs. Harris describes the initial roll out:

That was scary. We did a mini training with them that they had to go through before we gave them their device. And again, the MacBook was big, we're handing a kid a \$1000 device. We went through some very basic training with them. Again, kids are more, I don't know, they adjust easier than adults. I would say we spent the bulk of our time getting our teachers comfortable. Let our teachers have the devices in the summer, then gave them to the kids in August. And each year, it kind of got less and less, but we hand them out at the beginning of the year. We do it by class and our principal usually gives a speech to them, just all different things about the safety of it, about doing the right thing on it, about taking care of it, all of those things.

As Smallwood has now been a one-to-one school for several years, this initial training for students is not as cumbersome. Mrs. Harris explains the new process:

When we hand them out at the beginning of the year, our principal and our tech director come in here with me and we hand them out. And so, you've got a roomful of 20 kids at a time, and our principal gives his speech about it and we spend an hour talking about online safety and about if you're Tweeting from your school device, yes, it's your Twitter account, but it's our device. So, you have to be appropriate. And taking care of it and things like that. Getting them all logged on, making sure they're all comfortable. Going through some basic things. That's the way it needs to be done, and that can't always happen. But man, it just makes a huge difference when you can do it with a small group at a time rather than we're doing a whole class of 70 kids.

As the technology teacher, Mrs. Harris is directly involved in the new process more than any of the other participants. The school has now shifted the focus of their training to new students and freshman students who are entering the building for the first time.

Professional Development

The administrator and teacher participants of the study were all in agreement that when Smallwood High School first implemented one-to-one technology, professional development was a big focus for the school. As the district has moved further along they have backed off the technology professional development. Mr. Pearce explained earlier that this has allowed them to allocate resources into other areas of school improvement. Mr. Hill also mentioned the shift in professional development but also feels, it is an area that the school needs to reinvest in a different manner. It is no longer about focusing on the technology itself but how to utilize the technology to a greater extent in the classroom.

The teacher participants involved in the MacBook role out agree that professional development was at a high initially, but as they shifted from MacBook to iPad and now Chromebook there has not been as much in terms of organized specific professional development. In discussing some of the professional development opportunities the teachers were in agreement that the most effective professional development was when teachers were teaching teachers. Mrs. Kasey explains this process:

We had some technology groups where we split off and said, I'm going to talk about Google Classroom and then another group would be like, I'm going to talk about Twitter, or something. And then we got to choose, okay, I want to go learn about Google Classroom. Or I'm going to go learn about Edmodo or whatever. I think that's the only training we really went through. And that helped us, you know, gathered new ideas and just got to where we are now I think. But no professional came in and trained us.

Mrs. Gibson explains the transition from Apple training to what Smallwood High School

Currently utilizes:

School improvement days. What it did is, it transitioned from, because we were with Apple, they sent out Apple trainers originally. I believe that was part of our contract. After that contract was done, it just became our technology team, our technology coordinator. And then, probably our building leadership team, looking for ways to help train and integrate how to use the devices in the classroom and what apps are available and what we can do. Now it's become more of a building level training.

Mrs. Gray also agrees that switching models of technology professional development has been beneficial for the staff, "I think that the most beneficial thing that we have done with professional development and technology has been just using each other as resources." Mrs. Gray also discussed how the librarian has been a resource for teacher saying, "I think professional development-wise, the collaboration process of teachers helping teachers in that way has been really beneficial. Or librarian too. So that's been really helpful for us for sure." Other participants also mentioned the librarian as a resource who is always sending out new information for teachers to try.

There is a sense of disappointment amongst the teachers about the current lack of organized professional development. The teachers do share an agreement that the collaboration process between teachers in regard to professional learning has been a major impact. There is also a sense of importance in having somebody such as a librarian who can provide resources for teachers to utilize.

Research Question Four

The teacher and administrator interviews provided detail into whether or not teachers were more involved in the use of the one-to-one technology and why. There were two factors that the participants discussed as reasons teachers are more involved with one-to-one technology, age and comfort level with technology.

Teachers Who Excel in Technology

Teachers who excel with the implementation and usage of technology are teachers who are open to using technology and tend to have a high comfort level with technology. Mrs. Kasey describes this as, “I think there are teachers that either choose to be fully immersed in the technology or they choose just to do nothing.” The teachers who typically tend to fully immerse themselves in the technology are the teachers who have a high comfort level with utilizing technology.

Mrs. Gray as a younger teacher feels that age plays a factor as well. She grew up surrounded by technology and always having a device available. She went through her teaching credentialing program in an era where technology in education is prevalent. When Mrs. Gray was asked what teachers who excel with technology in the classroom do, she responded, “The teachers that understand how to purposely thread it into their content are the ones that I think are really successful with it.” The teachers who thread the technology into their content are able to have a more seamless transition from more traditional teaching methods to technology enhanced classrooms.

Mrs. Jones feels that teachers could utilize technology more but do not always do it in the right way. She still feels a lot of times in her English class, having a device is more distracting than not having a device. When asked how technology could be better utilized by teachers she explained, “I like the idea of technology is great, but I think oftentimes it's used as something to do instead of something that enhances.” Mrs. Jones feels the teachers who utilize the technology to truly enhance their classroom are the teachers who are the most successful.

Mrs. Harris who has a long history of technology in education as a former technology coordinator provided a very detailed response in what teacher who excel in technology do in the classroom:

You have to let go of, "I am the ... I'm the expert. You're my students, you are not the expert. I am the expert and I have the knowledge, and you have to get the knowledge from me." You have to let go of that, because they will eat you alive, especially in high school. They know more than we do. We can't keep up with them. So, you have to let go of that mentality and learn, "I'm kind of, I'm more of a facilitator of my classroom. I'm helping them learn, but I'm also learning from them." So, I think that's huge, letting go of that. Letting go of the fear of failing. "Man, that didn't go well. Okay, I know what to do better next hour or tomorrow. Or I'm going to try that again" because it's a management thing. It is. I mean, when all of a sudden you have kids who have something, every kid in their hand, it's a management thing, and that can be really scary, that they have all this stuff, you know.

The administration has the ability to see what is taking place in many different classrooms. At Smallwood High School they see a variety of teachers who are in different places with their comfort level of utilizing technology. Superintendent Mr. Pearce explains what he sees from teachers who excel, "you see teachers that are passionate about technology integration do really, really well and then you see others struggling with."

Mr. Hill feels the teachers who excel are able to use the technology as a supplement to the classroom similar to the feelings of Mrs. Jones stating:

Teachers are planning lessons in a way that is incorporating that as a tool in a lesson. Not the lessons based around it but that it is providing opportunity for them to enhance a lesson. Whether that's because they've got access to some different information or an opportunity for kids to interact with information in a little different way or to create something a little bit differently, that they're using it in those ways to improve a lesson.

Science teacher Mr. Scott understands that technology can be utilized in different ways depending on the subject. Some subject areas are more conducive to technology than others Mr. Scott says, "some of it is just how comfortable they are and some of it may be kind of what

they're teaching. Sometimes different subject matter goes better I think with technology than others.” Mr. Scott explains in more details:

If you've been in this district long enough, you're going to go to technology training, whether it's teacher-led or bringing in somebody. Well say you're a new teacher that really maybe had taught somewhere else, that didn't have one-to-one, that didn't do a lot of technology. That may be a reason why they're not using it as much; they just haven't had the training. And as teachers, we're coaches, we're doing ten other things. It's sometimes just like if you happen to use technology, and you're coming in, and all of a sudden they have one-to-one, you may not have enough time during that first year to implement everything you may want, or just get that comfort level up. So it's kind of those two things, it's what you're teaching I think makes a difference, on how much you use it. I think as a science teacher, I'm probably going to use it more than maybe if I'm teaching maybe Spanish or something. I know that in language you can certainly use the Chromebooks more, even like math class maybe I probably used it more. It kind of goes with that.

The teachers who excel with technology are vested in the technology and look for different ways to improve the classroom environment. Subject area also plays a role in the ease of implementing technology. Science and Technology classes are more technology driven compared to a Spanish or Math class where it become more difficult to easily implement technology.

Teachers Who Struggle with Technology

Each of the participants agrees that there are teachers who struggle with the usage of technology. As mentioned prior, experience and subject area taught are also reasons for teachers to struggle as well as succeed. Mrs. Kasey also believes that age is a factor explaining:

I think most of it is age. It's because I think teachers that have not been around it very much, have not grown up with it, I think they struggle to ... And I say to my parents all the time, to try things. Even if it would be totally wrong. It's so hard for them to try things and branch out. I just think it's so foreign to them that they're scared to immerse in the technology.

Mrs. Gibson believes that teachers who do not immerse themselves in the technology struggle claiming:

People that were not tech savvy, have no interest in how they are going to use the technology in the kids' hands. I would venture to say they were probably more resistant to, even the training because they didn't feel like they were going use it. Someone like me, who likes technology, and I like to play with it, and I think that it's fun to see what we can do, I enjoyed the trainings, so that way I could look for more things to try and integrate.

Teachers who do not have an interest in the technology are less likely to use the technology in the classroom and are likely to revert back to more traditional ways to teach in the classroom.

Mrs. Gray agrees that teacher comfort level is a factor in technology utilization explaining, “I definitely think it could be different if someone wasn't familiar with it or hadn't been using it a lot. It can be harder, and again, knowing how to manage kids when they're on their own.” When Mrs. Gray was asked what could be done to help these teachers she responded:

Support and PD for technology stuff. Again, in our building, I feel like we have a lot of teachers helping teachers. And again, I don't know other than that. I've been told that this can be a rare thing. And so I'm very appreciative of that, and I think that having people in the building that are willing to help teach, and administrators giving teachers the time to teach each other, or to work together and collaborate on that, that's been helpful for us in our professional development. Having good in-house resources is helpful for those teachers.

As an administrator Mr. Hill also feels that comfort levels and the ability for teachers to leave their comfort zone is what keeps them from being successful in utilizing one-to-one technology. Just because you are not comfortable with technology does not make you a bad teacher Mr. Hill explains:

There's a certain level of willingness to get out of your comfort zone and some folks that's really hard for. If I have taught form 25 years and I've got this way that I do things, sometimes that's hard for me. I certainly think there's on our staff some folks who are great teachers but who haven't necessarily been great with technology.

Mr. Pearce has a vision for his teachers and how to improve the teacher's ability with technology in the future and it begins with the teachers understanding what technology integration truly looks like in the classroom explaining:

We've been successful if you were to measure us by a lot of the basic ways that I would consider a measure of technology integration. It's being integrated. But as we move forward, I think that's where it will become more clear. Teachers will know this is what that looks like.

Having a vision for technology and teachers who have a high comfort level is what Smallwood High School believes will set them apart from other one-to-one schools. Students have devices in their hands every day now. Teachers are utilizing the devices in the classroom. The next step is to change the way students are learning and enhancing the learning environment through technology.

Through the interview process the teacher and administrator participants provide detailed information about the one-to-one environment at Smallwood High School. While each believes Smallwood High School is effective in their one-to-one program, the definition of success for and the means for being successful was somewhat different for each participant. The student survey also provided insight to the student's daily life within a one-to-one environment. Students shared the positive and the negative and ways in which they utilize their devices. The interview process, survey findings, and classroom observations have allowed me to adequately address each of my research questions. In Chapter Five I will be exploring the findings and their significance.

CHAPTER FIVE – DISCUSSION

One-to-one technology in education is a growing initiative across the country. School administrators and school districts are placing vast amounts of resources in these one-to-one programs without knowing best implementation strategies and the challenges faced when implementing one-to-one technology. As schools face many budgetary challenges, they are looking for assurance that one-to-one technologies are worth the financial investment in terms of providing students with an educational advantage versus a non-one-to-one environment.

The purpose of this case study was to examine the one-to-one technology initiative and its implementation at one rural mid-western high school. It was intended to understand the perceived effectiveness through the eyes of six teachers, one building level administrator, and one superintendent of schools through semi-structured interviews and classroom observations. It also intended to understand student perceptions through the use of a student survey. The information provided will allow school boards and school administrators the ability to make a more informed decision when facing the choice of implementing one-to-one technology.

The research design used a case study qualitative methods approach. The data collection methods utilized were semi-structured interviews, an electronic survey of students, and classroom observations. The opportunity for student participation was extended to all students of Smallwood High School; it was limited to those whose parents gave consent for students under 18 years of age and the students must have given their permission to be a part of the study as well. The administrators selected were limited due to the fact there is one high school principal and one district superintendent. The teacher participants were chosen utilizing purposeful sampling in which each participant was selected for a specific area. The Smallwood High School principal helped in identifying participants. I asked for a participant in each of the four

core subject areas and then two elective areas. I also asked for a mixture of experience in technology. Once Mr. Hill helped identify six teachers I then contacted them for their consent. While I expected a more diverse range of teachers in the area of technology comfort level, it was limited.

Participants included six teachers, two administrators, and 185 students. Student survey data was analyzed and presented to understand student perception of the effectiveness of Smallwood High School. Teacher and administrator interviews were transcribed, coded first by hand, second cycle coding was used utilizing nVivo a data analyzing software. At this point the codes were combined to be narrowed down to answer the following research questions:

- 1) Why is the one-to-one initiative perceived to be successful in Smallwood High School?
- 2) What perceived factors influence the success of one-to-one initiatives at Smallwood High School?
- 3) What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?
- 4) Are some Smallwood teachers more involved in the use of one-to-one technology than others? If so, why?

These four research questions were satisfied by the findings presented in chapter four of this study. This chapter will analyze the findings of this study. It will be organized by addressing each of the four research questions individually. Limitations of the study will then be presented along with future implications. The chapter will conclude with recommendations and conclusion.

Why is the one-to-one initiative perceived to be successful in Smallwood High School?

This first research question was derived to explore why it is perceived that the one-to-one initiative is successful in Smallwood High School. While all of the participants in the study agree that they perceived Smallwood High School to have a successful one-to-one initiative, it didn't take long to realize that there were other factors besides just the technology. When looking at the demographics, Smallwood High School has only 25.38% economically disadvantaged students, only 8.08% of students with disabilities, and a high school graduation rate of 95%. They have a community that shows strong support for the schools of Smallwood. Smallwood High School was perceived to be successful before implementing the technology.

Three areas make Smallwood High School successful in their one-to-one initiative. The first as the teacher participants mentioned is every student now has the opportunity to have a device at school and home every day. While Smallwood High School does not have a significant percentage of economically disadvantaged students, the playing field is now level for the students who formerly could not be provided with a device. While 97.3% of the students surveyed have internet access at home, students are also given access to the public library outside of school hours. Outside resources can be crucial to ensure that all students have access to the internet. Providing a device for students ensures that all students have a machine but accessibility when not in school can be crucial for success. A public library such as the one in Smallwood or other internet hotspots where students feel comfortable and welcome can enhance the one-to-one technology for the school district. These findings are in agreement with Thomson (2014) who suggest that providing a one-to-one device for students allows for equity between the students who readily have access to technology and those who do not. To better

serve students, you must have an understanding as to who has access to technology while off campus.

The second area that has made Smallwood High School successful is their ability to be sustainable over time with the technology. Smallwood High School made the decision to change the device they were using three times to allow them the affordability to continue with the one-to-one program. When it came time to replace the initial MacBook Pro, the district realized they could not sustain the cost of the device for an extended period of time and switched to the iPad. It was then recognized that the need for a keyboard was critical for high school students, the district then turned to the more cost-effective device and a device with a keyboard in the Chromebook. Smallwood High School was able to change devices to meet the continued goals of the district which complies with the work of Warshchauer & Tates (2015). However, when Smallwood High School first started out in one-to-one, they chose a device that met their goals at that time but could not sustain the cost associated with it over time. The district did adapt while getting input from their stakeholders.

The third reason for the perceived success of Smallwood High Schools one-to-one initiative is the community support and buy-in from all stakeholders. The community support for the schools, the support of the school board, and the support of the administration for the teachers and students utilizing the device is in place. There is an expectation from the community and parents to provide the best possible education at Smallwood High School, but there is also a trust that teachers are going to utilize any means to better meet the needs of their students. This does not always mean technology will be utilized the entire time. The design of Smallwood High School has a similar design of Weston & Bain's (2010) six component process in which the community has a set of beliefs, the school community uses those beliefs to design

the school, stakeholders are fully engaged, stakeholders provide feedback, goals are created, and the technology drives the goals.

The community providing a safe space for students to work outside of school hours is critical in the success of one-to-one programs to ensure all students have opportunities outside of school hours not dependent on internet connectivity at home. The Smallwood community provides their students with a public library that enhances the students learning environment. The library not only provides internet access for students outside of school hours but also caters to the 21st-century learner. With things such as free internet access, a coffee bar, and charging stations to stay connected with any device all around the building. The library not only provides this resource but also offers after-school tutoring sessions for students. This comfortable environment is welcoming to students and ensures consistent usage.

What perceived factors influence the success of one-to-one initiatives at Smallwood High School?

The most important aspect of the one-to-one technology is that each student has a device. However, it is not the device in itself that makes Smallwood High School successful in the one-to-one initiative. Providing changes in class offerings and changes in teaching pedagogy are the influence over the perceived success of the one-to-one initiative. While Smallwood High School is not fully immersed amongst all of their teachers in utilizing one-to-one technology to its fullest potential, they see changes within pockets of teachers. These teachers are providing students with the opportunity to create and explore deeper into the curriculum. The teachers who are utilizing the device strictly for word processing, while improving the organization for students are not producing any deeper learning than if they utilize a pen and paper. Downe & Bishop

(2015) suggest that getting out of the usual framework of school and using technology can lead to an inspired student and a path to a more purposeful learning environment.

Through my interviews with the participant teachers and administrators, it is apparent that Smallwood High School would like their one-to-one program to reach this more purposeful learning environment, but it is not currently where they would like it to be. Smallwood High School and the community share a vision of providing their students with the best possible education. The vision of technology is that students are utilizing technology to expand and dig deeper into their learning, not just doing the same things they have always done just adding a technology device. For example, a word processor is just a different way to hand-write a paper. Having a vision for success will allow Smallwood High School to work towards their goals as a building with their one-to-one technology. While having a vision is crucial, it is also essential to understand where your shortfalls are, which the administration at Smallwood believes is in continued professional development. The administration and teachers agree that professional development needs to continue in the area of technology. The focus, however, needs to shift away from merely implementing and using technology to how the technology can strengthen the learning taking place within the classroom.

What are the most effective implementation strategies identified by teachers and school administrators at Smallwood High School?

Smallwood High School was thorough in their initial implementation of one-to-one technology involving several teachers and administrators on a technology committee that took recommendations back to the school board. The school board continued to request more information before committing to the decision of going with one-to-one technology.

Teachers were then empowered by their administration to lead other teachers. The Apple 18 group was trained in different strategies of the Apple products and then returned to train other teachers. This strategy is supported by Li (2010) who suggest teachers and students who are empowered by their leaders have the most positive effect on faculty buy-in and successful technology implementation. Teachers were given the devices ahead of the students to prepare for the upcoming school year as well as trouble shoot any potential problems that could occur a strategy also seen as effective in the research of Varier et al. (2017).

The teachers were all in agreement that the most effective professional development was not a one shoe fits all approach. The approach that was the most effective for Smallwood High School was driven by comfort levels in technology. Teachers were given different sessions to attend based on their comfort levels in technology and desired usage in the classroom this approach to professional development is supported by Slavit et al. (2003) and Towndrow & Wan (2012). The professional development sessions were led by teachers within the Smallwood School District. The administration has also created time for teachers to collaborate amongst each other and share new ideas to utilize in the classroom.

Another viewed effective implementation strategy is providing a technology resource person for the building. The teacher participants of the study all discuss the importance of the school librarian as a resource person who provides information to be utilized in the classroom. Mrs. Harris also discussed the importance of a technology coordinator for the building. Teachers and administrators lack the time to specifically focus on technology and technology enhancement in the classroom. A technology coordinator can focus on staying current within the research of best teaching practices in utilizing technology in the classroom.

Providing teachers and administrators the opportunity to be a part of the decision-making process, empowering teachers to experiment and train other teachers, providing meaningful professional development, and providing resources to teachers were all effective implementation strategies utilized by Smallwood High School. The teachers of Smallwood High School were given some autonomy in how they implemented the technology in their classroom. There was no required programs or stipulations that teachers must use, other than students were given a tool to use in their classrooms, and the expectations were for it to be used. This allowed teachers the opportunity to explore the best way technology would fit into their curriculum. The approach of providing teachers with the freedom to explore will enable teachers who are not as comfortable with the technology to work within their comfort level. This is important as it ensures teacher comfort with technology. Teachers who feel forced to utilize the technology while not comfortable with it are more likely to not utilize the device within their classroom.

Are some Smallwood teachers more involved in the use of one-to-one technology than others?

The interview process led to the definite conclusion that some teachers are more involved in technology usage than others. The teacher's familiarity and comfort level in technology are significant in the teacher usage of technology in the classroom. Teachers who are not afraid to experiment and fail with technology are the teachers who can utilize it to its fullest extent. Through support and professional development teachers, comfort level with technology can improve and allow them the opportunity to further utilize the device within the classroom. However, this change in mindset can be complicated and time-consuming.

Limitations of the Study

It is apparent there are limitations to this study and the findings were presented with this understanding. One limitation of the study is the comfort level of technology for the teacher participants. All of the teachers selected for the study had a medium to high comfort level with technology. The sample selection of interviews was also small with six teachers and two administrators participating. The fact that this was a case study approach is a limitation in itself where at best the findings might inform similar cases but are not generalizable. This case study lacked a high number of low socio-economic students and students with disabilities. The study also has a very supportive community. The possibility of participants not providing transparent answers to interview questions could also be a limitation of the study. Each of these factors are limitations of this single case study.

Recommendations

This section offers recommendations based on the findings and conclusions of this case study. The recommendations are for school boards, school administrators, and teachers implementing or who have implemented the one-to-one technology. The recommendations are as follows:

1. Prior to the selection of a device, ensure you can continue to be sustainable with the device over time. Ensure the monetary investment you are willing to make is in line with your educational goals and purpose for one-to-one technology.
2. Ensure teachers and stakeholders are empowered throughout the selection and implementation process. Ensure communication with the community and garner community support to provide students access outside of school hours.

3. Provide meaningful professional development that tailors to the individual teacher's needs based on their comfort level with technology.
4. Teachers need continued professional development that goes beyond technology usage. Changes in pedagogy must take place to ensure a more in-depth instructional process utilizing technology.
5. Have a shared vision for what technology usage will look like in your building.

Recommendations for further research:

1. Replicate the study with a more diverse population. A case study with a school who has a broader range of students with disabilities and a more extensive range of students who are economically disadvantaged.
2. A multiple case study comparing different schools to each other.
3. Utilize student interviews to gain more insight into student perceptions of one-to-one technology.

Conclusion

In a period of education where technology has become the driving catalyst, one-to-one initiatives are being implemented across the country. The educational advantage has yet to be determined. This case study examined six teachers and two administrator's perceptions of the effectiveness of the one-to-one initiative within Smallwood High School. The study also utilized a survey of 185 students to gain their perceptions of the one-to-one initiative.

It was found that the perception of success within the one-to-one initiative at Smallwood High School varied from participant to participant. While all perceived Smallwood to be successful, they all had individual definitions of success. It is important for administrators and

teachers to define success when implementing one-to-one technology and understand that the goals of the initiative will change based on where you are in the process. Gaining information is the first step, choosing a device, implementing, and providing professional development is the next step. The third step is where Smallwood High School currently finds itself in utilizing technology to do new things by changing the pedagogical approach to teaching.

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Appendix A: One-to-One Administrator and Teacher Interview

One-to-One Administrator and Teacher Interview

Name of Interviewee: _____ Job Title: _____

Date: _____ Time: _____

Preliminary Script: "This is [interviewer's name]. Today is [day and date]. It is _____ o'clock, and I am here in [location] with [name of interviewee], the [title] of [institution or system]. We'll be discussing [topic of interview]."

1. Tell me about yourself and your experiences in education.

2. Your school is a one-to-one school. Were you employed at the school during the time one-to-one was implemented. If so, talk to me about your feelings and thought process when you heard your school was going one-to-one. If not, what are your thoughts and feelings about being in a one-to-one school?

3. Tell me the process your school district went through in making the decision to become a one-to-one school environment?
 - a. How many other school systems did you visit?
 - b. Whom did you visit with about the one-to-one environment? (students, teachers, etc.)
 - c. What cost considerations did your district take into account during the research process?
 - d. What stakeholders were involved in making the decision to go one-to-one

4. What do you feel was the determining factor in deciding to become a one-to-one school environment?

5. Explain to me your implementation process in your school?

- a. What worked well during the implementation process?
 - b. What would you do different if given the opportunity?
 - c. What was most challenging?
6. Your school has been one-to-one now with 3 different devices MacBooks, I pads, and now ChromeBooks. Talk to me about the reasons in the changes.
7. Talk to me about the advantages or disadvantages you feel your students have as part of a one-to-one school environment compared to non one-to-one?
8. Have you seen any academic improvement since the implementation of one-to-one in your school?
- a. If so, what types of academic improvements have you seen since the implementation of one-to-one?
9. What type of professional development for one-to-one has been offered for staff?
- a. Talk to me about how professional development has continued now that one-to-one is fully implemented?
10. How did administration support staff during the implementation process?
- a. How has administration continued to support staff currently with one-to-one technology?

11. Do you feel there are teachers who are more successful in the one-to-one environment than other teachers?

a. What are those effective teachers doing different?

12. How have your students adapted to the one-to-one environment?

13. Is there a certain demographic of students that are excelling more with the implementation of one-to-one?

14. Has discipline in the building been affected by the implementation of one-to-one?

15. Do you feel your school and students are more successful due to the one-to-one environment?

a. Why do you believe this?

b. Why do you not believe this?

16. Is there anything I missed or that you'd like to follow-up on?

17. Is there anything I haven't yet asked you that you think would help me better understand your schools one-to-one environment?

Appendix B: Student Survey

Student Survey

Grade Level _____ Date _____ Time _____

1. How many years have you been in a one-to-one school environment?**2. How much training did your school give you on using the device?**

A. None at all B. Some but could have used more C. I was well prepared

3. How many teachers do you have this semester?

a. 1

b. 2

c. 3

d. 4

e. 5

f. 6

g. 7

h. 8

4. How many of your teachers utilize the one-to-one in their classrooms

A. None B. 1-2 C. 3-4 D. 5-6 E. 7-8

5. What subjects do you utilize one-to-one the most?

a. English

b. Math

c. Science

d. Social Studies/History

e. Physical Education

- f. Electives
- 6. What subjects do you utilize one-to-one the least?**
- a. English
 - b. Math
 - c. Science
 - d. Social Studies/History
 - e. Physical Education
 - f. Electives
- 7. On average how often do you utilize the device during a class period?**
- A. None at all B. $\frac{1}{4}$ of the time C. $\frac{1}{2}$ of the time D. Most of the time
- 8. What activities do you use the one-to-one for the most?**
- a. Word Processing
 - b. Collaborating with Peers
 - c. Receiving Classroom Instruction
 - d. Communicating with the Instructor
 - e. Other
- 9. Do you prefer one-to-one to a traditional classroom setting?**
- A. Yes B. No
- 10. What are the biggest advantages to a one-to-one environment?**
- a. Increased Computer Skills

- b. Organization
- c. Communication with Instructor
- d. Research
- e. Instructor Using New Instruction Strategies
- f. Increased Instructor Feedback
- g. Ability to Re-write Drafts of Papers
- h. Other (If so, please specify)

11. What are the biggest disadvantages to a one-to-one environment?

- a. Lack of Face to Face Communication with the Instructor
- b. Eye Strain
- c. Headaches
- d. Internet Access at School
- e. Internet Access at Home
- f. Machine Breakage
- g. Ability to Stay on Task
- h. Ability to Show work in Math
- i. Other (if so, please specify)

Appendix C: Teacher/Administrator Interview Consent Form

Teacher and Administration One-to-One Effectiveness

Informed Consent

I, _____, agree to participate in the research study titled “The Perceived Effectiveness of One-to-One Technology in Smallwood High School” I understand the research will be conducted by Jason Clemensen Education Doctorate Student at the University of Arkansas, and that my participation is voluntary. I understand that at any time I may stop my participation in the study without penalty. I understand that I may also decline to answer any interview questions that I am uncomfortable answering. I understand that at any time I can ask the researcher to delete or destroy all information from the research records and/or return any information collected about me.

The purpose of this study will be to conduct a qualitative study of the effectiveness of a one to one initiative in a 9-12 High School in the Midwest. The interview data collected would be analyzed to determine common themes in classroom usage and implementation strategies. Interview data would also be analyzed to determine common themes of success versus failures of the one to one initiative. Survey data collected would be analyzed to determine common themes from students towards the benefits or restrictions of the one to one program. Observation data collected would be used to gain visual data of the effectiveness of one to one programs.

If I volunteer to take part in this study, I may be asked the following things:

1) Be personally interviewed twice, each with audio taped interviews lasting 60 minutes.

2) Be observed through classroom observations one of each teacher interviewed or interactions with students.

3) Review interview transcripts and findings for accuracy.

I will not receive any monetary compensation for participation in this study. I understand that I may be asked to discuss sensitive topics and difficult subject matter; I understand that at any time I can choose to not discuss said topics. I understand that all information will be kept strictly confidential to the extent of the law and University policy.

I understand all information collected will be stored on the researchers password protected computer. Unless required by law, no individually identifiable information will be shared. As a participant I understand that my school's name will not be used in the study, the city of my school will not be used in the study, and my name will not be used within the study. I will be given the title of Administrator or Teacher. I understand that geographic region will be used to describe my school ex. Rural Midwest. If I provide any identifying remarks, they will be removed from the transcript. Records of participant's names will be kept in a separate file from any other documents. Audio files will be saved on the researcher's computer. I understand the researcher will use a transcription service to transcribe interviews and the transcription service will sign a promise of confidentiality form. The researcher will answer any further questions about the research now or during the course of the project.

I understand that by signing this form I am agreeing to take part in this research project and understand that I will receive a signed copy of this consent form for my records.

For questions about your rights as a research participant please call or write:

Iroshi Windwalker

Compliance Coordinator, 201 Administration Building, Fayetteville, Arkansas 72701

Telephone (479)575-2208

E-mail Address irb@uark.edu

Name of Researcher: Mr. Jason Clemensen

Researcher's Signature: _____

Researcher's Telephone: (620)704-3359

Researcher's Email: jmcllemen@email.uark.edu

Name of Subject: _____

Signature: _____ Date: _____

Appendix D: Student Consent Survey Form

Student Informed Consent One-to-One Effectiveness

I, _____, agree to participate in the research study titled “The Perceived Effectiveness of One-to-One Technology in Smallwood High School” I understand the research will be conducted by Jason Clemensen Education Doctorate Student at the University of Arkansas, and that my participation is voluntary. I understand that at any time I may stop my participation in the study without penalty. I understand that I may also decline to answer any survey questions that I am uncomfortable answering. I understand that at any time I can ask the researcher to delete or destroy all information from the research records and/or return any information collected about me.

The purpose of this study will be to conduct a qualitative study of the effectiveness of a one to one initiative in a 9-12 High School in the Midwest. The interview data collected would be analyzed to determine common themes in classroom usage and implementation strategies. Interview data would also be analyzed to determine common themes of success versus failures of the one to one initiative. Survey data collected would be analyzed to determine common themes from students towards the benefits or restrictions of the one to one program. Observation data collected would be used to gain visual data of the effectiveness of one to one programs.

If I volunteer to take part in this study, I may be asked the following things:

- 1) To take a survey that addresses the one to one environment in my high school**

I will not receive any monetary compensation for participation in this study. I understand that survey questions may address sensitive topics and difficult subject matter; I understand that at any time I can choose to not answer said questions. I understand that all information will be kept strictly confidential to the extent of the law and University policy.

I understand all information collected will be stored on the researchers password protected computer. Unless required by law, no individually identifiable information will be shared. As a participant I understand that my school's name will not be used in the study, the city of my school will not be used in the study, and my name will not be used within the study. I understand that student data will only be used as a whole, there will be no individual student responses or names used. I understand that geographic region will be used to describe my school ex. Rural Midwest. If I provide any identifying remarks, they will be removed from the transcript. I understand that I will not be asked to provide my name on the survey. The researcher will answer any further questions about the research now or during the course of the project.

I understand that by signing this form I am agreeing to take part in this research project and understand that I will receive a signed copy of this consent form for my records.

For questions about your rights as a research participant please call or write:

Iroshi Windwalker

Compliance Coordinator, 201 Administration Building, Fayetteville, Arkansas 72701

Telephone (479)575-2208

E-mail Address irb@uark.edu

Name of Researcher: Mr. Jason Clemensen

Researcher's Signature: _____

Name of Subject: _____

Signature: _____ **Date:** _____

Appendix E: Parental Assent for Minor Student Form

One to One Effectiveness

Parental Informed Assent

I, _____, agree to allow my son/daughter _____ to participate in the research study titled “The Perceived Effectiveness of One-to-One Technology in Smallwood High School” I understand the research will be conducted by Jason Clemensen Education Doctorate Student at the University of Arkansas, and that my child’s participation is voluntary. I understand that at any time I may stop my child’s participation or my child may stop their participation in the study without penalty. I understand that my child may also decline to answer any survey questions that they feel uncomfortable answering. I understand that at any time I can ask the researcher to delete or destroy all information from the research records and/or return any information collected about my child.

The purpose of this study will be to conduct a qualitative study of the effectiveness of a one to one initiative in a 9-12 High School in the Midwest. The interview data collected would be analyzed to determine common themes in classroom usage and implementation strategies. Interview data would also be analyzed to determine common themes of success versus failures of the one to one initiative. Survey data collected would be analyzed to determine common themes from students towards the benefits or restrictions of the one to one program. Observation data collected would be used to gain visual data of the effectiveness of one to one programs.

If I allow my child to volunteer to take part in this study, he/she may be asked the following things:

1) To take a survey that addresses the one to one environment in my high school

My child will not receive any monetary compensation for participation in this study. I understand that survey questions may address sensitive topics and difficult subject matter; I understand that at any time my child can choose to not answer said questions. I understand that all information will be kept strictly confidential to the extent of the law and University policy.

I understand all information collected will be stored on the researchers password protected computer. Unless required by law, no individually identifiable information will be shared. As a participant I understand that my child's school's name will not be used in the study, the city of my child's school will not be used in the study, and my child's name will not be used within the study. I understand that student data will only be used as a whole, there will be no individual student responses or names used. I understand that geographic region will be used to describe my school ex. Rural Midwest. If I provide any identifying remarks, they will be removed from the transcript. I understand that my child will not be asked to provide my name on the survey. The researcher will answer any further questions about the research now or during the course of the project.

I understand that by signing this form I am agreeing to allow my child to take part in this research project and understand that I will receive a signed copy of this consent form for my records.

For questions about your child's rights as a research participant please call or write:

Iroshi Windwalker

Compliance Coordinator, 201 Administration Building, Fayetteville, Arkansas 72701

Telephone (479)575-2208

E-mail Address irb@uark.edu

Name of Researcher: Mr. Jason Clemensen

Researcher's Signature: _____

Name of Subject: _____

Name of Parent: _____

Parent Signature: _____ Date: _____

Appendix F: IRB Approval Letter

To: Jason Michael Clemensen
From: Douglas James Adams, Chair
 IRB Committee
Date: 11/17/2017
Action: Expedited Approval
Action Date: 11/17/2017
Protocol #: 1710079719
Study Title: The Perceived Effectiveness of One-to-One Technology in Smallwood High School
Expiration Date: 11/06/2018
Last Approval Date:

The above-referenced protocol has been approved following expedited review by the IRB Committee that oversees research with human subjects.

If the research involves collaboration with another institution then the research cannot commence until the Committee receives written notification of approval from the collaborating institution's IRB.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.

Protocols are approved for a maximum period of one year. You may not continue any research activity beyond the expiration date without Committee approval. Please submit continuation requests early enough to allow sufficient time for review. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study closure.

Adverse Events: Any serious or unexpected adverse event must be reported to the IRB Committee within 48 hours. All other adverse events should be reported within 10 working days.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, study personnel, or number of participants, please submit an amendment to the IRB. All changes must be approved by the IRB Committee before they can be initiated.

You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with the IRB Committee, original signed consent forms, and study data.

cc: Ed Bengtson, Investigator