THE IMPACT ON TEACHING AND LEARNING

THE IMPACT ON TEACHING AND LEARNING OF THE ONE-TO-ONE LAPTOP INITIATIVE AT THE AYERSVILLE LOCAL SCHOOLS

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ABSTRACT

One-to-one computer initiatives have become increasingly commonplace in today’s secondary educational environment. Such initiatives require time, effort, and finances from already strapped school-district budgets. The need to justify such expenditures to district stakeholders is important. The purpose of this qualitative study was to examine the impact of a one-to-one computer initiative at a small, rural school in northwest Ohio. The participants in this study included students who were involved in the initial implementation of the laptop computer program, teachers who were responsible for the implementation of the program, and the parents of the students. Each particular group was provided online surveys using Google Forms. The opinions of each particular group were analyzed, and the researcher identified patterns indicating how the use of laptop computers changed the students’ learning experiences. Key themes that emerged included the following: (a) increased student engagement, (b) increased access to information for research, (c) increased relevance of the topic, (d) student-centered instruction, (e) increased communication, (f) increased student excitement towards learning using the laptop, (g) improved preparation for the use of technology in students’ postsecondary experiences, (h) easier transition to college work, (i) students competitiveness in the job market, (j) increased collaboration among students, and (k) students’ abilities to be more innovative and creative through the use of laptop computers. Students and teachers recognized, as did parents, that the opportunities for off-task behaviors existed through the availability of laptops and use of the Internet, but each group also noted that students used other educational tools to engage in off-task behaviors before laptops were available. Teachers acknowledged that they need to be diligent in supervising the use of computers to help decrease off-task behaviors and that they could do so by effectively planning their lessons to ensure that students stay on task and are
aware of the consequences of using the laptops in ways not intended. This study explored the use of laptop computers through a constructivist theory, which involves students drawing their own conclusions through creative experimentation and functional use of laptop computers in the daily completion of educational activities. Focusing on the voices of the students, teachers, and parents provides authentic responses to determine the impact of a one-to-one laptop program as seen through their own unique experiences. It further provides direction for other school administrators and stakeholders who wish to explore the impact of a one-to-one laptop computer initiative and whether the impact is significant enough to justify the time, effort, and expense of implementing such a program.

*Keywords:* one-to-one computer initiatives, ubiquitous computing, teacher professional development, 21st Century Skills
This work is dedicated to my grandparents--both of whom have passed, but I believe Marvin and Kathryn Burkhart would be proud!

“Some see things as they are and say, why? I dream things that never were and say, why not?

-Edward “Ted” Kennedy quoting Robert Kennedy
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CHAPTER I. INTRODUCTION

Background of the Problem

The following quotation is attributed to Benjamin Franklin: “Tell me and I will forget, show me and I will remember, include me and I will learn.” Benjamin Franklin’s quotation, proffered during the 18th century, is as true now as it was then. It provides insight into the ability of children to learn through hands-on experiences that require them to use tools and perform work in a realistic and relevant manner. Across each of these authors and their respective theoretical models—e.g., Gardner’s 9 Types of Intelligences (Gardner, 2006), David Kolb’s Experiential Learning (Kolb & Fry, 1975), and Briggs/Myer’s Personality Typology (Myers, 1980)—teachers who are able to provide lessons that address multiple learning styles within the same lessons are effective at meeting the needs of each individual child, especially when these lessons involve manipulatives as learning tools (Chen, Jones, & Moreland, 2014; Medeiros Vieira, Ferasso, & Schroeder, 2014). Physical manipulation of learning tools is the underlying theme of the laptop programs currently used in K-12 schools. The importance of providing children the opportunity to practice using tools which they will use in the future helps them to acquire the skills needed to be successful in their chosen trade or career. The opportunity for students to use these devices is equally as important in social studies courses as it is in science courses in which teachers choose to use technological devices. The particular technological device serving as the focus of this study is the laptop computer. It is a multifunctional tool not relegated to single subjects; rather, it can be used throughout the educational process in virtually every course. If educators want students to be prepared for the future, it is clearly in their best interest to help them develop computer literacy skills. As Benjamin Franklin suggested more
than over 200 years ago, if students are instructed in the use of technology, they will learn how to use technology—potentially in ways never before imagined.

Technology use has been a driving factor in the acceleration of change in U.S. society and around the world. The citizens of the world today are constantly confronted with a variety of technological advances, such as cell phones, which have virtually an infinite number of applications that continue to increase. Examples of software applications include, Skype, which uses the Internet to facilitate video and audio communication. Another software application is Snapchat, which is a form of social media used to send messages that only appear for a brief amount of time and then are deleted. Additional technology applications include Facebook, texting, and emailing. Emerging technologies have resulted in increasingly smaller devices that can support these applications—such as (a) Google Glasses, computerized eyeglasses that act as computer screens, and (b) small computers that simulate the look and fashion of wrist watches (e.g., the iWatch). These technological innovations have influenced the ways in which individuals at almost every age interact with each other and use emerging technologies.

According to Holcomb (2009), “…few modern educational initiatives have been as widespread and costly as the integration of laptop initiatives into education” (p. 49).

Technology has thoroughly changed how individuals function at all levels of society; however, in many schools, teaching and learning bears a remarkable resemblance to the form in which it appeared 30, 40, and in even, 50 years ago. Many individual schools, and some entire districts have attempted to change the way teaching and learning occur through the use of laptop computers in a one-to-one computer environment during their primary and secondary school experience. Educational leaders have sought to take advantage of students’ interests in the use of
technologies outside of the classroom by providing accessibility to these technologies within the classroom.

According to information presented by Warschauer and Tate (2015) in which a synthesis of 57 studies of one-to-one laptop programs from 2001 and 2013 found evidence of moderately improved math, science, reading, writing, and language arts scores, with the strongest results for writing and mathematics (Zheng & Warschauer, 2013). Because accountability has become a target within educational politics, finding alternatives to improve student achievement is an important goal for school boards and administrators. The implementation of a one-to-one laptop program to help in this endeavor would appear to be a pathway to achieve this goal.

A “one-to-one computer environment” refers to a learning context in which each student has access to a device for use during the school day or on a full-time basis. This type of accessibility to computers has been formally termed “ubiquitous technology use.” The term was originally coined by Dr. Mark Weiser, who served as the head of the Computer Science Laboratory at Xerox Palo Alto Research Center (PARC). (Weiser, 1991, p. 78) Each one-to-one laptop program is typically unique based on the needs and desires of the district. The three most popular models of one-to-one implementation involve the following: The first model is the “bring your own device” (BYOD) model. Programs based on this model allow students to use a laptop, a tablet device, or a smartphone that they have purchased on their own and bring it to school on a daily basis for use in a variety of courses. The second model is a computer tablet program, which involves districts purchasing a tablet device, such as an Apple iPad, for each child. The devices are maintained and owned by the school districts, and students are allowed to use them during the school day, or they may also be allowed to take the devices home with them for use on a 24-hour basis during the formal school year. The third model involves districts
purchasing a particular brand of laptop computer for all children that can be used during the school day, or these devices can be provided to students to be used at school and taken home for use on a 24 hour basis.

There are positive and negative aspects of each model. The intent of all three of the models is to provide students with opportunities to use technology in an academic setting and integrate that technology into the educational experiences they encounter during their school day. The decision made by each individual school district to implement one of the three models derives from the unique conditions facing each particular school district. These conditions may include the socio-economic status of the stakeholders in the district, the financial condition of the school district, and the intended outcomes of the technology to be used in the school district.

School district stakeholders with limited financial resources may experience difficulty affording technology devices for their students during the school day; therefore, a student-purchased implementation model may be appropriate only for districts in which members are able to afford purchasing such devices using their own personal finances. The implementation of a one-to-one tablet program, in which case the school purchases and maintains the tablets, would provide many opportunities for teachers and students alike. However, tablet devices do have limitations that would not allow students in higher-level technology courses to fully utilize software programs that exceed the capabilities of tablets. Additionally, recent legislation in Ohio regarding online testing has required specific screen sizes on the devices used as well as non-Bluetooth enabled keyboards. Many brands of tablets do not meet the current requirements as established by the Ohio Department of Education (ODE).

The implementation of a ubiquitous, one-to-one laptop program allows students full access to the power of a computer, including online research, the use of a variety of software
applications (e.g., Microsoft Office Suite, Google Applications, etc.), and other functions. These software applications are currently available to educators at all levels--e.g., primary, secondary, and higher education--and they are used extensively in business and industry. One reason that the leaders of school districts have chosen the one-to-one laptop model on a 24/7 option is to prevent technology from becoming a barrier to learning. In other words, all students have access to a single computer platform, whether that platform is Apple-based, IBM/PC-based, or Google-based, and they all provide online access via “cloud computing.” Important factors for selecting the computer platform include the functionality and cost of the devices. The one-to-one initiative allows all students involved in the program to have the same type of machine so that they can become familiar and comfortable with technology on a consistent basis.

**Rationale and Significance of the Study**

Researchers have indicated that the use of laptop computers has had a substantial influence on the learning process. For example, one-to-one laptop programs lead to a more enjoyable learning environment, students writing longer essays, improvements in scientific skills, the use of an increased number of sources and improved critical thinking (Bebell & Kay, 2010; Dunleavy & Heinecke, 2008; Efaw, Hampton, Martinez, & Smith, 2004; Grimes & Warschauer, 2008). During the past 20 years, education leaders have recognized and acknowledged the power of learning through the assistance of computers (Bebell & O’Dwyer, 2010; Holcomb 2009). Additionally, researchers have identified benefits resulting from the ways in which teachers have altered their teaching practices as well as the manner in which students learn as a result of using computers. In fact, the use of laptop computers has enabled teachers and students to engage in experiences never before possible (Corn, Tagssold, & Patel, 2011).
Changes involving technology do not simply happen by chance. Planning, practice, and experimentation involving trial and error must occur in order for change initiatives to be implemented successfully. Supporters of the change, also known as “techno-enthusiasts,” view the technology movement to be positive, while others see this movement as negative and are referred to as “techno-dissenters” (Burns, 2013, p. 39). Techno-dissenters adhere to the belief that the impact of technology in education, particularly on teaching and learning, has been “oversold” and unproven, while techno-enthusiasts view technology as essential for increasing modernization and efficiency in schools (Burns, 2013). This argument is not new. A generation ago, Prensky (2001) noted a similar conflict based on the gap between “digital natives” and “digital immigrants” (p. 1-2). Prensky has pointed out an important difference in the learning environment in which today’s students--i.e., digital natives”--matriculate:

The Digital Natives began life with technology evolved and grow up having spent tens of thousands of hours actively using technology via digital games, talking and texting on cell phones, and emailing via personal computers. Digital Immigrants (teachers) assume that learners are the same as they have always been, and that the same methods that worked for the teachers when they were students will work for their students now. But that assumption is no longer valid. Today’s learners are different. (Prensky, 2001, p. 3)

According to Prensky (2001), the initial problems with the use of technology were that the children in school embraced technology, but the teachers of that generation did not. With time, teachers have generationally become more technology/computer literate and are able to relate more effectively to the students they teach. Prensky has suggested that teachers entering the field of education today are actually digital natives. Older, more experienced teachers who began their teaching careers before the digital divide have begun to retire upon reaching the end of their careers.
Due to the natural lifecycle of teachers’ careers, many teachers will continue to retire, greatly reducing and eventually eliminating the number of teachers who have been considered “digital immigrants.” However, because of the ever-changing and accelerating evolution of technology, the field of education has continued to experience a transition in which teachers considered to be digital immigrants teach students who are natives. When teachers and students both are from similar generations—in this case, digital natives—a more harmonious learning environment can be achieved. However, much work is required to bring the two generations together so that effective educational practices and transformational use of technology can influence students in positive ways. The term “transformational” in this context refers to teaching and learning in a manner not possible without the use of computers.

According to Burns (2012), the arguments of the techno-enthusiasts and techno-dissenters is more nuanced now than ever before:

Techno-enthusiasts are correct in stating that the issues that plague schooling are human and organizational and not derived from technology per se. On the other hand, as techno-dissenters rightly note, there are abundant examples of failed technology initiatives and school computer use that diverts from, rather than enhances, student learning. (p. 38)

As Burns (2012) has pointed out, the views of techno-dissenters may be correct from a micro perspective—e.g., particular implementation of a single laptop program. However, when programs fail, the computers themselves are not responsible for the failure. Both of these arguments have merit; however, the views of techno-dissenters do not negate the overall benefits of laptop computers that can be attained in classroom settings.

In order for school districts to implement a one-to-one laptop program in grades 9-12, they must commit time, effort, and resources. The first step is to gain support from the governing
board of education. Education leaders must demonstrate to the board of education the potential merits of such programming, assuming the costs/benefit analysis demonstrates the educational advantages of the program. With such a vast investment in time, effort, and money required, the results of a one-to-one laptop computer program must appear conclusive. In other words, the benefits must clearly outweigh the costs. The second step is to seek support from the teachers who will be impacted by the initiative. Of utmost importance to the success of the program is adequate time, effort, and funding in order to provide effective professional development for the teachers participating in the program (Corn et al., 2011). An important consideration is the likelihood of the need for upgrading the school’s technological infrastructure in order to adequately carry the additional demands on the local network and wireless capabilities. Finally, garnering the support of parents and community members is essential because properly funding the program will be a point of discussion that makes this decision an accountability issue with the stakeholders of the district.

Livingston (2006) synthesized history, context, and best practices in her book entitled *1-to-1 Learning* and offered a conceptual framework and planning templates to support such a program. The education, the planning, and the commitment (EPC) must all work in tandem to produce a one-to-one exemplary site. According to Livingston (2006), eight major pillars must be present to achieve success in implementing a one-to-one laptop program: vision, leadership, clarity, communication, implementation, purpose, assessment, and support.

Based upon these eight pillars, the decision to initiate a ubiquitous laptop program at the middle school and high school levels is a difficult decision for school leaders to make. The financial investment in both hardware and software, in addition to the significant commitment by the teachers and administrators in properly implementing the program, is daunting and requires a
well-conceived and properly implemented plan. As technology evolves, both hardware and software will continue to advance, which will continue to influence teachers and their ability to use technology effectively each year. Research on this subject consistently has indicated that ongoing, effective professional development is paramount in the success of a one-to-one laptop program. According to Lei and Zhao (2008) a great deal of discussion is required about the return on investment before implementing a one-to-one laptop computer program.

The intended outcomes of the Ayersville program were to (a) provide students and staff access to up-to-date and emerging technology; (b) prepare students and teachers for the use of technology in the future; (c) provide students and teachers with tools to help them develop twenty-first-century learning skills (e.g., collaboration, communication, creativity, and critical thinking). The world of technology is moving quickly, the intent of the program was not to restrict how the laptops were used but to enable staff and students to use the technology in ways that could not have been predicted. Teachers were also provided laptop computers for their use.

Based on exit surveys administered prior to graduation, graduating seniors from Ayersville High School generally pursue three tracks post-graduation. Approximately 75% attend an institution of higher learning, which includes a community/technical school or a four-year college/university. Approximately 20% pursue employment, and the remaining 5% enter a branch of the military. Because the largest percentage of the graduates were preparing for college, a primary focus of the program was to prepare students to develop the technology skills that they may need in their future studies.

**Purpose of Study**

The purpose of this study was to determine whether this one-to-one laptop initiative—an initiative which has become more and more prevalent in K-12 settings—is affecting the teaching
and learning process as intended by the objectives of the program. This study focused on the Ayersville Local Schools laptop program since it was initially implemented in grades 9-12. More specifically, the focus of this study was on (a) how the one-to-one laptop program has influenced students and their attitudes toward learning and (b) how the teachers involved in the one-to-one laptop computer initiative perceived the impact the program had on teaching and learning. Additionally, this study sought the opinions of the district stakeholders. The researcher sought the opinions of students’ parents regarding (a) the impact that the one-to-one laptop program had on their children’s educational experience and (b) whether, as district stakeholders, they valued the program enough to continue it into the future.

**Theoretical Framework**

A number of appropriate theories could be used as a theoretical lens for this study. One theory considered by this researcher was the concerns-based model of change (CBAM; Hall & Hord, 2006). The CBAM model seeks to understand the effects of change on individuals as well as to identify and examine components of the innovation itself. However, the CBAM model, focuses on the concerns that each participant has in relation to the change that is taking place. This study did not focus on the concerns related to the change but rather focused on the impact of the change. As a result, the CBAM model as a theoretical framework for this study was rejected.

Another theoretical framework that would appear to be appropriate for this study is the 21st Century Learning Skills initiative, which is an education standards and reform movement, located primarily in the United States, that focuses on improving the content that U.S. public school students must learn so that they are better prepared to succeed in higher education and in their careers. The Partnership for 21st Century Learning, also known as P21 Partnership has developed a unified, collective vision for learning referred to as the Framework for twenty-first-
century learning. The P21 approach is a rigid program that focuses on the inputs required to learn the skills needed to be successful in the four areas of 21st century skill development: critical thinking, communication, collaboration, and creativity. The acquisition of these skills is important in helping students to be successful in the future; however, the acquisition of these skill areas was not the focus of the study. Additionally, the teachers involved with the program were not trained specifically to teach to the skills associated with this learning paradigm.

This current study sought to understand the opinions of the students, teachers, and parents; how these three groups viewed the changes that took place during the students’ secondary experience; and the value of these changes within the one-to-one laptop computer program. The environmental conditions apparent in the classroom are altered with the introduction of laptop computers into the daily educational experience. With this in mind, this study was grounded in a theoretical framework of educational change. Specifically, the researcher chose to use the constructionism theory of learning technology skills as the theoretical framework. Seymour Papert developed the theory of constructionism, which was built upon the work of Jean Piaget in constructivism learning theories (Papert 1993). Constructionist learning involves students drawing their own conclusions through creative experimentation and functional use of laptop computers in the daily completion of educational activities. The constructionist teacher assumes the role of facilitator rather than adopting a central role in the dissemination of knowledge. Within this theoretical framework, students are able to learn by approaching the completion of assignments in a variety of ways. The role of teachers is not to serve as lecturers but rather as facilitators who coach students in attaining their own goals.

According to Bebell and Kay (2010) and Papert (1993), “In one-to-one learning environments, students have a continuous and personal relationship with technology that allows
them to communicate, construct, and collaborate in new and innovative ways. These environments help to create a ubiquitous learning situation where computer technologies have a pervasive presence in the school and classroom, surrounding students with opportunities for learning and changes in their perceptions of themselves as learners” (as cited in Prettyman, 2012, p. 7).

Teacher preparation is a factor that must be carefully considered if students are to have the most beneficial experience with technology. The ability of teachers to learn how to integrate the technology and the need to teach students how to manipulate computer hardware and software in the most effective manner has a tremendous influence on the overall educational experience and cannot be taken for granted. Simply providing students with laptop computers for use during their high school experience is not enough to offer effective educational experiences in technology. What this current study proposes is that when teachers are properly prepared to integrate the use of laptop computers in their daily lesson repertoire and students are enabled to effectively use them in new and innovative ways, students will be better prepared to accommodate the continuous changes and new technologies as they emerge in their adult lifespan.

Therefore, it is the premise of this study that by allowing students the opportunity to use the laptop computer under optimal educational conditions facilitated by properly prepared teachers, students will be prepared to use these skills when confronted with the needs in their chosen field throughout their academic experiences and careers and teachers will effectively change how they design their instructional strategies to accommodate their own needs and concerns, the needs of the students, and their responsibilities to effectively use the technological assets now afforded to them.
Understanding the authentic opinions of students, teachers, and parents as well as their experiences with the one-to-one laptop computer program and how they perceive their roles can help the implementation of technology programs and practices in ways that will lead to successful implementation of such programs. This understanding also will help illuminate factors that contribute to the effective use of the technology by students, the effective application of technology in the classroom by teachers, and continued understanding and support of parents and stakeholders in the community.

**Research Questions**

The following research questions guided this study:

1. How did the implementation of the laptop computers impact the students’ motivation to learn?
2. How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?
3. In what ways have teachers made school more relevant to the students?
4. How are student behaviors impacted by the use of the laptop computers?

**Definition of Terms**

The following terms are important and unique in this research study. For the purposes of this study, the following definitions of these terms will apply:

*Term 1.* One-to-one computing as used in this study to describe a program in which students have access to a computing device at school and at home during the regular school year.

*Term 2.* Ubiquitous use of computers, as used in this study, is synonymous with one-to-one computing, as described in Term 1.
**Term 3.** Techno-enthusiasts are individuals who support the use of technology in today’s educational setting and believe that the merits of the use of technology outweigh the negative effects associated with the changes of such use (Burns, 2013).

**Term 4.** Techno-dissenters are individuals who do not support the use of technology and believe the impact of technology in education, particularly on teaching and learning, has been “oversold” and unproven (Burns, 2013).

**Term 5.** 21st century skills are a set of abilities that students need to develop in order to succeed in the information age. These skills include collaboration, communication, critical thinking, and creativity.

**Term 6.** A Digital Immigrant is an individual who was born before the widespread adoption of digital technology. The term “digital immigrant” may also apply to individuals who were born after the spread of digital technology and who were not exposed to it at an early age (Prensky, 2001).

**Term 7.** A Digital Native is a person born or brought up during the age of digital technology and therefore has become familiar with computers and the Internet from an early age (Prensky, 2001).

**Term 8.** One-to-one computer environment refers to a learning context in which each student has access to a device for use during the school day or on a full-time basis.

**Term 9.** Differentiated Learning refers to the tailoring of instruction by teachers to meet the individual needs of the student. The origin of differentiation is
rooted in the work of Lev Vygotsky, who was an early 20th century Russian psychologist. His concept of the zone of proximal development (ZPD) refers to the way in which the acquisition of new knowledge is dependent on previous learning as well as the availability of instruction. The term “differentiated learning” grew out of an idea discussed in the 1950s that the needs of individual students are unique and require teachers to provide certain subtle (or in some instances drastic) variations in the curriculum offered (Brundage, 1953). Carol Tomlinson, today, is a leading innovator in the use of differentiated learning and has employed the idea of differentiating instruction to accommodate the different ways that students learn. It is an approach to teaching that advocates active planning in addressing student differences in classrooms (Tomlinson & Allan, 2000).

Delimitations

The study targeted three specific groups. The first group includes only those students who attended Ayersville High School during the implementation of the one-to-one laptop initiative, which includes students who graduated in 2012, 2013, and 2014. The second group includes parents of the students identified in the first group. The third group includes teachers who taught at Ayersville High School during the years 2010 through 2014. Because the purpose of this study was to explore participants’ perceptions about the influence of the one-to-one laptop program on students’ educational experience, the participants identified in these three groups would have had unique experiences in relation to the use of laptop computers during their secondary education.
Limitations

The surveys were distributed through known email addresses of a convenience sample of students, parents, and teachers. Because access to up-to-date email addresses for students and parents was limited, the sample size is small. With an average of 65 students per class across a three-year period, the total sample size could have increased to more than 195 students and more than 390 possible parent contacts. The teacher sample was well represented. During the data collection process, there were 20 potential teachers to contact, but due to teacher retirements or teachers leaving the district with no known email address, the teacher sample is representative of the teachers who actually took part in the one-to-one implementation.

Researcher Bias

The researcher was in a leadership position in the district during the entire investigation, planning, and implementation of the one-to-one laptop computer program at Ayersville High School. The premise for the implementation of the program was based on the belief that providing laptop computers to students within the district provided educational benefits. This belief is at the center of the purpose of this study. Potentially, the data will provide reinforcement to verify that (a) the one-to-one laptop computer program was successful by meeting the objectives as originally planned, (b) the program was beneficial for students, and (c) teachers and parents perceived their students’ and children’s educational experience was positively impacted. Additionally, the researcher is in the process of investigating the possibilities of implementing a similar program in another school district.
CHAPTER II. LITERATURE REVIEW

A number of research studies have focused on the influence that laptop computer programs have on student achievement. However, fewer studies have investigated the overall influence on students and teachers of a one-to-one laptop computer program as a central tool in the learning process (e.g., Boyer, Phillips, Wallis, Vouk, Lester 2009; Edmunds, Thorpe & Conole, 2012; Oliver, 2008). Rockman (2004) identified four models of implementation and noted that the most effective model for a one-to-one initiative is a concentrated model in which all students in a classroom have their own laptops that they are able to take home (as cited in Holcomb, 2009, p. 53). This concentrated model also has been referred to as ubiquitous computing.

Expectations in Higher Education

According to the annual exit survey administered to Ayersville High School graduating seniors, approximately 75% of the AHS graduates historically have aspired to seek opportunities at the next educational level. Due to the high percentage of college-bound students, there has been significant focus on providing students with experience in using technology throughout their secondary education to prepare them for their experience in higher education. Although it is difficult to predict the expectations of institutions of higher learning, incoming students must be prepared to use a computer for a variety of learning activities.

Just as there are techno-dissenters in secondary education, there are similar aversions to technology in institutions of higher learning. In recent years, researchers have devoted considerable attention to the use of technology by faculty members and its influence on student learning in primary education, secondary education. This research has indicated that the use of technology is most frequently at the discretion of individual instructors, suggesting that students
are likely to encounter a variety of technological demands in college (Kyei-Blankson & Nur-Awaleh, 2010). Due to the wide variety of technology used in higher education classrooms, it is important for students to be prepared to meet a variety of faculty expectations. As Oliver (2008) pointed out, the immersion of students through laptop computer programs provides students formal experiences with software and hardware applications; it also provide them with an advantage in the college classroom over students who have not participated in a one-to-one laptop computer program.

A specific concern is how to prepare future teachers to integrate technology into the classroom. Although standards have been established for the use of technology through the International Society for Technology in Education, (ISTE), the alignment of higher education expectations with K-12 practices has been flawed. Colleges have implemented a variety of strategies in order to immerse future teachers in the use of technology. These strategies have included providing specific technology courses to integrating technology throughout their content area courses (Donovan & Green, 2010).

A study completed by Donovan, Green, and Hartley (2010) focused on teacher preparation programs and indicated that each individual teacher’s approach to technology has the most influence on the effectiveness of the laptop initiative. Because institutions of higher learning have been charged with the responsibility of preparing future teachers but have not provided these future teachers with adequate skills to influence learning through the use of technology, schools hiring first-year teachers therefore have been responsible for providing professional development. In other words, the responsibility for training these new teachers and ensuring that they can use technology in new and innovative ways on a local level has fallen on schools that hire these new teachers (Prettyman, Ward, Jauk, & Awad, 2012).
Colleges have been conducting analyses in the area of technology use to enhance the educational experiences both of students as well as teachers. However, research by Garrison and Kanuka (2004) has suggested that higher education institutions must continue to respond to technological changes in order to address the needs of today’s students entering their programs. It is important that high schools enable students to use technology successfully once they reach college by giving them ample experience with technology while students are still in high school (Holcomb, 2009).

**Technology Use in the Workplace**

According to Armache and Armache (2015), “The growth of new technologies to be used in the workplace is showing no sign of slowing down. And companies should take it on as a strategic opportunity” (p. 7). Students who enter into the workplace immediately after graduation will be expected to use technology proficiently. Because the skills and abilities required to meet the needs of the workplace have undergone continuous change due to technology, individuals seeking positions in the general job market must arrive at the job market with technological proficiency. “Knowledge and skills needed for work and citizenship in the 21st century are different than what they were in the 20th century, in large part because of major shifts in the ways people communicate and process information” (Prettyman et al., 2012, p. 7).

In a separate study by Hatakka, Anderson, and Gronlund, (2012), these authors found (a) that new opportunities provided by technology should improve educational outcomes in schools and (b) that the use of technology should provide students with additional choices in their lives. Specialized technological knowledge is required in almost every career, such as auto repair, package delivery (e.g., UPS/FedEx), retail sales, auto manufacturing, the military, agriculture, and others. Every employment venue requires employees to possess skills related to varying
forms of computer technology that help to make that industry more efficient. A study by Oliver (2008) indicated that high school students whose formal education includes a one-to-one laptop computer program are better prepared to effectively use workplace technology, better prepared to respond to new and emerging technologies, and better able to adapt to technological changes more readily than those high school students who were not immersed in such programs.

**Impact on Students**

Studies focused on one-to-one laptop initiatives have indicated that these programs have substantially influenced student outcomes in the areas of decreased absenteeism, increased engagement, reduced behavioral referrals, improved study skills, improved research skills, and increased community support (Holcomb, 2009; Lowther, 2012). One-to-one laptop initiatives also reportedly have increased students’ technology proficiency through the consistent use of computer software and hardware, increased communication with teachers, increased student-to-student communication, improved analytical skills, and improved writing skills (Oliver, 2008).

According to Lei and Zhao (2008), results from their study suggested that one-to-one laptop computer programs can significantly help increase students’ technology proficiency because of the increased opportunities to learn technology content and skills while using the laptops to work on various tasks that help them improve their learning, communication, and expression. Another fact reflected in the literature is that students who use technology more often become familiar with various types of software and hardware platforms; as a result, they more readily accept the use of technology as they move into higher education or into their careers (Hatakka et al., 2013; Corn et al., 2011; Lei & Zhao, 2008). Further research by Lei et al. (2007) indicated that one-to-one laptop computer programs help students improve information processing skills, and according to Murnane and Levy (2004), one-to-one programs prepare
students for the high-tech global economy. Additionally, according to Livingston (2006), one-to-one laptop computer programs can help students become more self-sufficient and independent learners, making them adept at discerning useful information from non-useful information.

In another study, Prettyman et al. (2012) noted that students have been shifting from “consumers of knowledge” to “creators of knowledge” (p. 13). Students have begun to view themselves as moving from “learner to expert” (p. 13). In other words, students have become “more engaged creators of knowledge in school and outside its walls” (p. 13). Prettyman et al. (2012) further indicated the paradigm shift in the role of teacher and student in the learning process is global. Students have increasingly become more involved in the learning process and the central figure in what and how they learn. Teachers have begun to guide students through their educational experience rather than occupying the role of the “holder of knowledge.” Through this model, students have been able to produce innovative and creative products that are unique to them and their educational objectives.

Prettyman et al. (2012) further indicated that “one-to-one learning environments allow students to have continuous and personal relationships with technology that enable them to communicate, construct, and collaborate in new and innovative ways” (p. 7). Prettyman further noted that these programs permit teachers and students to collaborate, allowing students to organize their knowledge and construct that knowledge in different forms, as opposed to simply replicating their teachers’ interpretations. Prettyman’s research has reinforced the positive influence that one-to-one laptop computer programs have on students’ acquisition of twenty-first-century skills, which include creativity, collaboration, communication, and critical thinking. These skills have been identified by the Ohio Department of Education as essential for students to develop in order to prepare Ohio students to use technology successfully in the workplace.
According to Bebell and Kay (2010); Gulek and Demirtas (2005); Lowther, Ross, and Morrison (2003); and Silvernail and Gritter (2007), the most significant academic gains from one-to-one laptop computer programs have been related to students’ writing skills, while additional research by Suhr, Hernandez, Grimes, and Warschauer (2010) have identified gains both in writing skills and literacy skills. In addition, Berry and Wintle (2009) and Dunleavy and Heinecke (2008) have found that students in one-to-one laptop computer programs demonstrated higher science achievement compared to their peers who did not participate in such programs.

An important factor identified in a study by Levin and Schrum (2013) is the influence that one-to-one laptop computer programs have on school culture, especially in schools with three or more years of ubiquitous technology and in which school-wide expectations and trust are nurtured in students in ways that enable them to become active and competent digital citizens: “The results of this study indicated that students took ownership in the process, and they take pride because they have been entrusted with the proper use of the technology, and they feel an obligation to be trustworthy” (p. 40). Because students were encouraged to develop a sense of responsibility, they responded appropriately and endeavored to meet the expectations afforded them through the objectives of the program. Students realized the importance of using laptop computers as a tool, as well as the importance of taking proper care of the device, and they behaved in an appropriate manner.

**Influence of One-to-One Laptop Initiatives on Teachers**

The research literature has suggested that one-to-one laptop initiatives influence students and teachers in a variety of ways under the following conditions: (a) if teachers use the laptops effectively, (b) if programs are implemented appropriately, and (c) if the learning process becomes more student-centered.
Effective use of laptops by teachers. According to Warschauer, Zheng, Niiya, Cotton, and Farkas (2014), “It is impossible to overstate the power of individual teachers in the success or failure of one-to-one computing” (p. 48). Additional research also has confirmed that ongoing professional development and technical support are important when implementing one-to-one laptop computer programs (Bebell & Kay, 2010; Warschauer et al., 2015). According to this research, the quality of classroom teachers is one of the most important factors in student achievement in traditional classroom settings. In the same way, teachers play a pivotal role in the implementation of one-to-one laptop computer programs. To address teacher variability and specific needs, professional development has become an important concern (Dunleavy & Heinecke, 2008; Oliver & Corn, 2008, Storz & Hoffman, 2013). Effective professional development programming has been characterized as convenient and sufficient, including subsidized courses, in-school workshops, and technology support discussions at weekly team meetings (Lei & Zhao, 2008).

According to Garthwait and Weller (2005), “The professional development opportunities provided to teachers do not automatically shift instructional styles from teacher-centered to student-centered” (p. 373). Variations in the individual abilities of teachers to integrate technology into their teaching practices is to be expected. For example, Oliver and Corn (2008) reported inconsistent results as teachers adopted an innovation differently. A study by Levin and Schrum, (2013) identified a variety of changes in the teaching practices of teachers due to the implementation of ubiquitous technology--e.g., providing increased opportunities for students to be creative or innovative; locating appropriate online materials; and then guiding, facilitating, questioning, encouraging, and assessing students’ learning during class. Teachers relied on more student discussion and group work and less teacher-directed instruction. Levin and Schrum
further identified a key ability of teachers, which was to use the Internet to take advantage of teachable moments and capitalize on current events. Teachers made the curriculum more relevant by connecting unfolding social and political events to their curriculum using local, national, and global incidents. Teachers valued opportunities to enable students to engage in tasks that students likely will encounter in their post-secondary school and work environments. Examples include conducting online research, evaluating the validity of information sources, synthesizing information, presenting information to others, working in groups, and writing frequently. Teachers involved in the study also reported enjoying the opportunity to individualize and differentiate their instruction, which they also reported could be accomplished more easily and more effectively with the use of technology.

Warschauer and Tate (2015) provided the following description of the ways that teachers can provide instruction using technology:

Teachers can use digital devices to promote learning that is *individualized* (according to learning pace); *differentiated* (according to learning preferences); and *personalized* (according to learners’ specific interests).

- **Individualized.** Having access to his or her own device—for example, using a tutorial program in math or reading—can enable each student to move as quickly or slowly as needed.

- **Differentiated.** Teachers can provide support materials in multiple modalities, such as written text, video explanations, and games, that explore concepts and also give students flexibility in their own content creation. Students can interpret a poem by composing music to it or analyze a book by photographing scenes that illustrate its contents.
Personalized. Access to online resources enables students to find and use specialized information in areas that catch their interest, no matter how unusual or specific those areas are. For example, when studying the Roman Empire, different students might conduct research projects on areas as diverse as Roman architecture, the rise of Christianity, the life of Hannibal, or the Stoic philosophers. (p. 60)

Warschauer (2007) concluded that using computers will not make bad schools good, but rather they will make good schools better.

Program implementation. Donovan and Green (2010) concluded that faculty readiness to participate in a one-to-one laptop computer initiative is essential: “Preparation of faculty participants before the experience begins is crucial. The key element of this preparation is to provide faculty with as much information about the program as possible, but it is more important to guarantee support during the implementation process” (p. 146). Donovan and Green further observed that “teachers have varying degrees of technological skills and can benefit from having opportunities to express their concerns in order to alleviate fears associated with change. Appropriate professional development could address concerns and misconceptions and allow time for the late adopters to become more comfortable with the innovation by seeing how others they view as having the same technology skill level are implementing the adoption” (p. 145).

Student-centered instruction. The introduction of laptop computers in the classroom environment provides new challenges and opportunities for teachers to implement a variety of lessons that are focused on the individual needs or interests of students. According to Storz and Hoffman (2013), “Students and teachers reported less whole-class, lecture-format instruction and more small-group and individualized instruction. They also described examples of hands-on interactive instruction” (p. 7). This is not an isolated case; in fact, studies by Gulek and Demirtas
(2005), Donovan and Green (2010), Anastos and LaGace (2007), Wurster (2006), and Oliver and Corn (2008) all concluded that one-to-one computing provides teachers with opportunities to change the classroom from an environment in which all students receive the same lesson with little concern for individual skill levels or interests to a classroom in which teachers are able to individualize instruction in ways that are specifically tailored to individual students, individual skill levels, and individual topics.

**Negative Impact of Laptop Computer Programs**

In addition to the benefits of one-to-one laptop computer initiatives, the research literature also has indicated that not all laptop programs have been successful. Researchers have suggested that student demographics, teacher training and support, and instructional strategies are critical in the success or failure of laptop initiatives (e.g., Bebell & Kay, 2010; Bebell & O’Dwyer, 2010; Holcomb, 2009; Oliver, 2008). The absence of even just one of these criteria can negatively influence a one-to-one laptop computer program and potentially lead the program to failure.

**Student demographics impact on the one-to-one program.** Socio-economic issues can play a role in the success or failure of laptop computer program (Warschauer et al., 2014). Researchers have pointed out that programming is influenced by a lack of funding for proper ongoing professional development. In other words, differences exist between districts that are underfunded compared with districts that have the necessary funding to provide such professional development opportunities for their staff members. Students at schools where teachers are operating under effective professional development programs will not have the same experiences as students at schools where teachers lack effective professional development programs. Warschauer (2006) found that the success of a one-to-one laptop program depended
on the socio-economic status of the students in addition to the location of the school. Warschauer found that students who were prepared and encouraged to go to college from an early age were more successful within one-to-one laptop computer programs than students from low socioeconomic neighborhoods who were less likely to have strong research skills or the critical and analytical skills necessary for such initiatives. Additionally, although a bring-your-own-device (BYOD) model of implementation represents a less expensive option for school districts, if a large portion of students are unable to afford a device for use in the school, these programs quickly become extremely limited and cannot reach the full potential of meeting the needs of all student in the school; rather, they meet the needs of only the students who can afford a device. Another challenge when using the BYOD model is that the variety of devices students bring may not be able to utilize the same software, which creates a difficult challenge for the school’s digital network and for the use of a universal software package that can be used by all students in various courses and classrooms. In other words, not all devices can use software universally.

**Teacher training and support.** Appropriate professional development is an essential component in determining the success or failure of a one-to-one laptop computer initiative. According to Holcomb (2009), it is important to integrate technology not only in such a way that it is aligned with the curriculum but also in such a way that it aids students in the development and mastery of critical learning skills. Studies by Hu (2007) and Muir (2007) found that the success of a one-to-one laptop computer initiative can hinge on the ability and comfort levels of teachers to effectively integrate laptop computers into the learning process. According to Holcomb (2009), “It is not uncommon for teachers who do not have confidence in their technology skills to fail to utilize laptops. It is therefore critical for all teachers to be fully trained and supported as part of the one-to-one initiative” (p. 53).
Failure to meet the individual needs of teachers in ways that match both their level of skill as well as the level of confidence has been problematic. Lemke and Martin (2004a) found that the most effective professional development is job embedded, student-centered, collegial, ongoing, and metacognitive. Holcomb (2009) recommended that professional development should be provided to teachers on a regular basis across a continuum, anchored in the context of teaching and learning that is aligned with curriculum and standards. Crutchfield (2006) recommended that professional development should be ongoing and structured so that teachers have the opportunity to practice and reflect.

**Instructional strategies.** Prettyman et al. (2012) indicated that some one-to-one laptop computer programs have been mired in outdated pedagogy and have failed to innovate in ways that new technologies allow. Prettyman (2012) found that the act of placing laptop computers in the classroom does not improve the learning process if teachers employ antiquated teaching strategies. Further research has reinforced this point by indicating that for a laptop program to be successful, teachers must use teaching strategies that provide student-centered instruction (Donovan & Green, 2010; Holcomb, 2009; Lei & Zhao, 2008).

Although some research has identified improvements in teacher effectiveness and efficiency, other studies have failed to be in full agreement. According to Howard and Rennie (2013), “Tasks have tended to be more teacher-centered and were unlikely to engage students in higher cognitive activities, such as problem solving or critical thinking. Further, improvements in teaching or changes that have occurred have not yet resulted in measurable gains in student learning” (Lowther et al., 2003, p. 363). In addition, Holcomb (2009) has indicated that a variety of factors have been responsible for the fact that some programs fail to produce the expected student outcomes. However, according to Edmunds et al. (2012), regardless of the
expectations placed upon students who participate in one-to-one laptop computer programs, whether in professional arenas or with higher education settings, “Usefulness and ease of use are key dimensions of students’ attitudes toward technology” (p. 2). Further research has attributed the failure of one-to-one laptop computer programs not to the technology itself but rather to structural and human factors. According to Burns (2013), any solution to address the failings in one-to-one laptop computer programs must address human and organizational issues.

According to Penuel (2006), some evidence has indicated that particular program designs and factors affecting teacher attitudes and beliefs influence a program’s implementation and success. Penuel cited case studies by Lane (2003), Trimmel and Bachman (2004), and Windschitl, Bachman and Sahl (2002) indicating that the following factors influence the degree to which teachers use laptop computers with students: teachers’ beliefs about students, the potential role of technology in learning, and availability of high-quality digital content. Penuel further noted that teachers concerned about students using their laptops for unauthorized purposes, such as playing games or searching the Internet for recreational purposes during class time, are likely to use laptops less frequently with students in class (Jaillet, 2004; Trimmel & Bachman, 2004; Zucker & McGhee, 2005).

Summary

Researchers have indicated that one-to-one laptop computer programs can have a positive influence on the process of teaching and learning. Through these one-to-one laptop computer programs, teachers have been able to adapt their lessons in a variety of ways to accommodate the learning styles of students in a digital generation. Students have been able to use technology in a more personalized approach that is relevant to their individual interests and learning styles. In addition, students have become accustomed to the application of technology in their formal
education, enabling them to apply this knowledge and experience in new ways in postsecondary settings. The research has confirmed a strong relationship between (a) proper implementation and ongoing support for teachers and (b) the success of one-to-one laptop computer programs. Without such support and ongoing professional development, laptop programs have been hindered and or eventually fail.

Although some one-to-one laptop computer programs have flourished, many have failed or achieved only a modicum of success. These failing and low-performing programs have been the result of deficient professional development planning, insufficient funding, and inadequate leadership.

The purpose of this research was to test the theory that the Ayersville Local School District’s One-to-One Laptop Initiative was successful in positively influencing students’ learning experiences as well as the ability of teachers to provide effective, technology-rich lessons that prepare students for to use technology in the future. As a result of this study, the district stakeholders may be able to better appreciate the positive effects that the laptop program is having on the students within the district and continue to support the program.
CHAPTER III. METHODOLOGY

Schools across the country have sought to provide students technological tools for use in the classroom setting. The purpose of this research was to test the theory that the Ayersville Local School District’s One-to-One Laptop Initiative was successful in positively impacting students’ learning experiences as well as the ability of teachers to provide effective, technology-rich lessons that prepare students for to use technology in the future. In response to this study, the district stakeholders may be able to better appreciate the positive effects that one-to-one laptop computer programs can have on students within the district and continue to support the program.

The following research questions guided this study:

RQ1: How did the implementation of the laptop computers impact the students’ motivation to learn?

RQ2: How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?

RQ3: In what ways have teachers made school more relevant to the students?

RQ4: How are students’ behaviors impacted by the use of the laptop computers?

The answers to these research questions provided important information in determining whether and to what extent the experiences within the Ayersville Local Schools align with research conducted by Corn, Tagssold, and Patel (2011) as well as the findings of Oliver and Corn (2008), which indicated that one-to-one laptop computer initiatives have helped increase students’ technology proficiency through consistent use of software and hardware, increased communication with teachers, increased student-to-student communication, increased analytical skills, and increased writing skills.
Has the program at Ayersville impacted learning and attitudes towards the use of technology? Are the students better prepared for their postsecondary experience because of the one-to-one laptop program? The answers to these questions were a focus of this study.

**Research Design**

The researcher used a qualitative approach referred to as a grounded theory approach. According to Creswell (2003), qualitative studies are most appropriate when the information being sought is best found in participants’ individual experiences. The researcher collected open-ended, emerging data with the primary intent of developing themes from the data. The grounded theory design is an approach for developing theory that is "grounded in data systematically gathered and analyzed" (Strauss & Corbin, 1994, p. 274).

Using Google Drive, the researcher sent participants a survey to elicit their unique responses. The questions were open-ended and required participants in three specific groups to provide their opinions as they recalled their experiences with the one-to-one laptop computer program.

The grounded theory approach required the researcher to move in and out of the data collection and analysis processes, which has been referred to as an “iteration.” This method of analysis has been termed the constant comparative method. Grounded theory research involves multiple iterations. The process began with the researcher asking a question, or series of questions, through an online survey designed to lead to the development or generation of a theory regarding the one-to-one laptop computer initiative at Ayersville High School. After collecting a data set, the researcher analyzed it. The process of analysis allowed the researcher to begin to develop a theory and formulate answers to the research questions that guided this study. The comparative process continued until the researcher reached data saturation, which is a term
used to describe the point at which no new ideas or insights emerge from analyzing the data.

To analyze the data, the researcher used three levels, or types of coding:

Open Coding: The researcher began to segment or divide the data into similar groupings and form preliminary categories of information about the phenomenon under investigation.

Axial Coding: After the open coding process, the researcher began to bring together the categories that had been identified into groupings. These groupings resembled themes and were generally new ways of seeing and understanding the phenomenon under investigation.

Selective Coding: The researcher organized and integrated the categories and themes in a way that articulated a coherent understanding, or theory of the phenomenon under investigation (Cohen & Crabtree 2006).

Participants

Three distinct groups of participants participated in this study. The first group was a sampling of Ayersville High School graduates of the classes of 2012, 2013, and 2014. Ayersville Local Schools is a small, rural school district consisting of approximately 825 students in grades K-12. The district is located in Northwest Ohio in Defiance County. Based on data provided via the Ohio Department of Education, the median income of district residents is above average in the state of Ohio. According to an exit survey completed by graduating seniors, students identified the following aspirations upon graduation: 75% intended to attend a two- or four-year college or university, 20% planned to enter into competitive employment, and the remaining 5% planned to enter into a branch of the military. The student participants in this study attended Ayersville High School during the first three years that a one-to-one laptop computer initiative had been implemented.
The second group of participants included members of the teaching staff who had been employed in the district during or before 2010, which was the year in which the decision was made to begin the one-to-one laptop computer program. These teachers had been provided numerous opportunities for professional development focusing on the integration of technology in the classroom. The teachers involved in the study also were experienced with the use of technology to varying degrees. There were 24 potential teachers who took part in the one-to-one initiative.

The third group of participants included parents of Ayersville High School graduates from the classes of 2012, 2013, and 2014. These parents had the opportunity to observe the use of the laptop computers after school and on weekends, when students were not in school. As a result, they were able to obtain insights into the manner in which students’ behaviors and study habits were influenced by the use of the laptop computers.

The information provided to the interviewer from the participants will remain confidential. Efforts were made to limit the time required to complete the survey, but because the questions were open-ended and designed to elicit personal observations, the time required for each participant to complete the survey varied. Each participant was informed about the manner in which their responses would be tabulated and that their responses would remain anonymous.

**Instrumentation and Data Sources**

Data were collected through an online survey constructed using Google Forms. The questions were developed by the researcher based upon the purpose of the study and the specific role of each of the three groups. Similar studies influenced the development of the bank of questions used in the survey. The questions were reviewed by a central office administrative assistant who holds a Bachelor of Arts degree in communications and the district treasurer, who
holds a Master of Business and Organizational Leadership degree. Their task was to help provide clarity and focus to the questions that were developed.

Using district databases, alumni databases and Facebook, the researcher contacted a sampling of the 20 students and 20 staff members who fit the criteria of having been a part of the implementation of the one-to-one laptop computer initiative as well as 64 parents of the students in the student sample group. The researcher sent an email to request their participation in the online survey designed specifically for each group. The researcher designed a different survey specifically for each of the three groups (see Appendices A, B and C). From the survey responses, the researcher highlighted the trends and patterns in the responses as indicated by the various codes developed during the data analysis.

**Data Collection Procedures**

The data collection process included the following steps:

1. The researcher submitted a request and received approval to use interview questions, and a proposal for this study was submitted to the IRB of the University of Findlay.

2. Using the district’s alumni website, the district’s Facebook page, and the district’s PowerSchool Database, graduates of the classes of 2012, 2013, and 2014 were recruited to participate in the study.

3. Using the student records and district alumni website, the researcher obtained parent email addresses to request their participation in the study.

4. Using the past and current staff directories, the researcher contacted via email current and former teachers (2010-2014) of Ayersville High School to request their participation in the study.
5. The researcher sent to the potential participants a survey using Google Drive with questions developed specifically for each of the three groups. Each survey required approximately 15 to 20 minutes to complete. To maintain anonymity, the participants were not identified by name.

6. After reading through the responses, the researcher analyzed the data for specific codes and themes presented by the participants in response to each specific question.

7. The analysis of the data is presented in Chapter 4.

**Data Analysis**

After the survey responses were collected, the researcher analyzed the data by applying specific codes. The researcher established various codes and began to organize the codes into patterns and themes. During this process, the researcher investigated commonalities and discrepancies between responses and used these to generate a theory about the efficacy of the program. As each of the participants described unique perceptions in response to the various questions, the researcher sought to present the stories that unfolded in addition to any related emotions exhibited by the respondents.

**Assumptions**

One assumption the researcher made is that the participants were honest in their responses and provided responses indicative of their mindset during their experience with the one-to-one laptop computer initiative. The researcher also assumed that the one-to-one laptop computer initiative had influenced teaching and learning to the degree that was realized by the participants, and that participants were able to recall their thoughts and emotions during the time that the one-to-one laptop computer program was implemented.
CHAPTER IV. RESULTS

The purpose of this research was to test the theory that the Ayersville Local Schools one-to-one laptop initiative was successful in positively impacting students’ learning experiences and the teachers’ ability to provide effective, technology-rich lessons that prepare students to use technology in their post-secondary lives. As a result of this study, the district stakeholders can appreciate the positive effects the one-to-one laptop computer program may have on the students within the district and continue to be supportive of the program well into the future. Additionally, negative issues related to the laptop program can be identified and then be addressed by the district to improve the program for future students and teachers.

As discussed in Chapter 2 of this study, previous studies relating to one-to-one laptop computer programs implemented in the K-12 setting have reported many positive outcomes. However, negative outcomes also have been reported within programs that create a degree of conflict about the benefit of such programming in the K-12 setting. The costs of implementing a one-to-one laptop program must be accounted for and balanced against the expected outcomes of the program. Costs include computer hardware, software, and professional development training of staff members and faculty members. Stakeholders should be informed about the ways in which their children are being impacted by the one-to-one laptop program in order to make informed decisions about their continued support of the program.

As noted in studies by Warschauer and Tate (2015), teachers can use digital devices to promote learning that is individualized (according to learning pace); differentiated (according to learning preferences); and personalized (according to learners’ specific interests). In another study by Levin and Schrum (2013), the authors noted positive responses to one-to-one laptop computer programs. These positive responses included increased opportunities for students to be
creative or innovative as well as opportunities to engage in guiding, facilitating, questioning, encouraging, and assessing students during class time. Additionally, teachers reported that they engaged in more student talk and group work and much less teacher-directed instruction. Levin and Schrum further reported the following positive outcomes:

[Positive outcomes included the ability of] teachers to use the Internet to take advantage of teachable moments and capitalize on current events. Teachers made the curriculum more relevant by making real-world connections to their curriculum using local, national and worldwide events. Additional benefits that teachers valued included enabling students to engage in tasks that they will encounter in their post-secondary school and work environment. Examples include conducting online research, evaluating the validity of sources, synthesizing information, presenting to others, working in groups, and writing often. Teachers involved in the study also ‘loved’ being able to individualize and differentiate their instruction, which could be done more easily and more effectively with the use of the laptop. (p.42-43)

Both of the studies above, Levin and Schrum (2013) and Warshauer and Tate (2015), reported a positive relationship between one-to-one laptop use and students’ learning experiences. They also reported a positive relationship between one-to-one laptop computer use and teachers’ use of technology in the classroom to enhance student learning.

However, as previously discussed, some researchers have reported drawbacks associated with one-to-one laptop computer programs. Studies by Holcomb (2009), Bebell and O’Dwyer (2010), Bebell and Kay (2010), Oliver (2008), and Prettyman (2012) clearly indicated that one-to-one laptop computer programs have failed to meet project objectives due to a lack of ongoing, relevant, high-quality professional development that prepares teachers to implement a one-to-one
laptop computer program. Planning weighs heavily on the overall success of the one-to-one laptop program.

The survey responses reflected the personal perceptions of the students whose educational experiences were influenced during their high school experience by the opportunity to use laptop computers in a one-to-one environment. Their opinions were unique to their own personal observations and yet themes emerged. Themes arose that provided the researcher with findings that reflected the viewpoints of each participant in the study.

Parents have a stake in the education of their children not only from a personal perspective (i.e., it influences their own child’s education) but also from a socio-economic perspective--that is, as taxpayers who expect their tax dollars to be used effectively and efficiently. The third group who participated in the study was comprised of teachers who bore the brunt of the change that was needed in order to provide the impetus for and effective use of the technology provided to the students using the community’s tax dollars.

**Characteristics of the Sample**

The students who participated in the survey did so on their own volition. Contact was made via emails, and their impetus for completing the survey was to provide feedback for a program for which they were the pioneers. The former students are currently in college or in the beginning stages of their career. The parents who responded also did so on their own volition. Because they use email and actively responded to the email survey, it can be deduced that they were aware of the current technology needs in society and possess the basic skills needed to use technology to communicate through digital means and maintain an understanding of the impact technology has had on their lives during the past 10 to 15 years. The teachers who participated in the survey possessed different levels of experience in education. Due to their immersion into a
variety of professional development opportunities in the use of technology since the inception of the one-to-one laptop computer program, the researcher assumed that they were well versed in the use of technology within educational settings.

**Instrument Validity and Reliability**

Each participant in each specific group--students, parents and teachers--received the same set of questions in the same format. The questions were designed to elicit opinions from the participants and to encourage them to reveal their own personal feelings about the impact of the program. The questions were open-ended, and participants’ responses were unique to each individual. As such, any inferences drawn based on the data obtained through the use of the survey are appropriate, valid, and credible.

Prior to distribution, the survey questions were reviewed by two experts in the field of educational research. Additionally, the surveys were also reviewed by colleagues within the researcher’s central office to ensure the questions were clear and understandable to parents, students, and teachers.

**Research Question 1**

The first research question was as follows: How did the implementation of the laptop computers impact the students’ motivation to learn?

**RQ 1: Survey responses.** The codes emerged during the content analysis of the data and were correlated to common themes. Most themes can be correlated to themes from research that was previously discussed in Chapter Two. Due to the unique responses of each participant, codes were embedded within their response. For instance, relevance of subject matter to the interests of the students is important. Teachers who can provide relevance to the students will be able to hold students’ attention, increase student motivation, and increase student retention.
Student responses indicated that they better understood the subject matter and they were able to use the laptop computer to further research a topic presented in class. The underlying reason for their better understanding was interpreted by this researcher to be due to the relevance drawn from the topic to the interest of the student.

Parental responses from the survey indicated that through the use of the laptop computers, students could find information right away. In this instance, the researcher correlated the responses to access to information via the Internet to enhance or reinforce knowledge acquisition.

**RQ1: Student responses.** Question number one of the student survey asked how the use of laptops impacted students’ motivation to learn. The analysis of the responses resulted in a variety of codes, including the following; “student distraction,” “teacher supervision,” “student attention,” “negative use of computers,” “off-task behaviors,” “students not paying attention,” “accessing information outside of class time,” and “having interest in a particular topic.” The most frequent themes that arose from this prompt included increased engagement, relevance to the topic, access to additional information, student-centered instruction and the ease of typing versus handwriting. The themes can be correlated to similar themes noted in previous literature on the topic. Some of the codes were in multiple responses, giving them more relevance to the sample.

These themes were all noted as increasing the students’ motivation to learn. One student responded with the following:

“The use of the computer did not motivate me to learn as I was already self-motivated to learn, but the laptop did provide the opportunity for me to perform additional research into subjects of my choosing due to the ease of conducting research via the Internet.”
Outlier codes included the following: (a) some students used computers too much and (b) sometimes excessive use of the computers would inhibit learning.

One student responded with very strong convictions about the impact of laptop computers on student motivation:

“Having the laptop got me really excited to learn! It made the simplest tasks more fun. I could collaborate with group members more easily through Google Docs and having an email account made it a lot easier to communicate with my teachers. My generation has been raised on technology and having the laptops made learning a lot easier and more fun for me.”

However, another student voiced an opposing opinion about the impact the laptop program had on motivation:

“I think the use of laptops did very little to affect the motivation to learn. The benefits came from the ease of access to supplemental information. I honestly believe the students' motivation to learn is more directly influenced by their cognitive ability to understand the importance of a base education.”

**RQ1: Parent responses.** Question number three of the parent survey asked the parents if having access to the computers changed their child’s motivation to learn? The analysis of the responses resulted in a variety of codes, including the following: “more willing to do extra work due to the ease of finding information”; “provides opportunity to better understand what is being taught”; “easy access to information”; more comprehensive search for information, especially for literature/writing/research”; “prepares them for college/future career”; “[technology] enhances their knowledge and education beyond the classroom”; and “liked typing assignments more than handwriting.” The major themes included enhanced learning, increased
communication, relevance to the subject, increased access to information, willingness to type
rather than writing by hand, and the ease of performing research. According to the responses, all
of these themes helped to increase the motivation of the students. On the other hand, some outlier
responses were identified. For example, one parent indicated doubt in response to whether the
program impacted his/her child’s motivation, and two respondents felt that their children would
procrastinate due to the ease of finding research information easily and in a short amount of time.

Of particular interest was the following response by a parent who felt strongly about the impact
technology had on his child’s motivation to learn:

“It did for my child. Like anything new, it was "fun" to learn and a more enjoyable way
to research. She [the student] felt more in control of the process because she was able to
bring it [the computer] home in the evenings. Since the network was controlled by the
school, she still had access to the databases she used for research even though she was at
home. She was excited about the ability to explore other software, such as iMovie while
at home.”

Another parent was more cautious in responding to whether technology had an impact on
his/her child’s motivation to learn: “I have to wonder if it offers more motivation. In some cases,
I suspect the computer became more of a crutch than a motivator--too easy to rely on the
computer than to learn… at least to what my thinking of learning is.”

Finally, a parent who was uncertain about the positive or negative impact of technology
on his/her child reported the following:

“Yes, both in a positive and negative way. It [technology] does in a lot of cases make it
[learning] more fun so they [students] will work at it longer, but in some cases it also
makes them procrastinate because they know it will not take as long to get the information.”

RQ1: Teacher responses. Question number three of the teacher survey asked teachers how the use of the laptop computers in a ubiquitous manner changed student motivation to learn? The analysis of the responses resulted in a variety of codes, including the following: “increased motivation due to easy access of information--students can wait until last minute due to ease of access,” “instant access [to information] has improved learning,” “the average student is more motivated,” “students would rather type than hand-write assignments,” “students were thrilled to use the technology,” “students were excited to use the laptops,” “motivation is/was unchanged,” “students are lazier because all they have to do is ‘Google it’,” “ownership of their work,” and “students are not motivated by technology--they are motivated by subject matter.” Less frequent codes included the following: “computers do not motivate, good subject matter does”; “students are lazier as they can Google for information”; “easy access to information increased student procrastination”; and “motivation is unchanged from what it was prior to the implementation of the laptop program.”

Themes derived from these codes included the following: excitement about using technology, easy/instant access to information, and the ability to use the computer to type assignments rather than hand writing assignments.

The following response from one teacher reflected a strong belief that laptop computers increase motivation:

“I think kids enjoy doing more on the laptop instead of writing on paper. They enjoy typing and technology-oriented assignments far better, in my opinion. I think if you can get them online and doing stuff, they enjoy learning. Then they will be more motivated
for sure. Having computers definitely impacted student learning and motivation for sure. I think kids are able to prepare for the future using the laptops now. I wish I had this opportunity when I was younger.”

Another teacher reported the following potential drawbacks:

“I think motivation is still there to learn, especially now that the information is literally at their fingertips 24/7. However, in some instances I also see more procrastination because students can access that information at any time, leaving them to do it at the very last minute, which may cause them to not put forth the very best product they could.”

Another teacher offered the following opinion, suggesting that motivation has remained consistent despite the use of laptop computers: “Student motivation has not been changed.” A similar opinion is reflected in the following response: “I think they have become lazier learners. ‘Just Google it’ is a common term.” Finally, another teacher offered the following comment: “Students aren't motivated by laptops. They are motivated by subject matter.”

Based upon the responses provided by the three groups, the impact of the laptop on the students’ motivation was positive. Although consensus on the subject was not reached in terms of this particular question, the responses generally were more positive than negative. Students, who are not professionals in education and have not been formally trained in the use of education professional vernacular, were nevertheless able to describe characteristics of effective classroom teachers: “increased student engagement,” “relevance to the topic,” “student-centered instruction,” “access to information to enhance learning,” and “opportunity for further research due to the ease with which it can be found.” Parents responded with terms such as “enhanced learning,” “increased communication,” “relevance to the subject,” “increased access to information,” “willingness to type rather than writing by hand,” and “the ease of performing
research”--all of which they felt helped to increase the motivation of students. All of these terms and responses are related to positive educational factors and provide meaningful learning experiences for the learner, satisfaction for teachers, and parents who observe their child learning through innovative and creative methods. Finally, teachers identified the following factors: “increased excitement about using technology,” “easy/instant access to information,” and “the ability to use the computer to type rather than having to hand-write assignments.”

There were differences in opinions that reflected a degree of conflict about the role of computers in fostering motivation. For example, one student responded that he/she was not motivated by the use of the computer, but he/she was self-motivated. This student participant did note, however, that through the use of the laptop, they [students] were afforded opportunities to perform additional research into subjects of their choosing due to the ease of conducting such research via the Internet. Parent responses indicated that using laptop computers made finding information too easy and that their child would procrastinate, waiting until the last moment to begin their research because it did not take the child much time to find what he/she needed via the Internet. This parent further noted, “... this is the way of the world today.” Teachers noted that computers do not motivate, good subject matter does; students are lazier because they can use Google for information and increase their procrastination, and student motivation has been unchanged as a result of implementing the laptop computer program.

The responses to this group of questions indicated that the majority of students, parents, and teachers believe that students are more motivated to learn when provided access to a laptop computer. However, the degree to which motivation increases depends on many factors. It would appear from the responses that most students are excited to use a laptop computer to complete school work--some students more than others. No responses indicated that students became less
motivated when provided a laptop, which leads this researcher to believe that the positives outweigh the negatives after introducing a laptop computer program into students’ educational programming. Table 1 presents the most frequent responses in relation to Research Question 1: How did the implementation of the laptop computers impact the students’ motivation to learn?

Table 1

*Most Frequent Themes in Response to the Impact on Student Motivation of Laptop Use in a Ubiquitous Manner*

<table>
<thead>
<tr>
<th>Most Frequent Themes Concerning Increased Motivation of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students</strong></td>
</tr>
<tr>
<td>1. Increased access to information for research*</td>
</tr>
<tr>
<td>2. Increased Student Engagement</td>
</tr>
<tr>
<td>3. More relevance to topic</td>
</tr>
<tr>
<td>4. Student-centered instruction</td>
</tr>
<tr>
<td><strong>Parents</strong></td>
</tr>
<tr>
<td>1. Increased access to information*</td>
</tr>
<tr>
<td>2. Enhanced learning</td>
</tr>
<tr>
<td>3. Increased communication</td>
</tr>
<tr>
<td>4. More relevance to topic</td>
</tr>
<tr>
<td>5. Typing vs. handwriting assignments</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
</tr>
<tr>
<td>1. Easy and instant access to information*</td>
</tr>
<tr>
<td>2. Increased excitement using technology</td>
</tr>
<tr>
<td>3. Typing vs. handwriting assignments</td>
</tr>
</tbody>
</table>

*Note. * Denotes a response by all three groups.*
Research Question 2

The second research question was as follows: How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?

**RQ2: Student responses.** The codes that the researcher used during the content analysis of the data were correlated to previous research that was discussed in Chapter 2, and adjustments were made during the data analysis to accommodate unique responses to each particular question.

Question number seven of the student survey asked the following question: “Did the use of the laptops at school impact your future plans, either career path or college plans? Please explain.” Since this first part of the question elicited a “yes” or “no” response, the codes that emerged from this question were simple—for example, “No, laptops did not impact their future plans.” The question may be vague from the standpoint that the participants responded to the question as if the use of a laptop computer had little or no impact in the choice of college or career. However, students frequently indicated that they developed confidence in the use of technology, gained experience in using various hardware and software formats, and felt prepared to use computers in their college and/or career environments. The common theme was that the use of the laptop computer helped prepare them to use technology in their post-secondary experience. However, one student indicated that the use of a laptop computer during high school did not influence his/her plans:

I don't really feel that the use of laptops at school had any impact on my future plans. I plan on becoming a high school math teacher, but even though I do believe that incorporating different types of technology in the classroom can benefit and enhance the educational experiences of students, being able to use laptops during my high school experience had no influence on why I chose this career path.
Another student indicated that the use of a laptop computer influenced his/her college plans: “It impacted my college plans in a positive way because I use my laptop for everything in my classes during my last semester of college.”

Two students were forthcoming with their own personal stories which indicated that their future career plans were impacted by the use of the laptop computers during their high school experience. These participants indicated that their original interests focused on technology as a career, but due to the use of laptop computers during their high school experience, their plans were solidified. Both students eventually became involved in computer engineering and programming in college:

“The use of laptops at school did impact my future plans for my career. Since I was younger, I felt the draw towards a job that used computers. When I got to high school, I liked the idea of being a software engineer or programmer, but I didn't know if I would like it. Luckily, the school offered a programming class made possible by each student having a laptop. Because of the ability to program and code on the school laptops, my choice for a future career path was sealed.”

Except for two students, the participants felt their career path was not necessarily influenced by their experience with the laptop computer program, but many of them believed that the laptop program impacted their computer skills positively so they were able to proficiently use computers during their college and career experiences.

**RQ2: Parent responses.** Question number four of the parent survey asked the following: “Do you believe the computer program affects your child’s ability to relate to college and career opportunities? Explain.” The first part of this question was also closed ended, but it asked them to explain the reason behind their “yes” or “no” response. The parents offered
thorough explanations concerning their responses. All of the parents who responded to this question answered affirmatively. The explanations they provided resulted in codes such as “easier transition to college,” “using technology to submit college applications,” and “completing coursework in college.” These particular codes and the frequency with which they appeared led to an important theme, which was that their child was better prepared for their future either in (a) their next level of education or in (b) their current jobs or careers. The participants added that they felt their child was better prepared than other students at their college who had not had the overall experience of using laptop computers in high school. One participant was undecided about the impact on his/her child’s future career and college experiences but noted that his/her child had more access to information that would help to make a career choice.

One parent was skeptical in response to this question. The parent did not respond with a “yes” or “no” to the question but did provide justification for the overall use of technology: “I think it does make them more interested in the opportunities being presented to them by researching it on the Internet.” Although this parent did not completely agree with the merits of the use of technology, the parent recognized that such technology is in use in society today, that it will continue to be used in the future, and that students need to be properly prepared for its use.

One parent provided the following positive response:

Absolutely. She [the student] was definitely more prepared for college than many other students she met on campus. She possessed a more complete understanding of many software programs and had stronger reasoning and research skills. From a technology standpoint, she was prepared for the higher level of expectations that come along with the next level of learning.
RQ2: Teacher responses. Question number three of the teacher survey asked the following: “Through your interaction with the students, do you believe their post-high school plans have been altered due to the impact of the One-to-One Laptop Initiative?” The teachers responded negatively to the relationship between career choices and the use of the laptops. However, the responses to this question provided information about the impact that the use of the laptop computers had on students’ skills and the future use of technology, whether in college or in the workplace. The major theme that arose from analyzing the responses to this question was a resounding, “No, the use of the laptop computer in high school did not impact the students’ post high school plans.” However, another major theme suggested that although the one-to-one laptop computer program did not impact what students chose to do, it did better prepare them for their chosen paths. Teachers noted that students were more confident in their use of technology, they believed that they could do more with technology in the future, and they were prepared for the next level. A statement by one teacher illustrated this perspective:

Students have more confidence, that they know what they are doing and will be able to do more as they graduate and move on. They are not afraid to tackle new things, and it has potentially set them up to be able to work out problems.

The following question was intended to elicit opinions, “How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?” Based on the responses provided by all three participant groups, using the laptop computers prepared students to use technology at the next level of their education or in their career by providing them with confidence to use computer hardware and software, improved research skills, and improved typing/keyboarding skills—all of which helped them to become better prepared than their college
and/or work force counterparts. Parent responses to this question clearly indicated that the laptop computer program impacted their child’s career plans.

The use of laptop computers did not seem to be important in leading students to a change in their college or career plans, but it did provide them with skills that would help to enable them to be more successful in their chosen path, and as one parent responded, it enabled them to be “… more competitive in the job market due to this added skill acquisition stemming from the immersion into the laptop program.” Table 2 indicates the the most frequent responses to Research Question 2: How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?

Table 2
The Most Frequent Responses about How the 24/7 Access to the Use of the Laptop Computers in the School Changed Students’ Future Plans

<table>
<thead>
<tr>
<th>Most Frequent Responses Concerning the Future Plans of students in Correlation to the One-To-One Laptop Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
</tr>
<tr>
<td>1. Students were better prepared for using the computer in their college and/or career environments*</td>
</tr>
<tr>
<td>2. Students developed confidence in the uses of technology</td>
</tr>
<tr>
<td>3. Students gained experience using a variety of hardware formats and software programs</td>
</tr>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>1. Students were better prepared to complete coursework in college*</td>
</tr>
<tr>
<td>2. Students made an easier transition to college</td>
</tr>
</tbody>
</table>
3. Students were able apply their skills in technology to submit college applications and complete job applications when needed
4. Students were more competitive in the job market due to their technology skills

Teachers
1. Students were prepared for the next level*
2. Students had more confidence in their use of technology
3. Students could apply their previously learned skills to do more with technology in the future

Note. * Denotes a similar response by all three groups.

Research Question 3

The third research question was as follows: In what ways have teachers made school more relevant to the students?

**RQ3: Student responses.** Question number three of the student survey asked the following question: “Describe how the use of laptops impacted how you learned (i.e., did the use of computers change your ability to understand or relate to the subjects being discussed/taught in class?)” Responses to this question were coded as follows: “able to look things up,” “relating better to the topic,” “broaden knowledge,” “[I] could get answers to my questions without asking the teacher,” and “expanded knowledge.”

The themes that emerged as a result of the data analysis process included the following: individualized instruction; increased/expanded learning opportunities; collaboration opportunities via student learning system software applications, such as Google Apps and Moodle; teachers using online access to enhance learning; and access via Internet allowed personal research for better understanding and/or reinforcement.
One student’s response provided insight into a common opinion expressed by other students:

The hassle of handwriting my papers and being able to use spell check definitely impacted my learning in a positive way. I also used it [laptop computer] for looking up topics that I didn't understand in class and having it explained to me in a different way. The laptops enabled me to search topics and expand my knowledge in positive ways. I think having access to the Internet that quickly in class to clarify the things I didn't understand helped me learn more efficiently. If I were stuck in class and didn't understand a topic, I would just sit there not understanding for the whole class. Instead of asking the teacher to restate what he said, I can look it up and get a better understanding of it. That way, I wouldn't interrupt class and I would get a different point of view in case the teacher wouldn't be able to help me.

Another student provided the following response, further illustrating the positive use of a variety of software programs to expand their learning experience:

Using laptops definitely changed the way I learned. I taught myself how to use all of the Microsoft programs, and I also became proficient with iMovie and other Mac programs. We created videos and did a lot of multimedia projects while I was in school that I loved!

**RQ3: Parent responses.** The survey questions provided to parents did not include a question that specifically targeted whether teachers made school more relevant to the students. However, questions number five and six of the parent survey indirectly evoked opinions that were applicable to the research question. Question five asked the following: “As a parent and community stakeholder, do you believe the time, effort and funding for the computer program has been beneficial to improve student learning? Explain.” Question six asked the following:
“Please provide any additional comments that you have that best describe your opinions concerning the one-to-one laptop program at Ayersville High School. The parents’ responses indicated the laptop computer program made learning more relevant to the future needs of their children. None of the responses indicated otherwise.

The codes that were used in this explanation portion of questions five and six included the following: “prepared students for the digital world”; “learning was more individualized”; “more access to information via the Internet, especially for children who otherwise did not have access to technology or the Internet at home”; students not intimidated by technology”; collaboration with other students on project-based learning initiatives; relevance to the topic; and increased individualized learning.

After analyzing the data and assigning codes, themes were generated, which included the following: students can easily adapt to the technological skills needed to succeed, i.e., communication in today’s world; our students will be ahead of others—more competitive in the workplace and more adept in college, able to use time efficiently, knowing how the use of technology impacts time needed to complete tasks, more student-centered activities, the use of the laptop to enhance learning outside of school, increased access to information via the Internet while at home and at school, preparation for future career/college, and increased individualized learning.

The following response from one parent represents the opinion of most parents in this sample:

Yes. Simply put, this is a technology-based world. Instant communication between cities, states, and even continents demands a more skilled and technologically advanced employee. The younger we teach our children to adapt to the skills they will need to
succeed, the easier it is for them to learn. After seeing how the [laptop computer]
program works up close, I'm excited that the students in our school system have been
provided with this kind of opportunity!

Another parent further indicated support of building technology skills in response to
question six:

The more technology we can put into the hands of students, the quicker they will learn
and the quicker they will build the skills they need for their chosen career. The way we
learn now is different than it was 50 years ago. The way we teach has to keep up with the
way we learn. Supplying students with computers also allows them to learn at their own
pace. What they can't get done at school, they now have access to do at home. I also
believe it has given some students more opportunity than they might have had at home
since many homes didn't have computers and the students that did have a home computer
didn't necessarily have a computer that was compatible with what they were doing at
school. The one-to one program provides students with the most current software
technology, allows them the access they need at home, and prepares them for future
learning in college as well as in the workforce.

**RQ3: Teacher responses.** Question number four on the survey addressed Research
Question 3 by asking the following question: “Do you believe that access to computers impacts
student learning? Explain.” With the exception of one teacher, the responses to this question
were positive. One teacher responded “yes” and “no” to this question. Codes assigned to the
teachers’ responses included the following: “teachers could teach like college classes,” “able to
watch real-world experiences,” “[the use of laptops] motivates lower-achieving students,”
“students used time more efficiently,” “[the use of laptops] prepares students for the future,”
“students are able to watch videos of the class or topics multiple times for better understanding,”
“teacher was a facilitator rather than the holder of information,” “students have more fun learning,” and “[students] use the technology to extend learning in areas of interest.”

Themes that emerged from analyzing these codes included the following: increased motivation, more efficient use of time using the Internet for research, self-directed learning activities, more student-centered lessons, and higher relevance to the topic. Based on the responses provided by these three participant groups, common themes included the following: increased collaboration, increased abilities to research topics of interest to enhance their knowledge or for reinforcement of topics presented in class, and teachers used more student-centered lessons by assigning more project-based learning and collaborative student presentations. Through the use of instructional delivery systems (instructional strategies), such as project-based learning and collaborative student presentations, teachers enhanced creativity and innovation, and students proficiently employed research skills outside of class. Teachers also were able to embed video streaming into assignments, making materials more relevant and more individualized to students.

The findings suggested that participants perceived the laptop as a tool through which teachers can employ multiple strategies in order to make educational experiences more relevant to the students in their classes. Table 3 provides themes that emerged in the data collected to address Research Question 3: In what ways have teachers made school more relevant to the students?

Table 3

The Most Frequent Responses by Each Group in Relation to the Relevancy of Learning

Experience through the Use of the Laptop Computer in a Ubiquitous Manner
The Most Frequent Themes in Reference to the Relevancy Responses From Each Group

Students
1. Individualized instruction
2. Increased/expanded learning opportunities
3. Collaboration opportunities via Google Apps and Moodle
4. Teachers using online access to enhance learning
5. Access via Internet allowed personal research for better understanding and/or reinforcement*

Parents
1. Preparation for the needs of the future
2. Adaptability to emerging technologies
3. More competitive with technology skills
4. Individualization of student learning
5. Time-management in relation to technology use.

Teachers
1. Opportunity to collaborate with other students via Google Applications and/or Moodle
2. Allowing students access to research via the Internet to study real-world problems
3. Assigning student-centered projects and presentations

Research Question 4

The fourth research question was as follows: How are students’ behaviors impacted by the use of the laptop computers?

RQ4: Student responses. Question number two of the student survey requested the following information: “Describe how the use of the laptops impacted the behaviors of students during the school day.” Codes that were assigned to the data included the following: “off-task
behaviors of some students,” “some students played games or emailed others when they weren’t
supposed to,” “some students were easily distracted by researching irrelevant materials or
playing games,” “sometimes we did not pay attention to the teacher,” “the use of laptops had a
negative impact on some of the students during the school day,” “the IT team locked down the
bad websites,” “teachers who enforced the rules had less trouble with off-task use of the
computers,” and “most students used the computers appropriately.”

Major themes included the following: students’ off-task behaviors were exhibited at
times; most students used the computers as intended; many students when not engaged in active
learning misused the computer in off-task behaviors; and when teachers enforced their rules of
use and engaged students, there was little opportunity for misuse.

Also noted were positive behavior codes, which included the following: quieter study
halls; accessing pre-approved computer games; students’ eagerness to learn; students favored
typing on the computer rather than hand-writing assignments; and it was noted that with or
without the laptops, students would exhibit off-task behaviors when not fully engaged. Themes
from the positive codes included the following: students were excited to learn and complete tasks
via computer. Student were more attentive, students were more engaged and on task; and
students could use the laptop for self-directed activities on their own time.

The following student response illustrates comments of the majority of students in the
sample:

“Most students used the laptops how they were supposed to, and it didn't create any
problems when that occurred. However, there were some students who used the laptops
in a negative way. They were distracted by playing games, emailing their friends, and just
goofing off while not paying attention to the teacher. It was a big distraction when being allowed to use them in class when we didn't have a specific task assigned to us.”

The following student response identifies how most students perceived the role of the teacher and the importance of proper planning and supervision of students using laptops in school:

“The use of laptops impacted behaviors differently. Some [students] were very distracted, browsing irrelevant material, while others were more attentive. I think those who were distracted by the laptops would have been the students who would be distracted by other objects sans laptops. Another factor that I believe goes into this is the ability for the teachers to hold attention through discipline and respect.”

**RQ4: Parent responses.** Question number two of the parent survey asked the following: “Do you think the computers changed the manner in which your child learns? Explain.” The researcher assignment the following codes to the parent responses: “their child was more willing to do extra work due to the effortless way of finding information”; “the use of the laptop and access to the Internet at home enhanced learning outside of the classroom”; “would access class materials at home”; “trains them in the use of technology”; “prepares them for today's work and college environments”; “teachers’ varying use of the laptops and planning technology into their lessons”; “increased access to information”; “more comprehensive search for information, especially for literature/writing/researching purposes”; and “increased access to software enhanced creativity.”

The themes that emerged include the following: increased motivation of students to work outside of the classroom, increased access to information allowed for more individualized learning opportunities, more student-centered activities incorporated into the daily lessons by
some teachers, the use of laptops prepared students for college/career, and more relevance of the topic.

“The following response represents the majority of parents’ opinions:

Certainly, the computers definitely changed the manner in which my children learned, and they welcomed the [laptop computer] initiative. Education has progressed electronically, and children were able to learn from vast resources via the computers. The Internet enhanced their knowledge and education beyond what a classroom, single textbook, and a teacher accomplished alone.”

Another parent was conflicted about whether the impact of the laptop program was positive or negative:

“Not really. I think they did end up being a distraction. My kids were constantly telling me that kids were messaging and playing games on them during class time. Many teachers didn't seem to limit and monitor the use of them in class. However, since we live in a very technological society, they [students] do need to learn how to use computers properly, and I saw benefits to them when they learned to do projects and reports with them… like PowerPoint presentations.”

RQ4: Teacher responses. Question number three asked the following: “How has the use of laptop computers 24/7 changed the students’ behaviors exhibited in the classroom?”

Responses from teachers reflected mixed opinions, and the codes assigned were as follows: teachers noted there were off-task behaviors, while other teachers provided conflicting responses by indicating that student behaviors were improved. An interesting outlier opinion indicated that the off-task behavior of students depended on the expectations of the individual teacher.

One teacher noted that if students are allowed to “surf the net” when not fully engaged, there are
less problems. Teachers further noted that that when students are not engaged, with or without a computer, they will be off-task. Teachers explained that students were more willing to perform research via the Internet due to the ease of finding information and their own personal interest in the topic; in other words, they can just “Google it.”

Themes that emerged included the following: students will exhibit off-task behaviors, clear expectations and enforcement of student behavior, increased access to research information, more efficient use of time, enhanced knowledge of collaborative technology tools, ever-present student off-task behaviors. The following is a response from one teacher who suggested that despite the presence of computers, students will always find ways to get off task:

“They [students] still get off task and send messages to friends, or go looking at other things of interest sometimes, but really it is just another way of doing the same things that have always been done: passing notes, reading a comic instead of a text book, looking through a webpage instead of a magazine.”

The interesting point reflected in this teacher’s opinion is that this teacher associates off-task behavior with the level of behavioral development of individual students, not to the tools that they use to get off-task. This teacher notes that whether it is through a paper-and-pen-generated note passed during class, an email, or tweet sent via a laptop computer, students will at times be off task.

Another teacher reported having no problems with students after the laptop computers were distributed: “I had NO behavior issues at all once students had laptops, as I could have enrichment technology activities ready for those who finished early or could watch if they were doing other class work for other teachers when finished early.” This teacher was prepared for students who completed assignments early, and this preparation helped keep students focused
and on task, just as always has been the case. Students work at differing paces, and being prepared to address these differences can help alleviate free time and provide students with opportunities for learning if they finish early.

Based on the analysis of the data, a permeating theme was that students can and will become off-task when not engaged in the classroom, when not given clear expectations, or when activities are not adequately supervised. Also reflected in teachers’ responses is the notion that students will be off-task regardless of whether they use laptop computers. Compared to a time before computers were incorporated into the classroom, the type of off-task behaviors today include surfing the Internet or sending notes to friends via email. Also noted in responses from each of the three groups is that teachers are largely responsible for allowing such off-task behavior by inconsistently or lackadaisically enforcing their classroom rules as well as not paying attention to the use of time (i.e., time on task) in their classrooms. Additional opinions indicated that the use of the laptop program excited students about learning, study halls were quieter because students used computers to enhance learning with personal research or play games allowed on the approved school network. Students were more eager to learn, and students enjoyed composing essays and other written materials on the computer rather than writing assignments by hand. Parents noted that their children/students were more willing to work longer on assignments at home because of the ease with which they could locate information. According to parents, the laptop computers enhanced learning outside of the classroom because the computers allowed students to access class materials at home. Parents also reported that access to certain software programs enhanced their creativity. Teachers noted that students were more willing to conduct research than in the past because of the easy access to information provided to them through the use of laptop computers.
Based on an analysis of the responses to the survey provided by all three participant groups, student behaviors were impacted in a number of ways. Students, parents, and teachers alike recognized that there are some changes that take place in the learning environment when a tool with such powerful applications is provided. Students also have opportunities to use the tool in counterproductive ways, as well. Each of these three participant groups recognized that counterproductive behaviors may occur in the classroom when conditions exist for such behaviors to occur. Adolescent teens will find alternative uses other than schoolwork for laptop computers when given the opportunity to do so. Clear expectations about the use of laptop computers (and proper supervision of such use) are required to discourage widespread misuse of laptop computers. Table 4 provides the most frequent responses in response to Research Question 4: How are students’ behaviors impacted by the use of the laptop computers?

### Table 4

*The Most Frequent Responses Regarding Ways in which Students’ Behaviors are Impacted by the Use of the Laptop Computers*

**Most Frequent Responses Concerning Student Behavior Changes in Relationship to the Laptop Program**

<table>
<thead>
<tr>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students more willing to do research outside of class using the laptop*</td>
</tr>
<tr>
<td>2. Students were off task at times</td>
</tr>
<tr>
<td>3. Students were more eager to learn using the laptop</td>
</tr>
<tr>
<td>4. Students like to type assignments rather than hand writing</td>
</tr>
<tr>
<td>5. Study halls were quieter because students used the laptop to enhance learning or play approved games on the laptop computer</td>
</tr>
</tbody>
</table>

Parents
1. Students would access class materials at home while completing more homework at home*
2. Students were more willing to do extra work due to the effortless way of finding information using laptop computers
3. Students were able to have access to the Internet at home enhanced learning opportunities outside of the classroom

_____________________________________________________________

Teachers
1. Students were more eager to complete research assignments due to the online access*
2. Some teachers noted there were off-task behaviors related to the use of the laptop computers
3. Some teachers felt that student behaviors were improved
4. Some teachers noted that the off-task behavior depended on the expectations of individual teachers
5. Teachers must properly plan their lessons to help alleviate off-task behaviors

_____________________________________________________________

* Denotes a similar response by all three groups.

Summary

Providing laptop computers to students for use in the classroom and at home provided students with new opportunities for learning that were previously unavailable. The focus of this study was how the implementation of the laptop program impacted students’ motivation to learn. The analysis of the data indicated that student motivation was positively impacted by implementing the one-to-one laptop initiative. However, a small minority of participants in each group (i.e., students, parents, teachers) reported that the use of the laptop computers had little or no impact on motivation. Parents reported the following benefits of the program that impacted student motivation: enhanced learning opportunities, increased communication between teachers and students and between fellow students, increased relevance to the subject matter, increased
access to information via online access at home and at school, a willingness to type rather than completing assignments by hand, and the ease of performing research. Teachers reported that the following factors positively impacted the motivational aspect of using the laptop computer in a ubiquitous manner: the excitement about using technology, easy/instant access to information, and the ability to use the laptop computer in order to type rather than having to hand-write assignments.

Career and college plans were a focus of RQ2. Each of the groups provided responses concerning the impact that the one-to-one laptop computer program may have had on the students’ post-secondary plans. The opinions of these three groups clearly indicated that implementing the laptop computer program did not seem to provide an impetus for students to finalize their future career and college plans. Rather, students’ choice of career and their post-high school plans were not heavily dependent on the laptop computer initiative. The conclusion that students pursued computer careers because of the one-to-one laptop program was not supported by this research. However, integrating laptop computers during their high school experience provided students the skills and confidence to use technology in their chosen field or college experience. In fact, some parents were adamant that their child was more prepared for college than other students in the same college who had not been exposed to the use of computers in high school. This is an important point that supports the immersion of students into laptop computing during their high school experience. The added skills required to be competitive in college and in the workplace consists of a variety of skills that can be put to use at the next level. Students indicated that they were able to develop confidence in the multiple uses of technology, both hardware and software, which positively impacted how they use laptop computers in their college and/or career environments. If preparing students to be successful
during their post-secondary experiences is an objective of the laptop computer program, then students’ opinions are important.

Parents viewed the importance of laptop computer programs in a similar light by responding that they believed their child was better prepared for the future in either the next level of education or in their careers. Teachers reported that they did not believe the laptop computers impacted the students’ career and college path, but they did believe that the use of laptop computers impacted the confidence, experience, and technological problem-solving skills required to be successful during their post-secondary pursuits.

Another focus of the study was the ability of teachers to provide relevancy of the subject matter to students through the use of the laptop computer in a one-to-one environment. The data support the fact that teachers were able to make learning more relevant by providing topics in new ways using more individualized instruction. Using the laptop computers, teachers increased/expanded learning opportunities and provided collaboration opportunities via Google Apps and Moodle. Teachers also used online access to enhance learning, and using the Internet allowed personal research that provided better understanding and/or reinforcement. Parents also reported that enhanced creativity and innovation due to student-centered instruction and increased access to the Internet allowed students to perform research on their own, which enhanced their understanding and/or enhanced learning and afforded students’ real-life examples via video streaming. Parents also noted increased communication with other students and teachers, collaboration on project-based learning, and more individualized learning. Teachers’ opinions revealed they were able to provide students the opportunity to collaborate with other students via Google Applications and/or Moodle, provide opportunities for students to access information via the Internet, assign research projects focusing on real-world problems, and
assign more student-centered projects and presentations, all of which made the learning experience more relevant and meaningful.

Student behaviors in response to the implementation of a one-to-one laptop computer program was another area of focus for this study. Students can and will use computers in ways that are not appropriate, and due to the nature of the Internet and digital footprints, such misbehaviors can be quite serious. Additionally, study habits of students and the manner in which teachers present classroom activities may also be impacted. A focus of this study was to discover how student behaviors changed with the addition of the laptop computer as a learning tool. Students noted that study halls were quieter because students would use computers to enhance learning with personal research or play approved games on the school’s network. Students also felt that most students were more eager to learn, and most students liked writing on the computer rather than writing assignments by hand using a pencil and paper. Parents indicated that they are aware that students are off task at times, but that was true when the parents were in high school and will likely be true in future generations as well. Students find ways to use tools in a manner not originally intended.

Parents’ reported positive changes in their child’s behaviors, as well. They noted that their child seemed more willing to complete extra work due to the seemingly effortless ways of finding information, that they experienced enhanced learning opportunities outside of the classroom using the laptop before and after school hours, and that their child took advantage of the access to software programs that enhanced creativity (e.g., iMovie and Adobe Photoshop). Parents also noted that they would see their child doing more educationally focused activities outside of the classroom. Teachers also explained that students were more willing to perform research via the Internet due to the ease of finding information. Many times students can perform
research by just “Googling it,” whereas prior to the availability of laptop computers, students were required to use hardbound reference materials and physically go to the library to complete such research. In combination with the ease of researching topics, teachers also noted that students were willing to research topics that were related to their own personal interest.

Teachers’ ability to proactively influence appropriate use of the laptops was readily noted when teachers engaged students and clearly communicated clear expectations for use of the computers in their classrooms. Teachers noted that the incidence of off-task behavior was directly related to the expectations of individual teachers, their enforcement of those expectations, and the ability of teachers to engage students for the entire class period. One such teacher employed the LAN program, available to all teachers, to ensure that her students were working on the topic as instructed. This teacher reported that when a child was not meeting expectations, a clear response was given to the student and the class as a whole. This teacher acknowledged few problems with off-task behavior. Other teachers who do not have as much clear control over their students and who do not have clear expectations would have difficulties during the course of the year due to students under their supervision using their computers for tasks other than what they were originally intended. Members of all three groups understood that students would use their computers for emailing friends or surfing the Internet at times when they were supposed to be attentive to class discussion or when told not to use their laptop. This type of behavior is, of course, specific to the use of the computer but not limited to the medium, as students and teachers both recognized that students will exhibit off-task behaviors with or without a laptop being available. Such off-task student behaviors in the past included sending written notes in study hall or reading magazines during class instead of actively participating in
the class lesson. With the use of laptop computers, off-task behaviors can include writing emails to friends or surfing the Internet under similar circumstances.
Chapter five presents a review and summary of this study. The purpose of this research study was to test the theory that the Ayersville Local Schools’ one-to-one laptop initiative was successful in positively impacting students’ learning experiences as well as the ability of teachers to provide effective, technology-rich lessons that prepare students to use technology in their post-secondary lives. As a result of this study, the district stakeholders may appreciate the positive effects that the one-to-one laptop computer program has had on the students within the district and continue to support the program well into the future.

Studies by Warschauer (2015) as well as Bebell and Kay (2010) have clearly underscored the important role that teachers play in the classroom and the need for ongoing professional development opportunities to help them integrate technology into the classroom. Additionally, these studies indicated that professional development opportunities must continue to be offered so that teachers may gain knowledge and expertise in developing lessons designed to provide students with twenty-first-century skill development.

Review of the Study

The use of the personal computer has had a far-reaching effect on U.S. society and indeed the world. Educational organizations at all levels have been faced with the challenge of how best to respond to the use of personal computers during the K-12 experience in order to properly prepare students for their post-secondary plans. Because K-12 schools are microcosms of U.S society, both the educational system and professional industries alike strive to make use of emerging technologies to increase effectiveness and gain efficiencies. A primary focus of the K-12 setting is to prepare students for their future status in the global marketplace.
The implementation of a one-to-one laptop computer program should not be construed as intending to replace classroom teachers. A primary goal of one-to-one laptop computer programs is to empower teachers to integrate laptop computers into their daily lesson repertoire to enhance overall educational programming. As indicated in prior research studies, the teacher is a central figure in the educational opportunities provided to students. Based on the ubiquitous use of technology in today’s society, laptop computers also play an essential role in the educational process. This study was intended to identify the impact that the use of laptop computers had on students at a small, rural high school in northwest Ohio and whether this impact was substantial enough to warrant the associated costs of school district funds and the effort required by teachers who modified their instructional practices to incorporate laptop computers in their classrooms. Additionally, the study was designed to help determine whether the benefits of the program outweighed the commitment of time and resources required to provide high-quality, ongoing professional development opportunities for the teachers--professional development opportunities that were essential in accomplishing the desired outcomes of the one-to-one laptop computer program.

The focus of this study was not intended to determine the impact of a one-to-one laptop computer program on student achievement, student accountability, or the ability to meet current state standards, as has been the focus of many prior studies. Rather, this study focused on the impact of the one-to-one laptop computer program on students’ motivation, students’ post-secondary plans, and students’ behaviors as well as the impact of the delivery of services by teachers.

An email was sent to three separate groups: teachers, students who participated in the first three years of the one-to-one laptop computer program, and the parents of these students.
Twenty teachers were sent an email containing a link to the survey via Google Forms. Ten teachers responded to the survey, which corresponded to a 50% response rate. An email containing the survey link via Google Forms also was sent to 22 graduates from the classes of 2012, 2013, and 2014, and 11 responses were returned, which corresponded to a 50% response rate. Finally, an email with the survey link via Google Forms was sent to 66 parents of the graduates of these same classes, and 11 parents responded, which corresponded to a 16.67% response rate.

Each of the three groups was asked to complete a survey specific to their role in relation to the one-to-one laptop computer program. The items on the survey were intended to elicit participants’ opinions, personal experiences, and perceptions of the one-to-one laptop computer program. Content analysis was used to investigate the responses to the open-ended survey questions and identify common themes.

**Discussion**

The discussion of the results is presented in order of the research questions. The results of the data analysis are discussed below, and connections between the results and the factors that influenced the impact of the laptop program are suggested in each section.

**Research question 1.** This question sought the opinions of participants about the role that the use of laptop computers played in motivating students in the pursuit of knowledge as facilitated by the teacher. Research on the subject of one-to-one computing in the K-12 environment has identified many positive attributes derived from the use of laptop computers; however, in relation to the Ayersville laptop initiative, the researcher sought the opinions of the participants about their experiences and whether these experiences had an effect on students’ motivation to learn.
Based on the responses received from the three groups, the findings suggested that the following benefits accrued from the use of laptop computers: increased engagement, relevance to the topic, access to information via the Internet, student-centered instruction and the ability to type rather than the rigorous task of hand writing assignments. It is clear from the opinions of the participants that the use of laptops motivated students to take an active part in the learning process. Parents noted enhance learning, increased communication, increased access to information, willingness to type rather than write by hand, and the ease of performing research as positive motivators for student learning. Finally, teachers noted that students demonstrated increased excitement, experienced easier and instant access to information, and preferred using the keyboard rather than writing by hand as motivators to learn.

There were opposing opinions from one student who self-described as already being highly motivated to learn, but this student also indicated that the one-to-one laptop computer program provided positive outcomes, such as easier communication with teachers and other students, and that it “... made learning a lot easier and more fun.” This student’s response provided insight into whether the one-to-one laptop computer program positively impacts marginal students more than it does high-achieving student.

Parental observations were in agreement with the students’ observations in most respects, although some parents were less enamored with the influence of the one-to-one laptop computer program on their child’s education. They related the current state of education and the process of learning to their own experiences a generation or more ago. This association is not uncommon when discussing social and educational changes in a holistic manner. Relating their experiences when parents attended school with their child’s experience today was a common theme among comments made by parents.
Teachers’ responses also reflected some dissenting opinions about whether the one-to-one laptop computer program provided motivation or whether the teacher and curriculum were the central figures that determined the motivation of the student. Comments supporting the latter conclusion include statements indicating that laptops do not provide motivation, subject matter motivates students, and “students are lazier because they can ‘just Google it.’”

Motivation to learn is an individual process that is influenced by many factors. Students have their own personal motivators that lead them to take an active approach to their educational experience. Each child is unique. However, as indicated through the responses to this question, the laptop has an impact in a positive manner in the motivation of the students. There was not one teacher, parent or student whose response indicated that students were less motivated through the implementation of the laptop. Given the opinions provided, this researcher believes that this is a strong indication that the laptop usage in a ubiquitous manner provides students with a new impetus to provide effort in a variety of ways that positively impacts their learning experience.

**Research question 2.** Research Question 2 explored the opinions of the participants about the impact of the one-to-one laptop computer program in relation to students’ post-secondary plans. The researcher’s original intent was to seek opinions about the influence of the one-to-one laptop computer program on students’ career choices. However, the responses were aligned with how the one-to-one laptop computer program impacted students’ abilities to use the skills acquired from the laptop program in determining their post-secondary plans.

The students’ responses reflected confidence in the use of the technology, experience with various hardware and software formats, and the preparation for using laptop computers in post-secondary applications. Their comments emphasized these issues more so than whether
their career path was altered through the use of the laptop computers. This indicates that the program is important to the students to the degree that it facilitated the preparation for them to enter their “chosen field.” Although it did not influence their career choice, the one-to-one laptop computer program did provide them additional essential skills that enhanced their post-secondary plans. For many students their future plans are not yet known when they are still in high school. However, two students reported that the use of the laptop computer provided them with experience that helped to reinforce their career path. Prior to the implementation of the laptop program, they had interest in computers as a career, and through their experiences with the one-to-one laptop computer program, their plans and interests were confirmed. Both students reported that they are currently computer majors in college and that they credit their interest and their career path to their experiences with the one-to-one laptop computer program in high school.

Parental responses indicated that the use of laptops in high school provided their child with technology skills that provided them with an easier transition to college. These computer skills also enabled them to manipulate the technology effectively to complete job applications and college applications. They also felt that students were better prepared to complete coursework in college and that because of their technology knowledge and experience, they were more competitive in the job market in comparison with other college students, who may not have been exposed to such an extensive of experience with technology in their high schools as the students from Ayersville Local Schools.

One parent indicated uncertainty concerning his/her child’s technology abilities and skills and the relationship with the college and career opportunities and acknowledged that “such
technology is in use today and will be in the future, and students [including his/her child] need to be properly prepared for their use.”

Teachers indicated widespread negative opinions about the influence the one-to-one laptop computer program in relation to the selection of the students’ career paths, but they did report that the laptop program increased students’ confidence in their ability to use technology. Teachers further indicated that students could apply their technology skills to a greater extent in the future and that students were better prepared for their post-secondary experiences.

The opinions of the majority of the respondents indicated that the one-to-one laptop computer program did not influence the career path of students; however, experiences with laptop computers had a substantial impact on their preparedness for their chosen field. The confidence, skills, knowledge, and application of technology in a variety of approaches provided significant value to students’ future employers and or contributed to their success in higher learning experiences.

**Research questions 3.** The third research question sought the opinions of the participants in relation to the use of the laptops and the relevancy of the learning process to the student. The survey questions asked students to describe how the one-to-one laptop computer program impacted how they learned. The student themes that emerged included the following: afforded more individualized instruction, increased learning opportunities, enabled more collaborative projects using Google Apps and Moodle, enhanced learning with online access, and allowed personal research and better understanding and/or reinforcement.

The themes were indicative of students who were more interested in the activities used in conjunction with the laptop. The use of the laptop provided students with a variety of learning
opportunities that were more student-centered and allowed them more access to additional information to deepen their understanding when they felt they needed more depth.

Parents responded positively when asked whether they thought the computers changed the manner in which their child learn. The second part of the question asked them to explain their answer. Their responses affirmed that indeed students’ learning experiences changed. Themes that emerged from their responses included the following: (a) increased communication with teachers and other students and (b) the ability to complete more collaborative/project-based learning initiatives. Parents also reported the enhanced creativity and innovations contributed to more student-centered instruction, access to the Internet allowed students to conduct research on their own, enhanced learning opportunities, and provided real-life examples through use of video streaming.

Teacher responses emphasized the opportunities that the one-to-one laptop computer program provided for collaborative projects via student learning systems, such as Google Applications and/or Moodle. It also provided increased access to research and real-world applications as well as more student-centered projects and presentations. Students were able to use the laptops in the pursuit of information that was relevant and meaningful to their personal interests.

Based upon the responses of the three groups, relevancy of instruction to the individual student was positively impacted. The ability of students to independently perform personal research via the Internet on their school laptop provided opportunities for learning without the need to seek knowledge from the teacher and alleviated the need to go to the library to acquire desired information. This access, both at school and at home, ostensibly extended the school day. Students could personally choose whether they wanted to learn more and decide whether they
understood a topic or concept. This empowered them with greater control over what and how
they acquired knowledge.

**Research questions 4.** The fourth research question sought to understand the impact
laptop computers had on students’ behaviors. The purpose of this question was to determine
whether students’ study habits, approach to studying, interest in learning, and off-task behavior
were impacted by the one-to-one laptop computer program.

Student responses indicated that negative aspects of the one-to-one laptop computer
program were apparent. They described some students engaging in such off-task behaviors as
surfing the Internet during classroom discussions, playing games at times when they were
supposed to be performing classroom activities, and emailing other students instead of staying on
task during class. Students also reported that even without laptop computers, some students
exhibited other off-task behaviors through distracting activities that didn’t require a computer.
Students also reported the following: some students were more eager to learn through the use of
the laptop; students preferred typing rather than handwriting assignments; students were more
willing to perform research outside of class; and study-hall classes were quieter because students
would use the laptop computer to enhance learning or play games instead of engaging in other
off-task behaviors that may be disruptive to others in the same setting.

Parents reported the following: students were more willing to perform extra work due to
the ease with which they could locate information via the Internet; they were able to access the
Internet at home, which enhanced their learning opportunities outside the classroom; and
students accessed class materials and reviewed class lessons at home, which allowed them to
complete more homework at home. Two parents did report some concerns about the negative
behaviors associated with the use of technology, but they both admitted that the world uses this
technology and acknowledged that students should be given the opportunity to learn how to use laptop computers.

Some teachers reported that off-task behavior related to the use of laptop computers was a concern, while other teachers indicated they encountered students whose behavior was improved. Teachers also reported that students were more eager to complete research assignments due to the ease and convenience of online access. An interesting point made by teachers was that the occurrence of off-task behavior could be impacted positively when teachers communicated clear expectations about the use of the laptop computers and responded appropriately when students failed to meet them.

Students, parents, and teachers all agreed that students can use laptop computers in ways that are not aligned with the educational objectives of the one-to-one laptop computer program; however, it also is important to note that these off-task behaviors are not limited to laptop computers themselves. Rather, when students use laptop computers to engage in off-task behaviors, these computers are not unlike a pen or pencil used to write a note to a friend when they should be listening to a teacher delivering instruction. The point made by all three groups is that students, due to their normal adolescent behavior patterns, will exhibit off-task behaviors if given the opportunity whether these behaviors occur through the use of laptop computers or other means.

Teacher responses indicated that through appropriate planning and proper supervision, students’ off-task behaviors can be curtailed. Students noted that teachers who communicated clear expectations and provided proper supervision affected the ability of students to use the computers effectively. More importantly, student behaviors in relation to the educational
experience involving laptop computers were influenced in terms of how they approached their school work. Students were empowered to apply their efforts in more personal approaches.

**Conclusion**

Research by Grimes and Warschauer (2008), Bebell and Kay (2010), Dunleavy and Heinecke (2008), and Efaw et al. (2004) noted that the use of laptop computers leads to a more fun learning environment, students writing longer essays, improvements in scientific skills, the inclusion of more sources in student research, and increased critical thinking skills. The responses from the students, parents, and teachers in this study confirm similar findings. Student learning was more fun, research was easier, and students would rather type than hand-write assignments. Holcomb (2009) and Lowther (2012) indicated that students experienced increased engagement, reduced behavioral referrals, and improved study skills and research skills. Similar findings are apparent with this study. This similarity reinforces the effect that the use of laptop computers has relative to student behaviors (both on-task and off-task behaviors) as well as students’ individual approaches to learning.

Student preparation for post-secondary plans were documented in the literature as well. Oliver (2008) indicated that students realized increased technology proficiency through their continuous use of software and hardware. The responses of participants reflected a constant theme that students were prepared for post-secondary use of technology as a direct result of the one-to-one laptop computer program. This is a powerful finding that affirms the purpose of not only the one-to-one laptop computer program but also the mission of the K-12 system, which is to prepare students for the next level (i.e., entering higher education or the workforce). With the importance and potential uses of technology in the future, this finding provides strong support for continuing the one-to-one laptop computer program.
Teachers have an essential role in the effective implementation, integration, and engagement of laptop use in the K-12 setting. As Levin and Schrum (2013) noted, and as supported by the findings of Warchauer et al. (2014), teachers who provide increased opportunities for student creativity and then guide students by facilitating learning, encouraging questioning, and providing feedback during class time are improving teaching and learning. Through the use of laptop computers, teachers are able to provide alternative learning opportunities that enable students to learn in innovative ways and apply their learning to projects that students find more relevant.

Based upon the data provided by the three groups, the one-to-one laptop computer program at Ayersville High School has been a success. Review of data indicates parents are cognizant of the positive attributes of the program but are also aware of some of the difficulties of such a program, including the negative exploits of students who choose to use the laptop for inappropriate activities. On the other hand, parents acknowledge the need to properly prepare their children for unpredictable post-secondary careers. Teachers also understand that their role has been changing from the traditional role of the central figure in the classroom to a facilitator of learning. This transition enables students to be more creative, fosters innovation, and enables students to become more active participants in the learning process. Students are aware of the need to be familiar with the ever-changing technologies available to them and the necessity of being prepared to respond to emerging technologies in the future.

**Recommendations**

The results of this study indicated that the one-to-one laptop computer program was not perceived positively with every student, parent, or teacher. Although reaching consensus is relatively rare in any district-wide initiative, the response overall was positive. To avoid negative
outcomes of such a program, attention must be paid to the proper implementation of a laptop program in order to enable as much information as possible be afforded to the participants and stakeholders. This increased information will enable them to develop their opinions based on accurate information rather than their biases of others or misinformation from sources with opposing agendas.

Once committed to the implementation of a laptop computer program, continuous opportunities for professional development for teachers, advanced study opportunities for students using laptop computers, and parental and community technology workshops involving the use of laptop computers in the classroom would be appropriate methods of promoting the success of the program. Efforts to provide transparent information to all interested parties is important in ensuring that the correct information is provided to dissenters.

The findings of this study can be disseminated to faculty members and stakeholders of the Ayersville School District to provide them an analysis of the program as described through the eyes of the participants of this study. Those who take advantage of the opportunity to read the results of the study will be afforded the authentic opinions of the students, parents, and teachers who experienced the program firsthand. In this way, the stakeholders of the district will be enabled to form their own opinions about the use of laptop computers in their schools, but the true test will be the successes experienced by students afforded the opportunity to use the laptops, such as enhancing their learning and preparing them for the post-secondary careers, which have yet to be determined.

**Future Research Opportunities**

A more expansive study involving individual schools in similar stages of laptop computer implementation and use would provide data to compare the effectiveness within each district.
The purpose would be to seek the opinions of students, parents, and teachers about their experiences relative to the use of laptop computers and the influence such use has on (a) the delivery of services by teachers, (b) student preparedness for post-secondary pursuits, and (c) parental satisfaction of the outcomes of the program. The results of this type of study would provide districts a pathway to successful implementation and continuous improvement in the use of laptop computers.

Another study involving students, parents, and teachers from the Ayersville Local Schools district involving students in grades K-12 would provide interesting longitudinal information about children, parents, and teachers. The initial one-to-one laptop computer program has now expanded to a one-to-one program for students in grades 2-12. The devices vary and include the following: iPads in grades 2-4, ChromeBooks in grades 5-6, and MacAirs in Grades 7-12. Because this study was focused on the implementation and first three years of a one-to-one laptop computer program, this researcher would be interested to note the elementary teachers’ opinions of the implementation process, their level of preparation, and how they have changed their teaching repertoire during the implementation phase and during initial use of the technology at the elementary level. This may provide data important for continuous improvement of the Ayersville technology program as well as provide guidance for other districts with the intent of beginning their own technology program.
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APPENDIX A

Questions Use to Elicit the opinions of Teachers Who Took Part in the Implementation of the One-to-One Initiative at Ayersville High School during the 2010-11 School Year

Please answer the following questions honestly. Most questions require a typed answer. To remain anonymous, please do not write your name on this survey. Also please do not identify your students, teachers, parents or other people by name. Only the researcher and his research advisory committee at The University of Findlay will review information in this survey. Reports based on this survey are designed to help better understand the reflection that takes place when one-to-one laptop computer models are used in the high school setting.

A return of this survey indicates implied consent.

1. What is it about you and the way you teach that makes you effective with this age group?

2. Reaction to the initiative
   a. What was your initial reaction when you heard that Ayersville High School students were going to be getting their own laptop computers to use in the classrooms and be able to take them home?
   b. After 5 years of experience using the laptop computers, what opinions do you now have? Why?

3. Experiences
   a. How has the use of laptop computers 24/7 changed student motivation to learn?
   b. How has the use of laptop computers 24/7 changed the students’ behaviors exhibited in the classroom?
   c. Do you believe the access to computers impact student learning? Explain.
   d. Through your interaction with the students, do you believe their post-high school plans have been altered due to the impact of the One-to-One Laptop Initiative?

4. Impact of Initiative on how teachers teach. (i.e. are teachers changing their delivery model from prior to the implementation of the laptop program? More online assignments and use of online content rather than use of textbooks?)
   a. How have the use of laptops affected the way you teach? Explain.

5. Professional Development
   a. How well do you think the district prepared you and the students for the integration of laptops into the school?
   b. Is there additional professional development that would be helpful to you in using the laptops in your teaching?

6. Please provide any additional comments that you have that best describe your opinions concerning the one-to-one laptop program at Ayersville High School.
APPENDIX B

Questions Used to Elicit Opinions from the Parents of Graduates of the Classes of 2012, 2013, and 2014 Who Took Part in the Implementation of the One-to-One Initiative at Ayersville High School during the 2010-11 School Year

Please answer the following questions honestly. Most questions require a typed answer. To remain anonymous, please do not write your name on this survey. Also please do not identify your students, teachers, parents or other people by name. Only the researcher and his research advisory committee at The University of Findlay will review information in this survey. Reports based on this survey are designed to help better understand the reflection that takes place when one-to-one laptop computer models are used in the high school setting.

A return of this survey indicates implied consent.

1. What were your initial thoughts when you learned of your child having access to a laptop computer 24/7 through the school-sponsored one-to-one laptop program?

2. Do you think the computers changed the manner in which your child learns? Explain.

3. Does having the access to the computers change your child’s motivation to learn? Explain.

4. Do you believe the computer program affects your child’s ability to relate to college and career opportunities? Explain.

5. As a parent and community stakeholder, do you believe the time, effort and funding for the computer program has been beneficial to improve student learning? Explain.

6. Please provide any additional comments that you have that best describe your opinions concerning the one-to-one laptop program at Ayersville High School.
APPENDIX C

Questions Used to Elicit Opinions from the Students Who Were Graduates of the Classes of 2012, 2013, and 2014 Who Took Part in the Implementation of the One-to-One Initiative at Ayersville High School during the 2010-11 School Year

Please answer the following questions honestly. Most questions require a typed answer. To remain anonymous, please do not write your name on this survey. Also please do not identify your students, teachers, parents or other people by name. Only the researcher and his research advisory committee at The University of Findlay will review information in this survey. Reports based on this survey are designed to help better understand the reflection that takes place when one-to-one laptop computer models are used in the high school setting.

A return of this survey indicates implied consent.

1. Please describe how the use of laptops impacted your motivation to learn.

2. Describe how the use of the laptops impacted the behaviors of students during the school day.

3. Describe how the use of laptops impacted how you learned. (i.e. Did the use of computers change your ability to understand or relate to the subjects being discussed/taught in class?)

4. Describe how teachers responded in the classroom when the laptops were being used. (Did they change how they delivered the lessons? If so, describe how they changed what they did.)

5. How did the use of laptops in the classroom impact your attitude toward the use of technology? (Did you become more confident in the use of computer technology through the use of the laptops?)

6. How have the experiences you had with technology during high school impact your technology skills that you use in you college/career choice today?

7. Did the use of the laptops at school impact your future plans, either career path or college plans? Please explain.

8. Did you become a better student due to the use of the laptop computers? Why or why not?

9. How meaningful is it for students to have access to computer technology in high school? Explain.
10. How did the use of computer technology impact your ability to communicate with teachers? Other students?

11. Please provide any additional comments that you have that best describe your opinions concerning the one-to-one laptop program at Ayersville High School.
APPENDIX D

Dear Participant,

You are invited to participate in a survey entitled “ONE-TO-ONE LAPTOP INITIATIVES AND THE IMPACT ON TEACHING AND LEARNING AT THE AYERSVILLE LOCAL SCHOOLS”.

The purpose of the survey is to learn without prejudice the impact that the Implementation of the One-to-One Laptop Initiative at Ayersville High School had on the students and teachers who participated in the one-to-one laptop computer initiative during the implementation years of 2010-2014.

This is a descriptive study using an online survey developed by the researcher to collect responses to the following questions:

- How did the implementation of the laptop computers impact the students’ motivation to learn?
- How did the 24/7 access to the use of the laptop computers in the school change the students’ future plans?
- In what ways have teachers made school more relevant to the students?
- How are student behaviors impacted by the use of the laptop computers?

The survey consists of questions related to the research questions listed above. The survey should take you approximately twenty (20) minutes to complete.

All of your replies will be private and you will not be identified by name as a subject of our study. Completing the survey and submitting your answers serves as your informed consent for participation. Participating in the survey is entirely voluntary and you may withdraw at any time by terminating the survey without submitting your responses. This survey and consent waiver have been approved by The University of Findlay Institutional Review Board, which guarantees that research involving human subjects follows federal regulations. The IRB chair is Sue Stevens; and she can be reached at irb@findlay.edu. You will be made aware of any information that varies from what has been provided to you and/or might affect your willingness to continue to participate in the project.

The participants in the study are able to take pride in being the first teachers and students in the school district to be able to use laptop computers on a daily basis, and as parents observe how their child(ren) utilized the laptops during their educational experience. This study will present important data to others who wish to investigate the impact laptop computer programs have on the students and the manner in which they learn, in addition to data as to how their attitudes and future careers/education are impacted by the use of such technology.

The information provided to the interviewer from the participants will be kept in the strictest of confidence. Effort will be made to limit the time of each survey, but as the questions are open-ended, each participant’s time in the completion of the survey will vary. To maintain confidentiality, please do not identify yourself or others in any of the responses of the survey.
We will submit the results of this study for publication in its entirety. The unprocessed data will be destroyed 3 years after publication. If you are interested in the project results please email me with for information on retrieving the data. Please keep a copy of this email for your records. If you have any questions regarding this project feel free to contact us at tod.hug@findlay.edu or at 419-783-1842

Thank you,

Tod A. Hug, Ed.S.

Dr. Natalie Abell, Ph.D.
APPENDIX E

Institutional Review Board
Amendment/Modification Report Approval

Date: September 21, 2015

To: Natalie Abell

CC: Tod A. Hug

Project # : 912

Project Title: One-to-One Laptop Initiatives and the Impact on Teaching and Learning at the Ayersville Local Schools

Project Expiration date: June 26, 2016

The University of Findlay Institutional Review Board (IRB) has completed its review of your Amendment/Modification Report on your project utilizing human subjects and has granted you to continue with your research.

In order to comply with UF policy and federal regulations, human subject research must be reviewed by the IRB on at least a yearly basis. If you have not completed your research within the year, it is the investigator’s responsibility to ensure that the Progress Report is completed and sent to the IRB in a timely fashion. The IRB needs to process the re-approval before the expiration date, which is printed above.

Following the completion of the use of human subjects, the primary investigator must complete a Certificate of Compliance form indicating when and how many subjects were recruited for the study.

Please refer to the IRB guidelines for additional information. This packet can be obtained within blackboard under community section. Please note that if any changes are made to the present study, you must notify the IRB immediately. Please include that number on any other documentation or correspondence regarding the study.

Thank you very much for your cooperation. If you have any questions, please feel free to contact me at (419) 434-4523 or email irb@findlay.edu.
Sincerely,

Susan W. Stevens, EdD., AT
Chair, Institutional Review Board

Cc: IRB Office
APPENDIX F

Institutional Review Board

Date:  June 26, 2015

To:  Dr. Natalie Abell

CC:  Tod A. Hug

RE:  One-to-one Laptop Initiatives and the impact on teaching and learning at the Ayersville Local Schools.

Project Expiration date:  June 29, 2016

The University of Findlay Institutional Review Board (IRB) has completed its review of your project utilizing human subjects and has granted authorization. This study has been approved for a period of one year only. The project has been assigned the number 912.

In order to comply with UF policy and federal regulations, human subject research must be reviewed by the IRB on at least a yearly basis. If you have not completed your research within the year, it is the investigator’s responsibility to ensure that the Progress Report is completed and sent to the IRB in a timely fashion. The IRB needs to process the re-approval before the expiration date, which is printed above.

Understand that any proposed changes may not be implemented before IRB approval, in which case you must complete an Amendment/Modification Report.

Following the completion of the use of human subjects, the primary investigator must complete a Certificate of Compliance form indicating when and how many subjects were recruited for the study.

Please refer to the IRB guidelines for additional information. This packet can be obtained within blackboard under community section. Please note that if any changes are made to the present study, you must notify the IRB immediately. Please include that number on any other documentation or correspondence regarding the study.

Thank you very much for your cooperation. If you have any questions, please feel free to contact me at (419) 434-5442 or email irb@findlay.edu.

Sincerely,
Susan W. Stevens, EdD., AT
Chair, Institutional Review Board

Cc: IRB Office