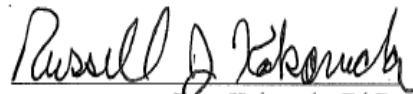**The Impact of Student-Owned Technology on Student Learning Practices and Classroom Instruction**

Kevin L. Gerke
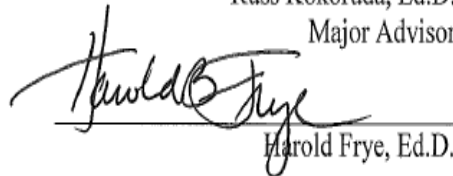B.A., Central Methodist College, 1995
M.S., University of Central Missouri, 2006

Submitted to the Graduate Department and Faculty of the School of Education of Baker University in partial fulfillment of the requirements for the degree of Doctor of Education in Educational Leadership

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Abstract

The use of computers in the classroom has been a significant focus for educators since the introduction of the first classroom computer. As school districts continue to implement new technology initiatives designed to provide students greater access to technology, schools must also find ways to measure the impact the technology is having in the classroom. This study used archived survey data to analyze the change over time in the technology access students have, the ways students are utilizing technology in the classroom, the impact technology is having on classroom instruction, and the obstacles teachers and students face in their efforts to integrate technology in the classroom. This study was guided by four research questions and 10 hypotheses to investigate aspects of technology use in the classroom. Chi-square tests of independence were conducted to test each of the hypotheses. The results of the hypothesis tests indicated the proportion of students who reported access to smartphones and tablets increased between 2010 and 2015 while the proportion of students reporting access to laptops decreased during that same time period. The results of additional hypothesis tests indicated the proportion of students who reported the particular instructional format used in the majority of their classes changed between 2014 and 2015. A larger proportion of students reported an increase in a traditional format in 2014 and a larger proportion of students reported an increase in a blended format in 2015. Additional hypothesis tests indicated the proportion of students who reported utilizing their digital device to access online textbooks, take online tests or quizzes, and post to classroom blogs, discussion boards, or wikis increased between 2010 and 2015. A final group of hypothesis tests indicated the proportion of students who reported obstacles to utilizing technology in the classroom,

including slow or inconsistent Internet service, teacher understanding of how to utilize the technology, and the number of websites blocked by the school that high school students believe would be helpful for completing their schoolwork, increased between 2010 and 2015. These results support the notion that the role of technology in the classroom continues to evolve. The results also emphasize the importance of educators continuing to look for new and more effective ways to utilize technology in the classroom. Finally, these results provide further evidence of the need for educators to carefully monitor the obstacles that exist to the effective integration of technology in the classroom.

Dedication

This work is dedicated to my family, Carmen, Zach, Brett, and Braden. Words cannot express how much I appreciate your patience and understanding as I have committed so much time to this work. Your continued support and encouragement has been instrumental to me getting to this point. I love you guys!

This work is dedicated to my parents, Donald and Debra Gerke, and to my sister Angie. The support of my parents and the lessons I learned from them growing up laid the foundation for my getting to where I am today. I could not have done this without them. My sister Angie continues to inspire me with the work she does to help others and her willingness to step outside her comfort zone to better herself.

Acknowledgements

I wish to thank Dr. Russ Kokoruda, my advisor, for his guidance and support throughout this process. His ability to flawlessly transition from advisor to motivator to cheerleader and boss were essential to my finally completing this work. I cannot thank him enough for all he has done for me both personally and professionally.

I wish to thank Dr. Margaret Waterman, my research analyst, for her endless patience in helping me complete this work. Her willingness to go above and beyond to help me gain a better understanding of the more complex portions of this process cannot be overstated and I will forever be grateful for her assistance.

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Chapter One

Introduction

Public educators have a long history of looking for new and innovative ways to incorporate technology into classrooms. Since the introduction of classroom computers, educators have paid particular attention to the significant impact technology can have on classroom instruction. Specifically, the days of teaching reading, writing, and arithmetic using a textbook and a chalkboard are in the past. Thomas Edison foreshadowed this changing educational landscape when in 1925 he proclaimed, "books will soon be obsolete in schools" (Dunn, 2011, p. 1). Although books have yet to disappear completely, the continued growth of technology in the classroom has led to the demise of textbooks as the point around which classroom instruction revolves. A key factor in the need for educators to embrace the use of technology in the classroom has been the growth of technology outside the classroom. As students have embraced technology use outside the classroom, educators have come to understand the importance of integrating technology into the classroom (Graff & Mouza, 2008). This understanding has helped educators continue to pursue new and innovative ways to prepare their students to be contributing members of a technology-centered 21st century society (Missouri Department of Education, 2014; Mouza, 2008). In doing so, many educators have made a significant effort to integrate technology into the classroom and thereby make technology an integral part of the instructional process (Bebell & Kay, 2010; Bebell & O'Dwyer, 2010).

The methods used to integrate technology into the classroom have varied. Among the methods used by schools are a 1:1 approach in which students receive some type of

digital device at district expense, or a "Bring Your Own Device" (BYOD) approach, in which schools allow students to utilize their own personal digital device in the classroom. Ultimately, educators must choose for themselves which of these philosophies is best suited for their students. In either case, they must look beyond the means by which students access technology, and carefully monitor the effectiveness with which they integrate technology into the classroom.

This chapter contains the background for the study and the statement of the problem, as well as the significance and purpose of the study. In addition, this chapter includes the delimitations inherent to the study, the assumptions of the researcher, and the research questions used to guide the study. Finally, this chapter provides definitions of terms along with a brief summary of the organization of the entire book.

Background

The background of the study identifies the context of the study, gives any background information needed to clarify the context, tells the reader why the study is important and timely, and builds a case for the statement of the problem (Lunenburg & Irby, 2008). The context of this study includes the introduction and rapid expansion of technology in schools. In addition, this study examines the methods and relative success of educators in integrating technology in the classroom.

Since the introduction of computers into classrooms in the 1980s, educators have taken steps to provide their students with even greater access to technology in the classroom. Originally, these efforts included giving students and teachers access to a single classroom computer. Eventually, educators began expanding student access to technology by building computer labs (Penuel, 2006; Spears, 2012). These labs typically

contained enough computers to allow an entire classroom full of students to have immediate access to computers during the school day. As district administrators began to invest even larger sums of money in technology, many school districts began providing portable computer carts that allowed teachers to provide every student access to a computer without ever leaving the classroom (Bebell & Kay, 2010). As society grew to embrace new technology and it became more accessible to families, educators began to see a significant increase in the number of students who had access to their own digital device (Anderson, 2015; Project Tomorrow, 2015). Some district administrators took advantage of this trend by implementing policies that allowed students to bring their own device to use in the classroom. These policies, commonly known as "Bring Your Own Device" (BYOD), allowed students to use devices they already owned (Johnson, 2012). However, with the increase of such policies, some school districts, particularly those in less affluent areas, began to recognize the need to better support students who did not have access to their own device. These efforts culminated with the creation of 1:1 initiatives that provided all students a digital device, at district expense (Bebell & Kay, 2010; Penuel, 2006; Spears, 2012).

As educators have continued to look for new and creative ways to provide students access to technology, they have also identified the need to examine how students and teachers are utilizing technology in the classroom (Bebell & Kay, 2010; Swan, van't Hooft, Kratcoski, & Unger, 2005). This type of analysis provides educators the opportunity to identify the obstacles they face in realizing the full potential of the technology they possess (Deloatch, Hendron, Kim, & Tolliver, 2014; Groff & Mouza, 2008; Hackler, 2015). By carefully examining these issues, district administrators will be

able to acquire a better understanding of the relative success or failure of the technology plan they have adopted.

The current study examined the efforts of one school district to integrate technology in the classroom. District A is a large suburban school district located in the Midwest. The district is home to over 22,000 students and 1,800 certified staff members and boasts a student/computer ratio of 1.7:1. The median income of families in the district is \$103,899 (District A, 2017a).   According to the district website, District A has "a longstanding commitment to ensuring the use of technology as an integral part of district curriculum and instruction" (District A, "District Technology", 2017b, para. 1). This commitment is reflected in the district's efforts to empower teachers to utilize technology in the classroom to deliver engaging and relevant learning opportunities for students while integrating personal and collaborative devices into a project-based curriculum (District A, 2017b). As an affluent suburban district, district administrators in District A have chosen to take advantage of the saturation of digital devices in their community by adopting a BYOD policy in each of their five high schools (grades 9-12). In addition, the district technology department has made an effort to measure the impact technology is having on learning in the district. Beginning in 2010, the district began utilizing the Speak Up Project for Digital Learning survey to gather data from students on a variety of topics related to technology access and integration in the district (Director of Professional Learning, personal communication, June 26, 2017). The current study will use the data provided by the Speak Up survey to analyze the impact of technology in the district.

Statement of the Problem

The statement of the problem "clarifies, outlines, limits, and brings into existence an expression of the problem" (Lunenburg & Irby, 2008, p. 114). The rapid expansion of technology use in schools has presented educators with a unique set of challenges. These challenges have included trying to identify the best way to provide students with access to technology and identifying an effective means by which to measure the impact technology has had on learning (Reinhart, Thomas, & Toriskie, 2011; Spears, 2012). This would include careful study of not only how students use technology to support their learning, but also when they use it (Fairbanks, 2014; Mouza, 2008). It should also be noted that these efforts can be particularly challenging given the quickly evolving landscape of technology in the classroom (Bebell & Kay, 2010). However, although research would indicate the effective integration of technology has the potential to transform teaching and learning, additional research will be needed to determine if schools are ably to effectively meet the educational needs of the increasingly tech-savvy students they work with (Bebell & Kay, 2010). In addition, educators must recognize "the lack of concrete research and consensus among experts on the objectives and outcomes of technology integration into the school curriculum" (Groff & Mouza, 2008, p.42). Specifically, when considering the unique circumstance of District A, "BYOD is still a new topic, both in practice and research literature" (Ross, 2013). Given this fact, educators in District A must carefully consider available research on the potential barriers to the effective implementation of BYOD programs to identify potential obstacles they will need to overcome to truly transform learning in the district (Ross, 2013). By doing so, District A will maximize their opportunity to effectively integrate technology in

support of their efforts to prepare their students to become contributing members of a technology-centered 21st century society.

Purpose of the Study

The purpose statement provides an overview of how the study will solve the problem defined in the statement of the problem (Lunenburg & Irby, 2008). The current study examined four significant factors administrators in District A must consider in their efforts to successfully integrate technology in the classroom. The first purpose of this study was to determine the change in what high school students report about having access to their own digital device for doing schoolwork over time. The second purpose of this study was to determine the change in students' perceptions of the class format that best represents the majority of their classes over time. The third purpose of this study was to measure the change in students' use of their own digital devices to complete schoolwork over time. The final purpose of this study was to measure the change in the obstacles reported by students that prevent student use of their own digital device in the classroom over time.

Significance of the Study

According to Lunenburg and Irby (2008), the significance of the study provides an argument for why the study makes a significant contribution to the field. The results of this study contribute to the research on how students utilize technology to support their learning and how effectively teachers are integrating technology into instruction. In addition, this study can help educators identify any potential obstacles they may face as they continue to expand the use of technology in the classroom. Perhaps most importantly, these evaluations can serve as the driving force behind the type of data-

based decision-making necessary to help district administrators determine the most effective way to expend their limited resources to help them achieve their goal of successfully integrating technology into the classroom.

Delimitations

Lunenburg and Irby (2008) defined delimitations as "self-imposed boundaries set by the researcher on the purpose and scope of the study" (p. 135). The delimitations utilized in this study included:

1. The study was limited to students in an affluent suburban school district in the Midwest.

2. The study was limited to sample survey data collected by district staff between 2010 and 2015.

3. The sample group for this study was limited to students in grades 9-12.

Assumptions

According to Lunenburg and Irby (2008); "Assumptions are postulates, premises, and propositions that are accepted as operational for purposes of the research" (p.135). The assumptions made as a part of this study include:

1. The students surveyed understood all aspects of the survey and completed it to the best of their ability.

2. The students were honest when surveyed.

3. All data calculations were correct.

Research Questions

When "teamed with a tightly drawn theoretical framework, the research questions or hypotheses become a directional beam for the study" (Lunenburg & Irby, 2008, p.

126). The following research questions guided the current study of technology use by high school students (grades 9-12) in a high SES BYOD school district.

RQ1. To what extent is there a change in what high school students report about having access to their own digital device for doing schoolwork over time (2010, 2011, 2014, and 2015)?

RQ2. To what extent is there a change in high school students' perceptions of the class format that best represents the majority of their classes over time (2014 and 2015)?

RQ3. To what extent is there a change in what high school students report about using their own digital device to complete schoolwork (2010, 2011, 2014, and 2015)?

RQ4. To what extent is there a change in what high school students report about obstacles that prevent them from utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015)?

Organization of the Study

This study includes five chapters. Chapter one included the background of the study, statement of the problem, purpose of the study, significance of the study, delimitations, assumptions, definition of terms, an overview of the methodology, and an organization of the study. Chapter two is a review of the literature, which includes an historical overview of technology in the classroom. Chapter three explains the methodology of this study, which includes the research design, selection of participants, measurement, data collection procedures, data analysis and hypothesis testing, limitations, and a summary. Chapter four provides descriptive statistics and the results of the hypothesis testing that addressed the four research questions. Chapter five includes a summary of the study with an overview of the problem, a review of the purpose statement

and research questions, a review of the methodology, and a summary of the major

findings. In addition, chapter five provides the findings related to the literature,

conclusions, implications for action, and recommendations for future research.

Chapter Two

Review of the Literature

Few modern educational initiatives have been as widespread, dramatic, and costly as the integration of computer technologies into American classrooms. Believing that increased use of computers will lead to improved teaching and learning, greater efficiency, and the development of important skills in students, educational leaders have made multi-billion dollar investments in educational technologies. (Bebell & Kay, 2010, p. 5)

As educators have continued to expand the use of computers as a part of the instructional process, they have encountered a variety of issues that have each provided their own unique set of challenges to the effective integration of this type of technology in the classroom. In their comprehensive review of the literature on the barriers to the effective integration of technology in the classroom, Groff and Mouza (2008) identified six factors that influence the successful integration of technology in the classroom. These included: "(a) legislative factors, (b) district/school-level factors, (c) factors associated with the teacher, (d) factors associated with the technology-enhanced project, (e) factors associated with the students, and (f) factors inherent to the technology itself" (p. 23). These six factors create the framework for this literature review.

Legislative Factors

Groff and Mouza (2008) described legislative factors as those influenced by policy, legislation, and research that exist outside the school. These factors can include new legislation designed to influence the role of technology in schools and the impact of new research on the integration of technology in classrooms. Specifically, these factors

have allowed federal, state, and local governments, as well as other outside agencies, to all play a significant role in shaping the role of technology in schools.

In their study of a 1:1 pilot program in five public and private middle schools in Massachusetts, Bebell and Kay (2010) described new technology initiatives in schools as having "captured the imagination of many educational and political leaders looking to reform political practices and improve underperforming schools" (p. 7). In addition to potentially improving the performance of underperforming schools, legislators have suggested that the successful integration of technology in schools could play a significant role in the long-term economic prosperity of the United States. This suggestion has served as the basis for a number of legislative measures and educational reforms in the last thirty years that have focused on the successful integration of technology in schools.

One of the first efforts to bring computers into the classroom took place in the early 1970's when the National Science Foundation led the charge to provide over two million students access to computers in their classrooms (Molnar, 1997). These efforts continued with the Apple Classrooms of Tomorrow (ACOT) project. Established in 1985, ACOT is a research and development collaboration among educators, researchers, and Apple Computer, Inc. that explored the use of technologies in teaching and learning. This project was a powerful statement in support of the growing belief among legislators, educators, and those in the technology industry that technology could and should play a significant role in restructuring America's education system (Dwyer, 1994).

The years that followed saw a significant increase in new technologies that impacted nearly every aspect of life in the United States. This included the significant expansion of technology use in in the classroom. One of the first legislative efforts to

address technology in the classroom was signed by President Bill Clinton in 1994. The

Goals 2000: Educate America Act provided the structure to improve instruction in

America's schools and to help give students the tools they need to remain competitive in

the increasingly technology driven 21st century global marketplace. These efforts

included providing a framework for integrating technology in classrooms around the

country. This framework highlighted seven key areas that the Clinton administration

believed were essential to the United States achieving this goal (Spears, 2012). In her

study of the effects of 1:1 technology on student performance and motivation, Spears

(2012) summarized these seven areas as

> (a) addressing the need for a national strategy for infusing technology into
>
> classrooms, (b) increasing awareness of the potential for technology to
>
> improve teaching and learning, (c) supporting state and local efforts to
>
> increase the use of technology in classrooms, (d) using technology to work
>
> towards equal opportunity for students, (e) promoting the use of
>
> technology in federal programs, (f) helping schools make informed
>
> decisions regarding their investment in educational technology, and (g)
>
> helping provide the highest quality of professional development possible
>
> to help educators effectively integrate technology. (p. 2)

This piece of legislation was symbolic of the growing commitment legislators had to

expand the use of technology in the classroom and to provide the resources necessary to

support these efforts.

The next significant piece of legislation was The No Child Left Behind Act

(NCLB) signed by President George W. Bush in 2001. Part D of NCLB, The Enhancing

Education through Technology Act, addressed technology in the classroom. Specifically, The Enhancing Education through Technology Act outlined three goals for technology use in the classroom (NCLB, 2001). These goals focused on the use of technology to improve student achievement, the need to help all students achieve technological literacy, and the need to provide professional development to teachers so they could more effectively utilize technology in their classrooms (NCLB, 2001).

The American Recovery and Reinvestment Act, signed by President Barack Obama in 2009, provided $4.35 billion for innovation and reform in the "largest discretionary fund for education in the history of the country" (Spears, 2012, p. 3). This commitment set the stage for the ConnectEd initiative unveiled by President Obama in 2013. In a summary of the ConnectEd initiative, Slack (2013) identified three key elements which directly impacted schools. First, ConnectEd pledged to connect 99% of America's students to the Internet in five years while also calling for an investment in providing teachers with additional technology, as well as additional training, in how to make effective use of the new technology. Finally, ConnectEd encouraged investment from the private sector in educational technology and software that can help schools realize the full potential of technology in the classroom (Slack, 2013). In the years that followed, President Obama continued to focus his attention on the state of technology in American classrooms. This attention led to President Obama's announcement in 2014 that the Federal Communications Commission (FCC) and several private technology companies, including Microsoft, Sprint, Verizon, AT&T, and Apple, were committing nearly $3 billion to "close the technology gap in our schools" (Bidwell, 2014, p. 1). These commitments included discounted prices on digital devices for schools,

professional development opportunities for teachers, and greater access to high-speed broadband and wireless Internet. President Obama's 2014 announcement signified our nation's continued financial commitment to integrating technology into the classroom (Bidwell, 2014).

As the use of technology in the classroom continued to expand, the United States Department of Education created The National Education Technology Plan (NETP). First published in 2010, this plan is "the flagship educational technology policy document for the United States" (U. S. Department of Education Office of Educational Technology, 2016, p. 1). In this plan, the United States Department of Education has attempted to articulate

> a vision of equity, active use, and collaborative leadership to make everywhere, all-the-time learning possible. While acknowledging the continuing need to provide greater equity of access to technology itself, the plan goes further to call upon all involved in American education to ensure equity of access to transformational learning experiences enabled by technology. (U. S. Department of Education Office of Educational Technology, 2016, p. 1)

The NETP is updated annually and provides a clear and ongoing commitment from legislators and policymakers to continue their investment in educational technology as a means of meeting the need for educators to prepare students to remain competitive in the increasingly technology-driven global marketplace.

District/School-level Factors

Groff and Mouza (2008) described district and school-level factors as those influenced by district and building administrators who are often the key decision-makers in determining which technology initiatives schools adopt as well as drive the methodology for integrating the technology into classrooms. Other key district and school-level factors include stakeholder involvement and issues related to infrastructure within the schools that could include the physical structures in the district, as well as the resources the district has to support their chosen technology initiative (Groff & Mouza, 2008).

The integration of computers in the classroom has taken several forms over the years. The recent dilemma faced by educators is how to provide continuous technology access to their students (Bebell & O'Dwyer, 2010). These efforts typically focus on one of two technology initiatives. The first of these initiatives is a 1:1 initiative in which schools provide students 24-hour access to some type of digital device at district expense. However, as district administrators recognized the significant increase in the access students had to their own digital device, many of them adopted a "Bring Your Own Device" (BYOD) or "Bring Your Own Technology" (BYOT) approach to technology integration (Johnson, 2012). This approach is consistent with what Norris and Soloway (2011) described as the "Age of Mobilism" which is characterized by the connectedness, affordability, and globalness of mobile technologies and supports the notion that the access divide is closing.

Regardless of which approach district administrators adopt, any new technology initiative requires significant planning and preparation in order for them to achieve their

desired goal. In schools where educators are considering the implementation of a BYOD

initiative, several issues have to be considered and addressed prior to implementation.

Specifically, educators must (a) establish policies that will govern technology usage, (b)

determine a rationale for the plan, (c) carefully review infrastructure requirements, (d)

provide adequate staff training, (e) engage and inform parents, (f) select resources wisely,

and (g) strive for equity (Johnson, 2012).

One of the primary concerns for school districts implementing any new

technology initiative is the ability of the existing infrastructure in the district to handle the

influx of new technology (Johnson, 2012). This idea was supported in earlier research by

Swan et al. (2005). In their study of the uses and effects of mobile computing devices in

K-8 classrooms, Swan et al. utilized a mixed methodologies approach to collect data from

four elementary and two seventh grade science classes in Northeast Ohio. As a part of

this study, Swan et al. (2005) found equipment problems can hamper the effectiveness of

technology in the classroom. Specifically, the findings suggested administrators must

pay special attention to classroom logistics, equipment maintenance, technical support,

and professional development in order to provide the framework for the successful

integration of technology in the classroom.

In his analysis of the preparation and implementation of a BYOD program in an

affluent school district, Hackler (2015) used district survey data from teachers, students,

and parents, as well as survey data from staff in three district high schools, to evaluate the

effectiveness of the district BYOD program. Hackler (2015) found administrators must

not only consider the physical infrastructure required to support the new technology, but

also develop strategies to address security concerns for students connected to the district

network. Therefore, to implement a BYOD initiative, administrators must provide the

necessary infrastructure to support the new technology while also providing for the online

safety and security of their students. If administrators fail in either of these areas, the

initiative has very little chance of succeeding and instead creates what Tomei (2002), in

his book on the barriers to the effective integration of technology in the classroom, called

the "technology façade." The technology façade is "the use of technology in a school or

school district without benefit of the necessary infrastructure to adequately support its use

as a viable instructional strategy" (p. 6). In their qualitative case study of five school

districts in the state of Virginia preparing to implement some type of 1:1 initiative,

Deloatch et al. (2014) found administrators implementing new technology initiatives

must create "policies that set the groundwork for Internet safety, management of

discipline, and protecting all stakeholders. Likewise, schools must adequately prepare for

the additional work in acquiring and managing the new hardware and software used in

ubiquitous programs" (p. 11).

In addition to issues related to infrastructure when a BYOD initiative is

implemented, the role of parents or stakeholders must be considered. Deloatch et al.

(2014) found community support has a significant impact on the use of computers in

schools and therefore educators must help parents and community understand the value

of the technology initiative in hopes this understanding will lead to the support of

additional technology in schools. In addition to helping stakeholders fully understand

any new technology initiative, educators must be mindful of any concerns parents or

stakeholders have regarding the use of technology in schools. Hackler (2015) found

parents surveyed about the BYOD initiative in their school district identified five

concerns about the initiative. These included (a) a fear of the device being lost, damaged, or stolen, (b) concerns about student use of social media, (c) concerns about the potential financial burden on families, (d) concerns about the online safety and security of students, and (e) a feeling that the district should be providing the technology (Hackler, 2015). These are all significant concerns to consider as district administrators work with stakeholders to implement BYOD initiatives.

If implemented effectively, BYOD has several potential benefits. In an article describing the benefits of BYOD, Saponaro (2014) summarized these potential benefits. They included: (a) increased student participation, (b) learning becomes more student-driven, (c) student collaboration and communication increases, (d) cost savings, (e) more personalized instruction, and (f) introduction of a new way of learning. Similarly, in his study of an affluent BYOD district, Hackler (2015) found 82% of teachers believed the BYOD would allow for more differentiated instruction, while 75% of teachers believed it would increase student engagement. In addition, 79% of teachers believed the BYOD would create more opportunities for collaboration and creativity in the classroom (Hackler, 2015).

Another important factor to consider at the district and school-level is the impact of socioeconomic status (SES) on the way schools integrate technology in the classroom. In his qualitative study of technology use in an affluent private school and an impoverished public school in Hawaii, Warschauer (2000) found that although educators from low SES schools tend to focus the use of technology on basic skills, under the right circumstances, they can also use technology to develop critical thinking in their students. This same study found, in general, educators in high SES schools utilized technology in

ways that prepared students for postsecondary education and tended to focus on preparing

students for life after high school. Specifically, Warschauer found that the integration of

technology in schools is influenced by the expectations teachers have for their students.

Warschauer reinforced the notion that educators must carefully consider the impact SES

will have not only on the access students may have to their own technology, but also the

impact it can have on how educators utilize technology in the classroom.

Factors Associated with the Teacher

Groff and Mouza (2008) described factors associated with the teacher as factors

directly influenced by the classroom teacher. These factors include the proficiency of the

teacher in utilizing technology and the attitudes and beliefs the teacher has regarding the

integration of technology into the instructional process. Factors associated with the

teacher are particularly relevant given the role teachers play in integrating technology

into the instructional process and their influence in shaping the attitudes students have

about technology in the classroom.

As the use of technology in the classroom has become more prevalent, educators

have found themselves playing catch-up with the successful integration of technology

into the instruction process. The struggle to use technology in a way that can engage

students and transform the learning process is summarized in a report on the need to

bring 21st century teaching and learning to Missouri students by the Missouri Department

of Education (2014).

Computers and Internet access have been in schools for decades, but a

fundamental change in education delivery using technology has not been

widely implemented. Textbooks, worksheets, and lectures still dominate

the education landscape, with technology being more of an "add-on" to

augment these traditional tools rather than a substantial change in delivery

and method. Simply placing technology in the classroom without a

change in teaching and learning is a waste of a valuable opportunity to

utilize technology in the most dramatic way possible- changing how our

children access, apply and synthesize information in a truly transformative

learning process. (p. 4)

As the report suggests, in order for technology to have the impact schools would like it to

have, teachers must continuously look for ways to use technology to transform the

instructional process. In their exploratory study of how teachers use technology in the

classroom Reinhart et al. (2011) surveyed 94 teachers working in diverse classroom

environments in a large Midwestern city to determine the differences in the use of

technology in K-12 classrooms. In the report of their research, the researchers argued

teachers must understand the importance of integrating teaching practices and

technologies in ways that challenge all students to learn. By doing so, teachers help

students become better problem solvers and more analytical in their approaches to

learning. In her study of the implementation and outcomes of a 1:1 initiative in a

predominantly low-income school in New York City, Mouza (2008) addressed the need

for teachers to change how students learn by exposing them to ideas and experiences that

otherwise would not be available to help them develop the higher-order critical thinking

skills and other skills necessary to be successful in the 21st century.

It is imperative for teachers to understand the effective integration of technology

requires making significant modifications to their instructional practices. In their study

on the educational outcomes from 1:1 computer settings, Deloatch et al. (2014) found

educational leaders typically target a change to classroom pedagogy with the

implementation of new technology initiatives. The International Society for Technology

in Education (ISTE, 2014) has provided some guidance for teachers in this area.

Specifically, the Standards for Teachers encourage teachers to (a) facilitate and inspire

student learning and creativity, (b) design and develop digital age learning experiences

and assessments, (c) model digital age work and learning, (d) promote and model digital

citizenship and responsibility, and (e) engage in professional growth and leadership. If

used appropriately, these standards provide teachers a framework for modifying their

teaching practices so they can utilize instructional methods that will resonate with

students. In doing so, teachers must come to the realization that they are no longer the

sole disseminator of information in the classroom and instead take on the role of a

facilitator with the goal of using a project-based approach to help students learn

(Deloatch et al, 2014). This more facilitative approach to instruction, in which the

teacher is able to successfully integrate technology-based lessons alongside more

traditional, person-to-person instruction, has come to be known as "blended" learning

(Fairbanks, 2014). As a part of the national results of the 2015 Speak Up survey, which

is an online survey given to students across the country to provide schools feedback on

how technology is utilized in schools, 31% of students said the majority of their classes

were blended classrooms, up from 23% on the 2014 survey (Project Tomorrow, 2014,

2015). In addition to the introduction of blended classrooms, educators have also begun

to adopt a "flipped" approach to classroom instruction. The Flipped Learning Network

(2014) described flipped learning as

a pedagogical approach in which direct instruction moves from the group

learning space to the individual learning space, and the resulting group

space is transformed into a dynamic, interactive learning environment

where the educator guides students as they apply concepts and engage

creatively in the subject matter. (Flipped Learning Network, "Definition of

Flipped Learning", 2014)

In practice, a flipped classroom is one in which students watch or listen to lectures at

home and use class time to complete projects and get assistance on homework from their

teacher (Project Tomorrow, 2014). According to the 2014 national Speak Up data, 6% of

students reported that the majority of their classes were flipped classrooms. This number

increased to 7% in the 2015 survey (Project Tomorrow, 2014, 2015).

In addition to data related to classroom formats, the Speak Up survey also

provides information to schools regarding how students are utilizing technology in the

classroom. For example, the 2015 Speak Up survey reports that 62% of students

nationally report using technology to take an online quiz or test, which is up from 58%

reported in 2014. Students also report an increase in using technology to access online

textbooks, going from 42% in 2014 to 46% in 2015, while the number of students

reporting using technology to post to class blogs or discussion boards remained steady at

25% in both the 2014 and 2015 Speak Up surveys (Project Tomorrow, 2014, 2015).

One final consideration when examining the role of teachers in integrating

technology is the level of comfort teachers have in utilizing technology in their

classroom. In their study of 18 North Carolina high schools, Corn, Tagsold, and Patel

(2011) used interviews, surveys, and focus groups with administrators, teachers and

students, to evaluate the impact of a laptop initiative on student learning. They found teachers had a tendency to resist increased technology use in the classroom during the first year of the new technology initiative. However, teachers reported their technology skills improved over time and enabled teachers to "lead students to a more thorough understanding of content, help them complete higher-level assignments, and individualize their learning experiences" (p. 6). Much of this improvement rests on the ability of administrators to provide adequate professional development for teachers. In a review of four empirical studies of K-12 computing programs, Bebell and O'Dwyer (2010) identified a key factor to the success of any new technology initiative is the ability of administrators to provide adequate professional development to teachers. In a study of technology literacy and the digital divide, Ritzhaupt, Liu, Dawson, and Barron (2013) gathered data from 5,990 students in 13 school districts across the state of Florida. The results of the study reinforced the notion that administrators must invest in professional development for teachers on effective ways to integrate new technology (Ritzhaupt et al., 2013). In addition, administrators must make sure the professional development opportunities they provide teachers do not focus simply on how to use the new technology but instead focus on integration into the instructional process and age and subject-specific instruction that will resonate with students (Deloatch et al., 2014; Penuel, 2006; Reinhart et al., 2011). By providing appropriate professional development opportunities to teachers, administrators help teachers become more comfortable in utilizing technology in the classroom and thereby enhance their ability to effectively integrate it into the instructional process.

Factors Associated with the Technology-enhanced Project

Groff and Mouza (2008) described factors associated with the technology-enhanced project as factors that impact the ability of teachers to successfully integrate the technology into the instructional process. Groff and Mouza (2008) cited the work of Zhao, Pugh, Sheldon, and Byers (2002) to provide the context for the factors associated with the technology-enhanced project. In their study of technology in the classroom, Zhao, Pugh, Sheldon, and Byers (2002) spent one year following a group of ten K-12 teachers who were attempting to successfully integrate technology in their classrooms. Using surveys, interviews, and classroom observations, the researchers identified several conditions they believe can impede the success of the effective integration of technology. Groff and Mouza (2008) identified two of the conditions that can impede successful integration as relevant to their work. These conditions were "distance" and "dependence".

According to Zhao et al. (2002), "distance" is comprised of two distinct components. The first is "distance from existing practice." The researchers defined this type of distance as the "degree to which an innovation differs from the prior educational practices of the teacher" (p. 498). In studying "distance from existing practice", the researchers found that the "the most successful projects generally involved an innovation that was a variation of a project previously completed by the teacher" (p. 498). The other distance component identified by the researchers is the "distance from available technological resources" (p. 499). The researchers defined this type of distance as "the amount of new technologies needed for successful completion of the innovation" (p. 499). In their study of "distance from available technological resources", Zhao et al.

found "the most successful projects were not very distant- they required no new

technology or minimal purchases or installations" (p. 499).   Similarly, "dependence" is

also comprised of two distinct components. The first is "dependence on others."   This

type of dependence is defined as "the degree that the innovation required the cooperation,

participation, or support of the people not under the innovator's authority" (p. 500).

According to Zhao et al., the "innovations with a low level of dependence were most

successful" (p. 500). The second component of "dependence" is the "dependence on

technological resources." The researchers defined this type of dependence as "the degree

that innovations require the use of technological resources beyond the control of the

teacher" (p. 500). Once again, Zhao et al. found that "the most successful projects tended

to be less dependent" (p. 501).

As educators consider the element of "distance", a framework exists, known as

the SAMR model, which will allow educators to assess the role of technology in the

instructional process. Created by Ruben R. Puentedura (2013) as part of his work with

the Maine Learning Technologies Initiative, the SAMR Model provides educators a

framework to look critically at technology-based activities to determine the specific role

technology plays in the activity. The SAMR Model identifies four levels of technology

integration. The first level is substitution. In this level, technology replaces the

traditional tools needed to complete the activity. The second level is augmentation.

Augmentation occurs when technology replaces the traditional tools for completing the

activity but with functional improvements. The third level of integration is modification.

Modification is characterized by the use of technology to redesign learning activities.

The fourth and final level of integration is redefinition. At this level, technology allows

for the creation of new learning tasks that could not have been done previously (Puentedura, 2013).

Another tool used to measure the integration of technology in the classroom is The Levels of Teaching Innovation (LoTi) framework (Moersch, 1995). This framework provides a means of assessing the use of technology in the classroom and the pedagogical choices made by teachers by identifying seven steps along a continuum including non-use, awareness, exploration, infusion, integration, expansion, and refinement. According to the framework, refinement includes authentic learning that is learner-based and requires access to the latest digital resources (Moersch, 1995).

As educators examine the element of "dependence," student access is a significant issue. The issue of student access to technology has been the subject of a great deal of research over the last several years. In its infancy, this research identified a group of students that had fallen victim to the "digital divide" (Attewell & Battle, 1999). The term digital divide describes the divide that exists between individuals who have access to technology in their home and those who do not (Attewell & Battle, 1999; Hargittai, 2002; van Dijk, 2006). Historically, studies have shown that factors such as socioeconomic status (SES) have a significant impact on student access (Attewell & Battle, 1999). As educators continue to utilize more and more technology in the classroom, SES and its impact on student access to technology is a significant concern. However, recent studies have shown great strides have been made to close the access divide for students and their families. As van Dijk (2006) found in her review of digital divide research from 2000-20005, "In terms of physical access, the divide seems to be closing in the most developed countries…" (p. 221). In a 2015 survey of Technology Device Ownership for 1,907

Americans living in all 50 states and the District of Columbia, Anderson (2015), seemed

to confirm the access divide is shrinking. Specifically, Anderson (2015) found that 86%

of those between the ages of 18 and 29 owned a smartphone, which was up from the 52%

who owned one in 2011. Similarly, 50% of those surveyed in 2015 between the ages of

18-29 owned a tablet of some sort, which was up from only around 10% who owned one

in 2011. Interestingly, only 78% in this age group surveyed in 2015 owned a laptop or

desktop computer, which was down from the 88% who owned one in 2011. On the other

hand, when the focus narrowed to student access, the 2015 Speak Up survey of students

across the country indicated that 86% of students reported owning a smartphone, which

was up from 82% on the 2014 Speak Up survey (Project Tomorrow, 2014, 2015). In

addition, 53% of students reported owning a laptop in 2015, which was up from 51% in

2014. Finally, 40% of students on the 2015 Speak Up survey reported owning a tablet,

while 38% reported owning a tablet in 2014 (Project Tomorrow, 2014, 2015).

In addition to the research being done on the digital divide and student access to

technology, Hargittai (2002) identified a "Second- Level Digital Divide (SLDD) which is

characterized by the difference in how technology is used by those that have access to it.

In his study, Hargittai (2002) conducted in-person observations and interviews with a

random sample of 54 Internet users from the suburban towns and boroughs of a New

Jersey county to determine the differences in how individuals use technology. Hargittai

(2002) found the SLDD goes beyond the Top-Level Digital Divide that focused on the

divide in access to technology. As educators consider the issues and access and usage,

Natriello (2006), in his discussion of the role sociologists can play in helping bridge the

digital divide in schools, argued,

In thinking about the issues of access and use, it may seem logical to address the access divide before the use divide is considered. However, if we do not wish to heighten the disparities in the use of technology, we will need to address both access and use simultaneously. Doing so will require a more complex analysis of how investments in improving access can be balanced against investments to promote the most appropriate use to enhance students' learning. Achieving this balance presents a challenge for policy makers who may have to forgo highly visible access initiatives, typically based on physical infrastructure improvements, for less visible and more demanding efforts to encourage appropriate use by teachers and students, typically rooted in shaping complex social and educational structures and processes. (p. 4)

As educators and researchers have continued to look at issues related to access and use of technology, a third divide has also emerged. This new divide, or the Third-Level Digital Divide (TLDD), goes beyond access and use. According to a study on digital literacy completed by Ritzhaupt et al. (2013), this divide does not focus on student access or how students use the technology they possess, but instead focuses on whether or not students know how to use the technology they have at their disposal. This new divide is more complex than simple access and use and can be far more difficult to measure. In their study of the digital divide in K-12 schools, Hohlfeld, Ritzhaupt, Barron, and Kemker (2008), used statewide data from four school years in an attempt to identify trends in school technology integration in Florida schools. As a part of this study, the researchers concluded

the characteristics of the third level of the digital divide may be the most

difficult for researchers and educators to address. Researchers must

determine which measurements can be used to characterize the third level,

and educators must identify meaningful ways to weave technology into the

curriculum. (p. 294)

Assessing the impact of the TLDD is an important consideration for educators as students

continue to have greater access to technology and schools continue to use it more

frequently as a part of the instructional process. Students must not only have access to

technology and teachers must not only use technology, but both students and teachers

must understand how to use technology. All of this research has laid the foundation for

the belief that the "digital divide is multilayered and includes several related dimensions

of computer access, usage, and skill" (Ritzhaupt et al., 2013, p. 293).

Factors Associated with the Student

Groff and Mouza (2008) identified factors associated with the student as the

students' experience with technology, the technology skills of the student, and the

attitudes and beliefs of the student about technology. In order to effectively integrate

technology in the classroom educators must recognize the impact students have on how

instruction is delivered. Specifically, educators must recognize "that the students who

will be working with the technology-based project will impact the likelihood of success"

(Groff & Mouza, 2008, p. 33).

One of the driving forces behind educators expanding the use of technology in the

classroom has been the explosion of technology use outside the classroom and the

introduction of "digital natives." A report on optimizing technology in the classroom

from the Missouri State Department of Education (2014) defined digital natives as students who "have been exposed to communication, media, and information technology their entire lives, with access to mobile phones, the World Wide Web, text messaging, powerful computing devices and constant connection to their peers and the world" (p. 3).

As student access to technology throughout the school day has continued to expand, educators have come to the realization that access to technology during the school day does not have to serve as a distraction to students or detract from the level of student engagement. Previously this belief had led to schools banning technology, typically cell phones, in the classroom (Johnson, 2012). However, in his study of teacher implementation of BYOD at a high SES suburban high school, Ross (2013) suggested, schools must recognize mobile technologies "are not the cause of these negative behaviors; they are tools, just like any other. If students are trained and empowered to use them in positive ways, it is more likely that they will be used positively and appropriately" (p. 18). Ross's view of technology in the classroom requires educators to find ways to train students on digital citizenship in an effort to minimize the negative behaviors that are inevitable when students have 24-hour access to technology.

As discussed previously, one of the significant voices in the integration of technology in schools has been the International Society for Technology in Education (ISTE). In addition to the ISTE Standards for Teachers that were discussed earlier in the review, the ISTE has also created a series of standards for students. The standards for students "are designed to empower student voice and ensure that learning is a student-driven process" (ISTE, 2017, "ISTE Standards for Students", para. 1). The student standards encourage schools to use technology to promote (a) creativity and innovation,

(b) communication and collaboration, (c) research and information fluency, (d) critical thinking, problem solving, and decision-making, (e) digital citizenship, and (f) technology operations and concepts (ISTE, 2017). These standards provide a framework for technology integration that is student-focused and helps educators look past the impact technology can have on instruction and forces them to consider its impact on learning.

Factors Inherent to the Technology Itself

Groff and Mouza (2008) described the factors inherent to the technology as possible barriers to integrating technology in the classroom. In summarizing these factors and the potential barriers they create, Groff and Mouza (2008) stated their belief that "by its very nature, technology brings its own challenges and, therefore, creates its own barriers to success in the classroom" (p. 34). In addition, Groff and Mouza (2008) identify the need to recognize that any new technology initiative might face a variety of potential problems that educators must be prepared to overcome if they hope to successfully integrate technology into their classrooms.

In an article on bridging the digital divide in schools, Green (2000) suggested school districts that successfully integrate technology in the classroom address four significant issues related to the technology. These include, (a) infrastructure, including what hardware is used and where is it located, (b) student usage, including which students have access to technology and how they use it, (c) adequate technical support, including who provides and is it timely, and (d) teacher training, including who is trained, how they are trained, and is follow-up support provided (p. 8). The successful integration of technology in the classroom requires district administrators to continuously assess any

new technology initiative in all of these areas to make sure they are providing the necessary support to fully implement the new initiative (Green, 2000).

In addition to the obstacles faced by school districts, teachers often face significant challenges when integrating new technology. In their study of effective of instruction in a 1:1 classroom, Corn et al. (2011) found several barriers to teachers' integration of technology in the classroom. These barriers included (a) inadequate time to learn new ways to incorporate technology, (b) technology skills of the students, (c) lack of knowledge about how to incorporate technology into a lesson, (d) student Internet access at home, and (d) keeping students on task (p. 19). Similarly, in his analysis of BYOD, Hackler (2015) found teachers identified five potential obstacles to the successful integration of technology in the classroom. These included (a) limits on the time spent becoming comfortable with the technology, (b) limited access to electronic devices, (c) lack of professional development, (d) lack of understanding on how to integrate technology into their curriculum, and (e) the ability of teachers to restrict the resources students have available to them (Hackler, 2015, "Trying to identify the motivation to implement BYOD in the district", para. 11). All of the potential barriers must be considered by teachers, and addressed by schools, as they continue their efforts to make technology a more integral part of the instructional process.

Summary

During the review of the literature on the use of technology in the classroom, three significant themes emerged. The research highlights the need for district administrators to take the time to adequately plan and prepare prior to the implementation of any new technology initiative. In doing so, administrators can gain a better

understanding of the resources necessary to adequately support the initiative. Failure to plan can significantly impact the ability of the educators to effectively implement the new initiative. The second theme identified in the research is the need for administrators to provide adequate and ongoing professional development to teachers. By doing so, administrators provide teachers the tools they need to incorporate the new technology in their classroom and truly transform the instruction. The final theme that emerged in the research is the need for teachers to continuously evaluate the role technology is playing in their classrooms. By evaluating the impact of technology in the classroom, teachers can identify areas of need and any potential obstacles to the effective integration of technology. Once these issues are identified, administrators can find ways to address each of them, thereby allowing educators to make significant progress towards their goals of using technology to transform teaching and learning.

Chapter three provides a description of the methodology used in the study. This description includes an explanation of the research design and the selection of participants used in the study. In addition, an overview of the measurement used in the study, as well as the data collection procedures are included. Finally, Chapter three provides the data analysis and hypothesis testing used and provides a list of limitations for the study.

Chapter Three

Methods

The first purpose of this study was to analyze archived survey data collected from students in District A, an affluent suburban school district in the Midwest, to determine the change in what high school students report about having access to their own digital devices for doing schoolwork over time. The second purpose of this study was to determine the change in students' perceptions of the class format that best represents the majority of their classes over time. The third purpose of this study was to measure the change in students' use of their own digital devices to complete schoolwork over time. The final purpose of this study was to measure the change in the obstacles reported by students that prevent student use of their own digital device in the classroom over time. This chapter includes a summary of the research methods used to complete the study as well as the research design, selection of participants, measurement, data collection procedures, data analysis and hypothesis testing, and limitations.

Research Design

This research design section describes the methods of inquiry used in the study (Lunenburg & Irby, 2008). The researcher used archived survey data of high school students (grades 9-12) provided by District A, an affluent suburban school district in the Midwest. The data was used to conduct quantitative analyses of the change in what high school students report about having access to their own digital device for doing schoolwork over time, the change in high school students' perceptions of the class format that best represents the majority of their classes over time, the change in what high school students report about using their own digital device to complete schoolwork, and the

change in what high school students report about obstacles that prevent them from utilizing their own digital device in the classroom over time.

Selection of Participants

The selection of participants section includes information about who participated in the study, the method used to select the participants, and the number of participants that were included in the study (Lunenburg & Irby, 2008). The participants in this study included students enrolled in grades 9-12 in District A, an affluent suburban school district in the Midwest. All students present on the day of the survey in 2010, 2011, 2014, and 2015 were asked to participate. However, the survey was voluntary and students could choose not to participate without penalty. In addition, parents had the option to recuse their student from participating in the survey.

Measurement

The archived survey data used in this study came from the Speak Up Research Project for Digital Learning. Distributed as part of a national initiative by Project Tomorrow, a national education nonprofit group, the Speak Up survey is an online survey that provides educators "the largest collection of authentic, unfiltered stakeholder input on education, technology, schools of the future, science and math instruction, professional development and career exploration" (Project Tomorrow, 2017a, para. 2). The Speak Up survey has been administered in District A since 2010 by the district technology department. The online survey was administered to students in the five district high schools (grades 9-12) in 2010, 2011, 2014, and 2015. The survey was completed in classrooms and monitored by a classroom teacher. The classroom teacher provided the link needed to access the survey and asked the students to answer each

question honestly and to the best of their ability. The survey typically took students approximately 20 minutes to complete (A. Murphy, personal communication, July 25, 2017).

The questions and possible student responses on the Speak Up survey vary from year-to-year. This variation is due primarily to the method used by Project Tomorrow to create the questions for the survey each year. According to Project Tomorrow, the questions are updated annually based on the ongoing conversations between the Project Tomorrow team and educators, as well as other individuals and agencies that bring their own unique perspective regarding the questions and data that will most benefit participating schools. The final creation of all questions included on the survey is the responsibility of the Project Tomorrow team (Project Tomorrow, 2017b).

For the purpose of this study, three questions which appeared on the survey administered to students in District A in 2010, 2011, 2014, and 2015 were identified as relevant to the study. One additional question which only appeared on the survey given to students in 2014 and 2015 was also selected (See Table 1). A copy of each survey can be found in the appendix.

Table 1

Survey Questions used for Research

Research Question		Survey Version Year			
		2010	2011	2014	2015
RQ1	Survey Question	4	4	8	5
RQ2	Survey Question	N/A	N/A	4	2
RQ3	Survey Question	6	6	5	3
RQ4	Survey Question	8	8	6	4

Survey questions four, six, and eight were used from the 2010 survey (Appendix A). Survey question four provided data regarding the variable specified in RQ1, which examined the extent to which there is a change in what high school students report about having access to their own digital device for doing schoolwork over time. Survey question four asked students to select from a list of 13 digital devices to identify all of the digital devices they have access to for their own use. Among the items on the list, smartphone, laptop, and tablet appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three devices were used to measure the variable specified in RQ1. Survey question six provided data regarding the variable specified in RQ3, which examined the extent to which there is a change in what high school students report about using their own digital device to complete schoolwork over time. Survey question six asked students to select from a list of 23 possible ways they utilize their digital device to complete schoolwork. Among the items on the list, accessing online textbooks, completing online tests or quizzes, and posting to classroom discussion boards, blogs, or wikis appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three uses of their devices were used to measure the variable specified in RQ3. Survey question eight provided data regarding the variable specified in RQ4, which examined the extent to which there is a change in the obstacles that prevent high school students from utilizing their digital device in the classroom over time. Survey question eight asked students to select from a list of 17 possible obstacles they face in utilizing technology in the classroom. Among the items on the list, slow or inconsistent Internet access, teachers do not understand how to utilize the technology, and

the school blocks websites that could be helpful appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three obstacles were used to measure the variable specified in RQ4.

Survey questions four, six, and eight were used from the 2011 survey (Appendix B). Survey question four provided data regarding RQ1, which examined the extent to which there is a change in what high school students report about having access to their own digital device for doing schoolwork over time. Survey question four asked students to select from a list of 10 digital devices to identify all of the digital devices they have access to for their own use. Among the items on the list, smartphone, laptop, and tablet appeared on the 2010, 2011, 2014, and 2105 versions of the survey and were selected as relevant to this study. Student responses about these three devices were used to measure the variable specified in RQ1. Survey question six provided data regarding RQ3, which examined the extent to which there is a change in what high school students report about using their own digital device to complete schoolwork over time. Survey question six asked students to select from a list of 22 possible ways they utilize their digital device to complete schoolwork. Among the items on the list, accessing online textbooks, completing online tests or quizzes, and posting to classroom discussion boards, blogs, or wikis appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three uses of their devices were used to measure the variable specified in RQ3. Survey question eight provided data regarding RQ4, which examined the extent to which there is a change in the obstacles that prevent high school students from utilizing their digital device in the classroom over time. Survey question eight asked students to select from a list of 13

possible obstacles they face in utilizing technology in the classroom. Among the items

on the list, slow or inconsistent Internet access, teachers do not understand how to utilize

the technology, and the school blocks websites that could helpful appeared on the 2010,

2011, 2014, and 2015 versions of the survey and were selected as relevant to this study.

Student responses about these three obstacles were used to measure the variable specified

in RQ4.

    Survey questions four, five, six, and eight were used from the 2014 survey

(Appendix C). Survey question eight provided data regarding RQ1, which examined the

extent to which there is a change in what high school students report about having access

to their own digital device for doing schoolwork over time. Survey question eight asked

students to select from a list of seven digital devices to identify all of the digital devices

they have access to for their own use. Among the items on the list, smartphone, laptop,

and tablet appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were

selected as relevant to this study. Student responses about these three devices were used

to measure the variable specified in RQ1. Survey question four provided data regarding

RQ2, which examined the extent to which there is a change in what high school students

report about the classroom format for the majority of their classes over time. Survey

question four asked students to select from a list of five formats to identify the classroom

format which best represents the format of the majority of their classes. Among the items

on the list, traditional, blended, and flipped appeared on the 2014 and 2015 versions of

the survey and were selected as relevant to this study. Student responses about these

three formats were used to measure the variable specified in RQ2. Survey question five

provided data regarding RQ3, which examined the extent to which there is a change in

what high school students report about using their own digital device to complete schoolwork over time. Survey question five asked students to select from a list of 17 possible ways they utilize their digital device to complete schoolwork. Among the items on the list, accessing online textbooks, completing online tests or quizzes, and posting to classroom discussion boards, blogs, or wikis appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three uses of their devices were used to measure the variable specified in RQ3. Survey question six provided data regarding RQ4, which examined the extent to which there is a change in the obstacles that prevent high school students from utilizing their digital device in the classroom over time. Survey question six asked students to select from a list of 16 possible obstacles they face in utilizing technology in the classroom. Among the items on the list, slow or inconsistent Internet access, teachers do not understand how to utilize the technology, and the school blocks websites that could be helpful appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to this study. Student responses about these three obstacles were used to measure the variable specified in RQ4.

Survey questions four, five, six, and eight were used from the 2015 survey (Appendix D). Survey question five provided data regarding RQ1, which examined the extent to which there is a change in what high school students report about having access to their own digital device for doing schoolwork over time. Survey question five asked students to select all the devices they have access to for their own use from a list of seven digital devices. Among the items on the list, smartphone, laptop, and tablet appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were selected as relevant to

this study. Student responses about these three devices were used to measure the variable

specified in RQ1. Survey question two provided data regarding RQ2, which examined

the extent to which there is a change in what high school students report about the

classroom format for the majority of their classes over time. Survey question two asked

students to select from a list of five classroom formats which best represents the format

of the majority of their classes. Among the items on the list, traditional, blended, and

flipped/online appeared on the 2014 and 2015 versions of the survey and were selected as

relevant to this study. Student responses about these three formats were used to measure

the variable specified in RQ2. Survey question three provided data regarding RQ3,

which examined the extent to which there is a change in what high school students report

about using their own digital device to complete schoolwork over time. Survey question

three asked students to select from a list of 19 possible ways they utilize their digital

device to complete schoolwork. Among the items on the list, accessing online textbooks,

completing online tests or quizzes, and posting to classroom discussion boards, blogs, or

wikis appeared on the 2010, 2011, 2014, and 2015 versions of the survey and were

selected as relevant to this study. Student responses about these three uses of their

devices were used to measure the variable specified in RQ3. Survey question four

provided data regarding RQ4, which examined the extent to which there is a change in

the obstacles that prevent high school students from utilizing their digital device in the

classroom over time. Survey question four asked students to select from a list of 12

possible obstacles they face in utilizing technology in the classroom. Among the items

on the list, slow or inconsistent Internet access, teachers do not understand how to utilize

the technology, and the school blocks websites that could helpful appeared on the 2010,

2011, 2014, and 2015 versions of the survey and were selected as relevant to this study.

Student responses about these three obstacles were used to measure the variable specified

in RQ4.

The use of archived Speak Up survey data for this study requires a careful

analysis of the reliability and validity of the survey instrument and the data it provides.

According to Cronbach (1951),

Any research based on measurement must be concerned with the accuracy

or dependability or, as we usually call it, reliability of measurement. A

reliability coefficient demonstrates whether the test designer was correct

in expecting a certain collection of items to yield interpretable statements

about individual differences. Even those investigators who regard

reliability as a pale shadow of the more vital matter of validity cannot

avoid considering the reliability of their measures. (p. 297)

Typically, reliability is not an issue with single-item measurement because it

involves the evaluation of the linear combination of the values associated with

multiple items into a scale score (Nunnally & Bernstein, 1994). However, there

might be concern for the temporal reliability of single-item scores considering the

likelihood the participant would respond the same way if answering again

(Nunnally & Bernstein, 1994). Specifically, this concern speaks to the relative

strengths and weaknesses of self-reporting and the impact on the reliability and

validity of the Speak Up survey data. In an article by Garcia and Gustavson

(1997), self-reporting is described as a "primary tool in research" (para. 2). The

authors went on to describe the issue with self-reported data as not whether or not

it should be replaced but that "we will always need self-report about many behaviors that are going to be unobservable by anyone else. We're going to need it because the interpretation of events may be important, and only the individual can provide those interpretations" (Garcia & Gustavson, 1997, "Value, Limits, and Improvements", para. 1). However, it should be noted that

> observational and experimental studies have shown that there are barriers to accuracy at every stage of the autobiographical report process- perception of the state of the self, encoding and storage of memory, understanding the question being asked, recalling the facts, and judging how and what to answer. (Garcia & Gustavson, 1997, "Value, Limits, and Improvements", para. 2)

These concerns are best addressed by careful and simple question wording, and tracking results over multiple samples (Nunnally & Bernstein, 1994). The creators of the Speak Up survey attempted to address these concerns by creating and selecting survey items (questions and responses) that are part of an item bank that is reviewed annually. "Approximately 60% of the survey questions are consistent year to year for longitudinal trend analysis" (J. Hostert, personal communication, August 16, 2017).

The survey questions contained in the Speak Up survey are concrete questions about behavior requiring no inference and no scales to be constructed. The authors of the study provided no validity and reliability analysis but were able to provide information regarding instrumentation development. According to Jenny Hostert, Speak Up Operations Manager for Project Tomorrow:

The primary data collection instrument used within the Speak Up Project

is an audience-specific online survey. The Project Tomorrow staff

develops the questionnaires with input from national, state and local

thought leaders and practitioners in K-12 education. Each audience

specific survey consists of 10-30 questions with responses in multiple

choice, single choice or Likert formats. Additionally, the surveys contain

one or two open-ended questions for narrative response (J. Hostert,

personal communication, August 16, 2017).

In addition, "the process of authenticating the survey question text, responses and Likert

scales with student participants is a typical Speak Up process and is significant for the

development of an instrument with high validity and relevancy for this study" (J. Hostert,

personal communication, August 16, 2017).

Data Collection Procedures

According to Lunenburg and Irby (2008), the data collection section describes the

methods used to obtain data from the participants in the study. In preparation for

conducting this research, a Request to Conduct Research was submitted via email to the

Director of Professional Learning in District A on June 19, 2017 (Appendix E). In this

email, the researcher explained the proposed study and requested permission to access the

archived survey data. The Director of Professional Learning approved the request in an

email dated June 26, 2017 (Appendix F). The archived survey data was attached to the

email approving the Request to Conduct Research. Once the survey data was received

from District A, a request was submitted via email on July 31, 2017, to Project Tomorrow

to request access to Speak Up survey data and the right to use the data in this study. This

same email also contained a request for access to blank Speak Up surveys. In a series of emails on July 31, 2017 Project Tomorrow approved the request to use Speak Up survey data (Appendix G) and provided the researcher with blank copies of the 2010, 2011, 2014, and 2015 versions of the survey.

The Institutional Review Board form was submitted to Baker University on August 11, 2017 (Appendix H). The request was approved by the Baker University IRB Committee on August 14, 2017 (Appendix I). This approval was forwarded to the Director of Professional Learning in District A on August 21, 2017 in accordance with the requirements of the Request to Conduct Research.

Data Analysis and Hypothesis Testing

The data analysis section describes the statistical tests used to address the research questions and hypotheses used in the study (Lunenburg & Irby, 2008). Student responses to the four survey questions selected for this study were used to complete chi-square tests of independence. These tests determined the change in student access to their own digital device over time, the change in student perceptions of classroom format over time, the change in student use of their own digital device to complete schoolwork over time, and the change in obstacles to students utilizing technology in the classroom over time.

RQ1. To what extent is there a change in what high school students report about having access to their own digital device for doing schoolwork over time (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ1. The survey question asked students to select from a list of digital devices to identify all the devices they owned for their personal use. Three devices which appeared on the 2010, 2011, 2014,

and 2015 versions of the survey were identified as relevant: a smartphone, a laptop computer, and a tablet.

H1. There is a change in what high school students report about having access to their own smartphone for doing schoolwork over time (2010, 2011, 2014, and 2015).

H2. There is a change in what high school students report about having access to their own laptop for doing schoolwork over time (2010, 2011, 2014, and 2015).

H3. There is a change in what high school students report about having access to their own tablet for doing schoolwork over time (2010, 2011, 2014, and 2015).

Three chi-square tests of independence were used to address *H1*, *H2*, and *H3*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

RQ2. To what extent is there a change in high school students' perceptions of the class format that best represents the majority of their classes over time (2014 and 2015)?

Data from one survey question was used to examine RQ2. The survey question asked students to select from a list of classroom formats to identify which format they believed best represented the majority of their classes. Three formats that appeared on the 2014 and 2015 versions of the survey were identified as relevant: traditional, blended, and flipped.

H4. There is a change in high school students' perceptions about the classroom format that best represents the majority of their classes over time (2014 and 2015).

A chi-square test of independence was used to address *H4*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

RQ3. To what extent is there a change in what high school students report about using their own digital device to complete schoolwork (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ3. The survey question asked students to select from a list of possible uses for their digital device to complete schoolwork. Three uses that appeared on the 2010, 2011, 2014, and 2015 versions of the survey were identified as relevant: accessing online textbooks, completing online tests or quizzes, and posting on blogs, classroom discussion boards, or wikis.

H5. There is a change in what high school students report about using their own digital device to access online textbooks over time (2010, 2011, 2014, and 2015).

H6. There is a change in what high school students report about using their own digital device to complete online test or quizzes over time (2010, 2011, 2014, and 2015).

H7. There is a change in what high school students report about using their own digital device to post on blogs, classroom discussion boards, or wikis over time (2010, 2011, 2014, and 2015).

Three chi-square tests of independence were used to address *H5*, *H6*, and *H7*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

RQ4. To what extent is there a change in what high school students report about obstacles that prevent students from utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ4. The survey question asked students to select from a list of obstacles that would prevent them from utilizing their own digital device in the classroom. Three obstacles that appeared on the 2010,

2011, 2014, and 2015 versions of the survey were identified as significant: building Internet is slow or inconsistent, teachers lack an understanding of the technology, and the school blocks websites that would be helpful.

H8. There is a change in what high school students report about slow or inconsistent Internet service being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

H9. There is a change in what high school students report about teachers' lack of understanding of the technology being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

H10. There is a change in what high school students report about schools blocking helpful websites being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

Three chi-square tests of independence were used to address *H8*, *H9*, and *H10*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

Limitations

Lunenburg and Irby (2008) defined limitations of a study as "factors that may have an effect on the interpretation of the findings or on the generalizability of the results" (p. 133). In addition, "limitations of a study are not under the control of the researcher" (Lunenburg & Irby, 2008, p. 133). The following limitations were identified that could affect the interpretation of the findings from this study:

1. Student participation was voluntary, which could influence student responses.

2. The effectiveness with which technology is integrated in the classroom could influence student responses.

3. The format of the survey varied from year to year.

4. The possible responses to survey questions varied from year to year.

5. The questions on the survey varied from year to year. These variance resulted in no questions from the 2010 or 2011 surveys being used to gather data for RQ2

Summary

Chapter three summarized the methodology used to complete this study. A quantitative study was conducted using archived survey data from high school students (grades 9-12) in District A, an affluent suburban school district in the Midwest. This survey was intended to determine the impact of technology on learning in the district. Specifically, the current study focused on the change in what high school students report about having access to their own digital device for doing schoolwork over time, the change in high school students' perceptions of the class format that best represents the majority of their classes over time, the change in what high school students report about using their own digital device to complete schoolwork, and the change in what high school students report about obstacles that prevent them from utilizing their own digital device in the classroom over time. Chapter four provides the results of the study.

Chapter Four

Results

This chapter provides the results of the hypothesis tests, and a summary of the results of the hypothesis tests. The summary section provides the results for each of the four research questions and ten hypothesis tests that were conducted. In addition, chapter four provides the context for further analysis and the recommendations found in chapter five. The purpose of this study was to analyze archived survey data collected from students in District A, an affluent suburban school district in the Midwest, to determine the change in what high school students report about having access to their own digital device over time, the change in students' perceptions of the class format of the majority of their classes over time, the change in students' use of their own digital devices to complete schoolwork over time, and the change in the obstacles students report that prevent students from utilizing their own digital device in the classroom over time.

Hypothesis Testing

Based on the variables identified as relevant to this study, 10 hypothesis tests were conducted. The results of the 10 hypothesis tests are explained in this section.

RQ1. To what extent is there a change in what high school students report about having access to their own digital device for doing schoolwork over time (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ1. The survey question asked students to select from a list of digital devices to identify all the devices they owned for their personal use. Three devices which appeared on the 2010, 2011, 2014, and 2015 versions of the survey were identified as relevant: a smartphone, a laptop

computer, and a tablet. The three hypotheses for RQ1 are listed below followed by a description of the test used for analysis of each hypothesis and the results for each of those tests.

   H1. There is a change in what high school students report about having access to their own smartphone for doing schoolwork over time (2010, 2011, 2014, and 2015).

   H2. There is a change in what high school students report about having access to their own laptop for doing schoolwork over time (2010, 2011, 2014, and 2015).

   H3. There is a change in what high school students report about having access to their own tablet for doing schoolwork over time (2010, 2011, 2014, and 2015).

   Three chi-square tests of independence were used to address *H1*, *H2*, and *H3*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

   The results of the χ^2 test that was conducted to test H1 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 1873.70$, $df = 3$, $p = .000$. See Table 2 for the observed and expected frequencies. The observed frequency of students not reporting smartphone access in 2010 ($n = 564$) was higher than the expected frequency of students not reporting smartphone access in 2010 ($n = 169.18$). The observed frequency of students not reporting smartphone access in 2011 ($n = 266$) was higher than the expected frequency of students not reporting smartphone access in 2011 ($n = 83.05$). The observed frequency of students reporting smartphone access in 2014 ($n = 3598$) was higher than the expected frequency of students not reporting smartphone access in 2014 ($n = 3404.51$). The observed frequency of students reporting smartphone access in 2015 ($n = 4670$) was higher than the expected

frequency of students not reporting smartphone access in 2015 ($n = 4285.93$). The

results of this analysis supported H1. There was a change in what high school students

reported about having access to their own smartphone for doing schoolwork over time.

The proportion of students reporting access to smartphones was higher in 2014 and 2015

than in 2010 and 2011.

Table 2

Observed and Expected Frequencies for H1

Device		Year			
		2010	2011	2014	2015
Smartphone	Observed	756	382	3598	4670
	Expected	1150.82	564.95	3404.51	4285.93
No Smartphone	Observed	564	266	307	246
	Expected	169.18	83.05	500.49	630.07

The results of the χ^2 test that was conducted to test H2 indicated a statistically

significant difference between the observed and expected values, $\chi^2 = 373.55$, $df = 3$,

$p = .000$. See Table 3 for the observed and expected frequencies. The observed

frequency of students reporting laptop access in 2010 ($n = 966$) was higher than the

expected frequency of students reporting laptop access in 2010 ($n = 849.18$). The

observed frequency of students reporting laptop access in 2011 ($n = 620$) was higher than

the expected frequency of students reporting laptop access in 2011 ($n = 416.87$). The

observed frequency of students not reporting laptop access in 2014 ($n = 1549$) was higher

than the expected frequency of students not reporting laptop access in 2014

($n = 1392.84$). The observed frequency of students not reporting laptop access in 2015

(n = 1917) was higher than the expected frequency of students not reporting laptop access in 2015 (n = 1753.44). The results of this analysis supported H2. There was a change in what high school students reported about having access to their own laptop for doing schoolwork over time. The proportion of students reporting access to a laptop was higher in 2010 and 2011 than in 2014 and 2015.

Table 3

Observed and Expected Frequencies for H2

Device		Year			
		2010	2011	2014	2015
Laptop	Observed	966	620	2356	2999
	Expected	849.18	416.87	2512.15	6940.76
No Laptop	Observed	354	28	1549	1917
	Expected	470.82	231.12	1392.84	1753.44

The results of the χ^2 test that was conducted to test H3 indicated a statistically significant difference between the observed and expected values, χ^2 = 410.59, df = 3, p = .000. See Table 4 for the observed and expected frequencies. The observed frequency of students not reporting tablet access in 2010 (n = 1134) was higher than the expected frequency of students not reporting tablet access in 2010 (n = 816.90). The observed frequency of students not reporting tablet access in 2011 (n = 441) was higher than the expected frequency of students not reporting tablet access in 2011 (n = 401.02). The observed frequency of students reporting tablet access in 2014 (n = 1556) was higher than the expected frequency of students reporting tablet access in 2014 (n = 1488.32). The observed frequency of students reporting tablet access in 2015 (n = 2163) was higher

than the expected frequency of students reporting tablet access in 2015 ($n = 1873.64$).

The results of this analysis supported H3. There was a change in what high school

students reported about having access to their own tablet for doing schoolwork over time.

The proportion of students reporting access to their own tablet was higher in 2014 and

2015 than in 2010 and 2011. Although a difference was reported in 2011 and 2014, the

difference was potentially not large enough to be meaningful.

Table 4

Observed and Expected Frequencies for H3

Device		Year			
		2010	2011	2014	2015
Tablet	Observed	186	207	1556	2163
	Expected	503.09	246.97	1488.32	1873.64
No Tablet	Observed	1134	441	2349	2753
	Expected	816.90	401.02	2416.67	3042.35

RQ2. To what extent is there a change in high school students' perceptions of the

class format that best represents the majority of their classes over time (2014, and 2015)?

Data from one survey question was used to examine RQ2. The survey question

asked students to select from a list of classroom formats to identify which format they

believed best represented the majority of their classes. Three formats that appeared on

the 2014 and 2015 versions of the survey were identified as relevant: traditional, blended,

and flipped. The hypothesis for RQ2 is listed below followed by a description of the test

used for analysis of the hypothesis and the results of that test.

H4. There is a change in high school students' perceptions about the classroom

format that best represents the majority of their classes over time (2014, and 2015).

A chi-square test of independence was used to address *H4*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

The results of the χ^2 test that was conducted to test H4 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 65.32$, *df* = 3, *p* = .000. See Table 5 for the observed and expected frequencies. The observed frequency of students reporting the majority of their classes as having a traditional format in 2014 (*n* = 3124) was higher than the expected frequency of students reporting the majority of their classes as having a traditional format in 2014 (*n* = 2993.42). The observed frequency of students reporting the majority of their classes as having a blended format in 2015 (*n* = 1032) was higher than the expected frequency of students reporting the majority of their classes as having a blended format in 2015 (*n* = 891.89). The observed frequency of students reporting the majority of their classes as having a flipped format in 2015 (*n* = 147) was higher than the expected frequency of students reporting the majority of their classes as having a flipped format in 2015 (*n* = 141.56). The observed frequency of students reporting the majority of their classes as other in 2014 (*n* = 106) was higher than the expected frequency of students reporting the majority of their classes as other in 2014 (*n* = 90.66). The results of this analysis supported H4. There was a change in what high school students reported about the format of the majority of their classes over time. A traditional format was reported more in 2014 and a blended format was reported more in 2015. Although there were differences in what students reported about flipped and other, they were potentially not large enough to be meaningful.

Table 5

Observed and Expected Frequencies for H4

Variable Name		Years	
		2014	2015
Traditional	Observed	3124	3638
	Expected	2993.42	3768.42
Blended	Observed	568	1032
	Expected	708.47	891.89
Flipped	Observed	107	147
	Expected	112.44	141.56
Other	Observed	106	99
	Expected	90.66	114.14

RQ3. To what extent is there a change in what high school students report about

using their own digital device to complete schoolwork (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ3. The survey question

asked students to select from a list of possible uses for their digital device to complete

schoolwork. Three uses that appeared on the 2010, 2011, 2014, and 2015 versions of the

survey were identified as relevant: using online textbooks, taking online tests or quizzes,

and posting on blogs, classroom discussion boards, or wikis. The three hypotheses for

RQ3 are listed below followed by a description of the test used for analysis of each

hypothesis and the results for each of those tests.

H5. There is a change in what high school students report about using their own

digital device to access online textbooks over time (2010, 2011, 2014, and 2015).

H6. There is a change in what high school students report about using their own

digital device to complete online test or quizzes over time (2010, 2011, 2014, and 2015).

H7. There is a change in what high school students report about using their own digital device to post on blogs, classroom discussion boards, or wikis over time (2010, 2011, 2014, and 2015).

Three chi-square tests of independence were used to address *H5*, *H6*, and *H7*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

The results of the χ^2 test that was conducted to test H5 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 394.69$, $df = 3$, $p = .000$. See Table 6 for the observed and expected frequencies. The observed frequency of students not reporting accessing an online textbook in 2010 ($n = 508$) was higher than the expected frequency of students not reporting accessing an online textbook in 2010 ($n = 469.70$). The observed frequency of students not reporting accessing an online textbook in 2011 ($n = 251$) was higher than the expected frequency of students not reporting accessing an online textbook in 2011 ($n = 230.58$). The observed frequency of students not reporting accessing an online textbook in 2014 ($n = 1802$) was higher than the expected frequency of students not reporting accessing an online textbook in 2014 ($n = 1389.55$). The observed frequency of students reporting accessing an online textbook in 2015 ($n = 3638$) was higher than the expected frequency of students reporting accessing an online textbook in 2015 ($n = 3166.69$). The results of this analysis supported H5. There was a change in what high school students reported about accessing an online textbook over time. The proportion of students reporting accessing an online textbook was higher in 2015 than in 2010, 2011, and 2014. Although a difference was

reported in 2010 and 2011, the difference was potentially not large enough to be

meaningful.

Table 6

Observed and Expected Frequencies for H5

		Year			
Schoolwork		2010	2011	2014	2015
Online Textbook	Observed	812	397	2103	3638
	Expected	850.29	417.41	2515.44	3166.69
No Online Textbook	Observed	508	251	1802	1278
	Expected	469.70	230.58	1389.55	1749.31

The results of the χ^2 test that was conducted to test H6 indicated a statistically

significant difference between the observed and expected values, $\chi^2 = 84.16$, $df = 3$,

$p = .000$. See Table 7 for the observed and expected frequencies. The observed

frequency of students not reporting completing online tests in 2010 ($n = 795$) was higher

than the expected frequency of students not reporting completing online tests in 2010

($n = 674.195$). The observed frequency of students reporting completing online tests in

2011 ($n = 321$) was higher than the expected frequency of students reporting completing

online tests in 2011 ($n = 317.032$). The observed frequency of students not reporting

completing online tests in 2014 ($n = 2078$) was higher than the expected frequency of

students not reporting completing online tests in 2014 ($n = 1994.49$). The observed

frequency of students reporting completing online tests in 2015 ($n = 2605$) was higher

than the expected frequency of students reporting completing online tests in 2015

($n = 2405.14$). The results of this analysis supported H6. There was a change in what

high school students reported about completing online tests over time. The proportion of

students reporting completing online tests was higher in 2015 than in 2010, 2011, and 2014. Although a difference was reported in 2014, it was potentially not large enough to be meaningful.

Table 7

Observed and Expected Frequencies for H6

		Year			
Schoolwork		2010	2011	2014	2015
Online Tests	Observed	525	321	1827	2605
	Expected	645.805	317.032	1910.51	2405.14
No Online Tests	Observed	795	327	2078	2311
	Expected	674.195	330.968	1994.49	2510.86

The results of the χ^2 test that was conducted to test H7 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 121.38$, $df = 3$, $p = .000$. See Table 8 for the observed and expected frequencies. The observed frequency of students reporting not posting on blogs, classroom discussion boards, or wikis in 2010 ($n = 1064$) was higher than the expected frequency of students reporting not posting on blogs, classroom discussion boards, or wikis in 2010 ($n = 908.024$). The observed frequency of students reporting not posting on blogs, classroom discussion boards, or wikis in 2011 ($n = 489$) was higher than the expected frequency of students reporting not posting on blogs, classroom discussion boards, or wikis in 2011 ($n = 445.75$). The observed frequency of students reporting posting on blogs, classroom discussion boards, or wikis in 2014 ($n = 1330$) was higher than the expected frequency of students reporting posting on blogs, classroom discussion boards, or wikis in 2014

($n = 1218.76$). The observed frequency of students reporting posting on blogs, classroom discussion boards, or wikis in 2015 ($n = 1622$) was higher than the expected frequency of students reporting posting on blogs, classroom discussion boards, or wikis in 2015 ($n = 1534.3$). The results of this analysis supported H7. There was a change in what high school students reported about posting on blogs, classroom discussion boards, or wikis over time. The proportion of students reporting posting on blogs, classroom discussion boards, or wikis was higher in 2014 and 2015 than in 2010 and 2011. Although a difference was reported in 2011, it was potentially not large enough to be meaningful.

Table 8

Observed and Expected Frequencies for H7

		Year			
Schoolwork		2010	2011	2014	2015
Posting for Class	Observed	256	159	1330	1622
	Expected	411.97	202.24	1218.76	1534.3
Not Posting for Class	Observed	1064	489	2575	3294
	Expected	908.02	445.75	2686.24	3381.7

RQ4. To what extent is there a change in what high school students report about obstacles that prevent students from utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015)?

Data from one survey question was used to examine RQ4. The survey question asked students to select from a list of obstacles that would prevent them from utilizing their own digital device in the classroom. Three obstacles that appeared on the 2010, 2011, 2014, and 2015 versions of the survey were identified as relevant: building Internet

is slow or inconsistent, teachers lack an understanding of the technology, and the school blocks websites that would be helpful. The three hypotheses for RQ4 are listed below followed by a description of the test used for analysis of each hypothesis and the results for each of those tests.

H8. There is a change in what high school students report about slow or inconsistent Internet service being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

H9. There is a change in what high school students report about teachers' lack of understanding of the technology being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

H10. There is a change in what high school students report about schools blocking helpful websites being an obstacle to utilizing their own digital device in the classroom over time (2010, 2011, 2014, and 2015).

Three chi-square tests of independence were used to address *H8*, *H9*, and *H10*. The observed frequencies were compared to the frequencies expected by chance. The level of significance was set at .05.

The results of the χ^2 test that was conducted to test H8 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 2149.35$, $df = 3$, $p = .000$. See Table 9 for the observed and expected frequencies. The observed frequency of students not reporting slow or inconsistent Internet service as an obstacle in 2010 ($n = 1106$) was higher than the expected frequency of students not reporting slow or inconsistent Internet service as an obstacle in 2010 ($n = 563.49$). The observed frequency of students not reporting slow or inconsistent Internet service as an obstacle in 2011

($n = 538$) was higher than the expected frequency of students not reporting slow or inconsistent Internet service as an obstacle in 2011 ($n = 276.62$). The observed frequency of students not reporting slow or inconsistent Internet service as an obstacle in 2014 ($n = 1831$) was higher than the expected frequency of students not reporting slow or Inconsistent Internet service as an obstacle in 2014 ($n = 1666.99$). The observed frequency of students reporting slow or inconsistent Internet service as an obstacle in 2015 ($n = 3785$) was higher than the expected frequency of students reporting slow or inconsistent Internet service as an obstacle in 2015 ($n = 2817.42$). The results of this analysis supported H8. There was a change in what high school students reported about slow or inconsistent Internet service as an obstacle to utilizing their own digital device in the classroom over time. The proportion of students reporting slow or inconsistent Internet service as an obstacle was higher in 2015 than in 2010, 2011, and 2014. Although a difference was reported in 2014, it was potentially not large enough to be meaningful.

Table 9

Observed and Expected Frequencies for H8 (Slow or Inconsistent Internet)

		Year			
Obstacle		2010	2011	2014	2015
Slow Internet	Observed	214	110	2074	3785
	Expected	756.50	371.37	2238.00	2817.42
Internet not Slow	Observed	1106	538	1831	1131
	Expected	563.49	276.62	1666.99	2098.57

The results of the χ^2 test that was conducted to test H9 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 65.51$, $df = 3$,

$p = .000$. See Table 10 for the observed and expected frequencies. The observed frequency of students not reporting teachers' lack of understanding of the technology as an obstacle in 2010 ($n = 1107$) was higher than the expected frequency of students not reporting teachers' lack of understanding of the technology as an obstacle in 2010 ($n = 1012.44$). The observed frequency of students not reporting teachers' lack of understanding of the technology as an obstacle in 2011 ($n = 535$) was higher than the expected frequency of students not reporting teachers' lack of understanding of the technology as an obstacle in 2011 ($n = 497.01$). The observed frequency of students reporting teachers' lack of understanding of the technology as an obstacle in 2014 ($n = 1008$) was higher than the expected frequency of students reporting teachers' lack of understanding of the technology as an obstacle in 2014 ($n = 909.86$). The observed frequency of students reporting teachers' lack of understanding of the technology as an obstacle in 2015 ($n = 1180$) was higher than the expected frequency of students reporting teachers' lack of understanding of the technology as an obstacle in 2015 ($n = 1145.43$). The results of this analysis supported H9. There was a change in high school students reporting teachers' lack of understanding of the technology as an obstacle to utilizing their own digital device in the classroom over time. The proportion of students reporting teachers' lack of understanding of the technology as an obstacle was higher in 2014 and 2015 than between 2010 and 2011. Although a difference was reported in 2011, it was potentially not large enough to be meaningful.

Table 10

Observed and Expected Frequencies for H9 (Teacher Understanding of Technology)

		Year			
Obstacle		2010	2011	2014	2015
Does Not Understand	Observed	213	113	1008	1180
	Expected	307.56	150.98	909.86	1145.43
Understands	Observed	1107	535	2897	3736
	Expected	1012.44	497.01	2995.13	3770.57

The results of the χ^2 test that was conducted to test H10 indicated a statistically significant difference between the observed and expected values, $\chi^2 = 102.10$, $df = 3$, $p = .000$. See Table 11 for the observed and expected frequencies. The observed frequency of students not reporting schools blocking helpful websites being an obstacle in 2010 ($n = 611$) was higher than the expected frequency of students not reporting schools blocking helpful websites being an obstacle in 2010 ($n = 494.80$). The observed frequency of students not reporting schools blocking helpful websites being an obstacle in 2011 ($n = 286$) was higher than the expected frequency of students not reporting schools blocking helpful websites being an obstacle in 2011 ($n = 242.90$). The observed frequency of students not reporting schools blocking helpful websites being an obstacle in 2014 ($n = 1525$) was higher than the expected frequency of students not reporting schools blocking helpful websites being an obstacle in 2014 ($n = 1463.79$). The observed frequency of students reporting schools blocking helpful websites being an obstacle in 2015 ($n = 3294$) was higher than the expected frequency of students reporting schools blocking helpful websites being an obstacle in 2015 ($n = 3073.22$). The results of this analysis supported H10. There was a change in what high school students

reported about schools blocking helpful websites being an obstacle to utilizing their own

digital device in the classroom over time. The proportion of students reporting schools

blocking helpful websites being an obstacle was higher in 2015 than in 2010, 2011, and

2015. Although a difference was reported in 2011 and 2014, it was potentially not large

enough to be meaningful.

Table 11

Observed and Expected Frequencies for H10 (School Blocking Websites)

		Year			
Obstacle		2010	2011	2014	2015
Blocked Websites	Observed	709	362	2380	3294
	Expected	825.19	405.09	2441.20	3073.22
Websites	Observed	611	286	1525	1622
	Expected	494.80	242.90	1463.79	1842.77

Summary

Chapter four summarized the results of the statistical tests of the 10 hypotheses

that address the four research questions. Chapter four also created a framework for the

further analysis and recommendations contained in chapter five. Chapter five provides a

summary of the study including implications for action and recommendations for future

research.

Chapter Five

Interpretation and Recommendations

This study examined the impact of a BYOD technology initiative in District A, an affluent suburban school district in the Midwest. Perception data were gathered on the change over time in the access high school students have to their own digital device, the change over time in what high school students report about the classroom format for the majority of their classes, the change over time in what high school students report about the ways they use their digital devices to complete schoolwork, and the change over time in what high school students identify as obstacles to utilizing their technology in the classroom. Chapter five provides a summary of the study, reviews the major findings, connects the findings to the literature, and addresses implications and recommendations for future research.

Study Summary

The current study was focused on changes in technology use in District A, an affluent suburban school district in the Midwest. The literature review conducted as a part of this study identified a variety of issues that must be considered as educators continue to expand the role of technology in the classroom. These included student access to technology, the impact technology has on classroom format and classroom instruction, as well as its impact on how students utilize technology, and the obstacles faced by students attempting to utilize technology in the classroom. The research was conducted using archived survey data from District A. Four research questions and 10 hypotheses were created and statistical tests were conducted to measure the impact of the BYOD initiative.

Overview of the problem. As the use of technology in the classroom continues to expand, it is imperative educators look beyond just the technology teachers and students possess. Instead, educators must look critically at how teachers and students access and utilize the technology. It is only through this critical lens that educators can determine if the technology used in the classroom has actually transformed learning and is being used in a way that is preparing students to become contributing members of a technology-centered 21st century society.

Purpose statement and research questions. The purpose of this study was to measure the impact of a BYOD technology initiative in an affluent suburban school district. This impact was measured by examining the change over time in the access students have to technology, as well as the impact the technology has had on teaching and learning. The four research questions that guided the study were aligned with archived survey data provided by the district and included questions about student access to technology, classroom formats, how students utilize technology to complete their schoolwork, and obstacles to student use of technology in the classroom.

Review of the methodology. The data used for this study came from archived student survey data from surveys given to high school students in District A in 2010, 2011, 2014, and 2015. The population for this study was comprised of 14-18 year old students in affluent suburban high schools in the Midwest. The sample included all students in attendance on the day the surveys were administered who chose to complete the voluntary survey. The survey provided students the opportunity to provide feedback on their access to technology and the impact of technology in the classroom. The data

provided by the survey were used to conduct 10 hypothesis tests using chi-square tests for independence.

Major findings. Results from the hypothesis tests support all 10 of the hypotheses. Specifically, the proportion of high school students reporting access to smartphones was higher in 2014 and 2015 than in 2010 and 2011 and access to their own tablet was higher in 2015 than in 2010. On the other hand, the proportion of high school students reporting access to laptops was higher in 2010 and 2011 than in 2014 and 2015. The proportion of high school students reporting an increase in a traditional format for the majority of their classes was higher in 2014 and an increase in a blended format for the majority of their classes was higher in 2015. In addition, the proportion of high school students reporting an increase in the use of their digital device to access online textbooks was higher in 2015 than in 2014. The proportion of high school students reporting an increase in the use of their digital device to take online tests or quizzes was higher in 2015 than in 2010 and 2011. The proportion of high school students reporting an increase in the use of their digital device to post to classroom blogs, discussion boards, or wikis was higher in 2014 and 2015 than in 2010. The proportion of high school students reporting an increase in slow or inconsistent Internet service, as an obstacle to their use of technology in the classroom was higher in 2015 than in 2010 and 2014. The proportion of high school students reporting a lack of teacher understanding of how to utilize the technology as an obstacle was higher in 2014 and 2015 than in 2010. Finally, the proportion of high school students reporting an increase in the number of websites blocked by the school that high school students believe would be helpful for completing their schoolwork as an obstacle was higher in 2015 than in 2010. Other smaller

differences were noted in the results of hypothesis tests but were not large enough to be meaningful.

Findings Related to the Literature

The first major finding of this study supports the research that student access to their own digital device is increasing. The first research question focused on student access to their own digital device. The three hypothesis tests used to measure RQ1 identified smartphones, laptops and tablets as relevant to this study. This finding is consistent with the research summarized in the review of the literature. Several studies have found that student access to their own digital device has increased significantly in recent years. The shrinking access divide was noted in a study by van Dijk (2006) and figured prominently in the work of Norris and Soloway (2011) who described the current era as the "Age of Mobilism" characterized by connectedness, affordability, and globalness of technologies that supports the notion that the access divide is closing. Additional surveys by Anderson (2015) and Project Tomorrow (2014, 2015) have also shown a significant increase in student access to devices like smartphones, laptops, and tablets.

The second major finding of this study supports the research that classroom instruction is changing as a result of the expansion of technology use in the classroom. The second research question focused on classroom formats for high school students. Specifically, traditional, blended and flipped approaches were identified as relevant to this study. Several studies found that classroom instruction has evolved as a result of the increased access to technology in the classroom (Deloatchet al., 2014; Hackler, 2015; Mouza, 2008; Warschauer, 2000; Zhao et al., 2002). Recent surveys by Project

Tomorrow (2014, 2015) have shown an increase in the number of students that identified an increase in both a more blended approach to classroom instruction, as well as more flipped classrooms. In both cases, technology access has significantly impacted classroom instruction. The creation of tools like the SAMR Model have also placed a greater emphasis on the role of technology in classroom instruction (Puentedera, 2013). In addition, the LoTi framework created by Moersch (2015) has also allowed educators the opportunity to effectively evaluate the impact technology is having on classroom instruction.

The third major finding of this study supports the research that students are making greater use of technology in the classroom to support learning (Anderson, 2015; Corn et al., 2011; Fairbanks, 2014; Missouri Department of Education, 2014; Reinhart et al., 2011). The third research question focused on student use of technology to complete schoolwork. The three hypothesis tests identified accessing online textbooks, completing online tests or quizzes, and posting to classroom blogs, discussion boards, or wikis as relevant to this study. The increased use of technology in the classroom supports the findings of surveys conducted by Project Tomorrow (2014, 2015) that found significant increase in the number of students reporting using their digital device to access online textbooks, as well as using their technology to complete online tests or quizzes. These same surveys also found students reported using their technology to post to class blogs, discussion boards, or wikis. The ability of students to utilize technology in support of this type of learning supports the work of Saporano (2014) who identified increased student participation, and increased student collaboration and communication as possible benefits of a BYOD technology initiative.

The final major finding of this study supports the research that obstacles still exist that impact the ability of students to utilize technology in the classroom. The fourth research question focused on the obstacles that exist that prevent students from effectively utilizing technology in the classroom. The three hypothesis tests identified slow or inconsistent Internet service, lack of teacher knowledge about how to utilize the technology, and schools blocking websites students believe would be helpful for completing schoolwork. Several researchers identified a variety of significant barriers to the effective integration of technology into the classroom. These barriers include professional development, or more specifically, helping teachers understand how to use the technology they and their students have access to, infrastructure, and other issues (Corn et al., 2011; Deloatch et. al, 2014; Green, 2000; Groff & Mouza, 2008, Hackler, 2015; Swan et al., 2005). Additionally, the findings in this study support the notion that district administrators must take a proactive approach to recognizing and addressing potential barriers prior to implementation of any new technology initiative in order to maximize the potential impact of the initiative (Deloatch et al., 2014; Groff & Mouza, 2008; Hackler, 2015; Johnson, 2012; Swan et al., 2005).

Conclusions

The conclusion section of chapter five "is the summative statement of the researcher's findings" (Lunenburg & Irby, 2008, p. 240). This section will provide assertions made in response to the major findings and their relation to the theoretical framework of the study (Lunenburg & Irby, 2008). Specifically, this section will review the implications for action, the recommendations for future research, and provide the concluding remarks for the study.

Implications for action. The findings in this study indicate student access to their own digital device has changed between 2010 and 2015. This change supports the belief that implementation of a BYOD initiative is a viable option for district administrators hoping to make technology an important part of the instructional process without the cost of providing digital devices to students at district expense. The findings of this study also indicate student access to technology in the classroom has had a significant impact on classroom instruction. However, in order for technology to truly transform learning, district administrators must continue to provide ongoing professional development to teachers so that they can better understand and appreciate the dramatic impact technology can have on classroom instruction. The findings in this study indicate the ways high school students utilize technology in the classroom has changed significantly. It is imperative for educators to create meaningful opportunities for students to utilize technology in the classroom. By doing so, educators can engage students in a way public education has not seen before and truly begin the process of transforming learning. Finally, the findings in this study indicate high school students continue to face obstacles to effectively utilizing technology in the classroom. In order to address this issue, district administrators must partner with students and teachers to identify these obstacles and take the appropriate steps to mitigate their impact on technology usage. Failure to do so will serve to undermine the effective integration of technology in the classroom and turn technology into a determent.

Recommendations for future research. Researchers interested in conducting additional research in this area would be well served to expand the research to students in less affluent school districts. Additional research should also be conducted to analyze the

differences in how technology impacts learning in 1:1 school districts, in which schools provide all students access to technology, versus BYOD districts that rely on student access to their own digital device. Future research could also investigate the impact of technology on groups of students beyond just high school students. As the use of technology continues to expand, significant opportunities exist to measure its impact at the middle and even elementary levels. Finally, researchers could expand the study to include perception data from educators regarding the role of technology in the classroom.

Concluding remarks. This study examined the impact of a BYOD technology initiative in an affluent suburban school district. As district administrators continue to expand the use of technology in the classroom, it is the obligation of educators to do everything they can to maximize the tremendous potential technology has to transform student learning. A failure to recognize this obligation is a failure to recognize the importance of preparing students for life in a technology-driven 21st century society.

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Appendices

Appendix A: 2010 Speak Up Survey Questions

2010 Speak Up Student Survey
Grades 9 - 12

1 What grade are you in?

Grade 9
Grade 10
Grade 11
Grade 12
Ungraded GED program

2 Gender

Girl/Female
Boy/Male

3 Thinking about the other students in your class, do you consider yourself…

An advanced tech user – more expert than most of the students at my school
An average tech user – the same as most of the students at my school
A beginner – below the skills of most of the students at my school

4 What types of electronic devices do you have access to for your own use? (Check all that apply)

Cell phone (without Internet access)
Smartphone or cell phone (with Internet access, such as: Blackberry, iPhone, Droid)
Laptop computer
Desktop computer
Netbook or mini-notebook computer Tablet computer (such as iPad)
Digital reader (such as: Kindle, Sony Digital Reader)
Music or video device (such as: MP3 player,iPod or iPod Touch)
Handheld digital video camcorder (such as: Flip Camera)
Video Gaming System (such as: Xbox, Playstation, Wii)
Handheld game (such as: GameBoy, Nintendo DS)
Other

5 What kind of computer or Internet access do you have outside of school? (Select one)

A home computer with no Internet access
A home computer with dialup or slow Internet access
A home computer with fast Internet access (such as: DSL, Broadband, or cable)
Outside of school, I only use computers and the Internet at a location other than my home (such as: the public library, after school program or community recreation center, etc.)
My only access to computers or the Internet is at school

6 How do you use technology for schoolwork? (Check all that apply)

Access class information (such as: grades, teacher's notes or presentations, podcasts)
Communicate with other students (via email, IM, text or chat)
Communicate with teachers (via email, IM, text or chat)
Complete writing assignments
Conduct research
Conduct virtual experiments or simulations
Create slide shows, videos or web pages for an assignment
Get help from an online tutor
Listen to a podcast for a class Participate in online communities
Participate in videoconferences
Participate in 3D virtual reality worlds (such as: Second Life, Whyville)
Play educational games
Post to blogs or wikis
Take an online class
Take tests online
Turn in papers for plagiarism check (such as: TurnItIn)
Upload assignments and homework to school portal
Use my profile (MySpace, Facebook) to collaborate with classmates on a project
Use online textbooks or other online curriculum
Use Twitter to communicate or to follow others
Work on projects with students in other countries
None of the above

7 In which of your classes is technology regularly used to enhance or increase your learning?

English/Language Arts Math
Science
Foreign languages Social Studies/History Art
Music Health
Career Technical Education Physical Education
Technology is not used regularly in any of my classes to enhance or increase my learning. Other

8 Besides not having enough time in your school day, what are the major obstacles to using technology in your school? (Check all that apply)

Cannot access the Internet
Cannot access my personal email account or send email or IM to classmates
Cannot use my own laptop in school
Cannot use my own cell phone, smartphone or MP3 player
I don't have the skills I need
My assignments don't require using technology
My school has different computers or software than I am used to
Not enough computers or they don't often work
Software is not good enough
Teachers don't know how to use the technology
Teachers limit our technology use

The Internet is too slow
There are rules against using technology at my school
Websites that I need are blocked (through school filters or firewalls)
There are no obstacles to using technology at my school
Not a big deal. I rarely use the technology at my school
Other

9 How could your school make it easier for you to use technology for schoolwork? (Check all that apply)

Allow greater access to websites I need
Let me access the school network from home or school
Let me recharge my devices at school
Let me use my own cell phone, smartphone or MP3 player
Let me use my own laptop, or netbook (mini-notebook computer) during the school day
Provide access to an online tutor
Provide access to social networking sites (such as MySpace, Facebook)
Provide class work, assignments and resources online
Provide me a laptop or other mobile device that I can use at school
Provide me with unlimited Internet or Wi-Fi access throughout the school
Provide tools for me to organize my schoolwork
Provide tools to help me collaborate with my classmates on schoolwork
Provide tools for me to communicate with my classmates
Provide tools for me to communicate with my teacher(s)
Nothing - I like the way things are
Other

10 Which of these tools would you like to use to collaborate with other students on school projects or homework? (Check all that apply)

An online environment where I'm linked to my classmates and teacher via IM or text and know who is online
An online student directory for easy access to my classmates
Blogs or wikis Email
GOOGLE Apps (such as: docs, calendar, groups or video) IM or text messaging
Online chat
Online class
Social networking site (such as: Facebook or MySpace)
School Learning Management System (such as: Blackboard, Moodle, Angel)
School portal sites (such as Edline or Schoolloop)
Skype
Tagging (such as: del.icio.us, digg, diigo, reddit)
Webcams
I don't want to use technology to work with other students.
Other

11 In some schools, students use mobile devices (cell phones, smartphones, MP3 players,etc.) to help with schoolwork. If that was allowed at your school, how would you use a mobile device to help you with your schoolwork? (Check all that apply)

Access online textbooks
Access social networking sites (such as: Facebook, MySpace)
Access the school network from home or school
Check grades
Create or share documents, videos or podcasts
 Learn about school activities
Look up information on the Internet
Organize my schoolwork assignments Play educational games
Record teachers' lectures so that I can refer to them later
Send an email
Share information with other students
Take notes for class
Take videos of class presentations or experiments to study from later.
Text or IM someone to get help with schoolwork (such as teachers, students, parents or other family members)
Upload or download information from my teachers' website and/or the school's portal
Use language translator
Use speech recognition software Use the calendar
Use tools and applications to increase my productivity or organization
Work on projects with my classmates
None of the above
Other

12 In the past 12 months, how have you been involved in classes taught online? (Check all that apply)

I researched taking an online class
I took an online class for school that was led by a teacher
I took an online class for school that was a self-study class
I took a blended online class where I spent part of the time online and part of the time in a classroom
I took an online class for personal reasons (outside of school)
I have not taken an online class but I am interested
I am not interested in taking an online class

13 If you have taken an online class, you can skip this question. If you have not taken an online class, why not? (Check all that apply)

I have not found a class I am interested in
My school does not offer online classes
I do not know about the online classes offered at my school
I do not know how to find information about online classes outside of my school
No one at my school can help me find online classes to meet my needs
I do not know how to sign up for an online class

I cannot afford to pay for an online class
I am not sure this would be a good way to learn
I am not interested in taking an online class
I have taken an online class

14 What would be the most significant benefits to you of taking an online class? (Check all that apply)

Class could better fit my schedule
I could earn college credit
I would be in control of my learning
I would be more comfortable asking my teacher questions
I would be more motivated to learn
I would feel more connected to school
I would get extra help in a subject that is hard for me
I would graduate early
I would have a greater sense of independence
I would receive more attention from my teacher(s)
I would satisfy my school's graduation requirement by taking an online class
It would be easier for me to succeed
It would be easier to review class materials as many times as I want
It would be easier to share ideas with my classmates
My technology skills would improve
Take a class not offered at my school
To work at my own pace
I am not interested in taking an online class
I don't think there would be any benefits for me
I do not know
Other

15 Imagine that you can design a new kind of textbook that will be 100% online. What should be included in that new online textbook? (Check all that apply)

Ability to create podcasts or videos
Ability to download information to my cell phone
Ability to make electronic highlights or notes
Ability to print from the online textbook
Ability to search through the textbook by key terms or events
Access to 3D content
Animations and simulations that explain concepts
Brain teasers or advanced topics to extend my learning Calculator
Chat room with video capability
Dictionary
Email tools
Games to explore concepts or ideas
I am learning
Information about careers that use the academic subject of the textbook
Links to real-time data (such as: population, weather, NASA, earthquakes, Google Earth, etc)

Links to useful websites
Mobile applications Online tutors
Podcasts from subject experts
Podcasts from my teacher about the subject matter
PowerPoint presentations of lectures
Problems and experiments to conduct virtually or in real life
Quizzes and tests that I can take myself
Self-paced tutorials
Take an online class
Tools to help me collaborate or share information with my classmates (such as: blogs, social networking sites, wikis, bookmarking)
Tools to help me develop my writing skills
Tools to help me organize my schoolwork (communications, organize my assignments, take notes)
Tools that show me where I need to improve
Video clips about topics I'm studying
Virtual labs
Virtual notebook
Virtual reader that could read the text aloud
Webcams or video conferencing capabilities
I don't think online textbooks are a good idea for me
Other

16 What would make learning science more interesting, engaging and relevant for you? (Check all that apply)

Conducting real research on topics that I am most interested in
Creating multi-media presentations of my scientific findings
Having experts come and speak to our class about science careers
Learning from a teacher who is excited about science
Practicing what I have learned using interactive simulations
Reading the science textbook
Understanding why science is relevant to my life
Using animations to help me visualize difficult concepts
Using data collection, measurement and analysis tools
Using online databases to do research
Using standard lab tools to conduct scientific investigations
Using technology based tools to conduct scientific investigations
Using visualizing software to help me organize ideas
Working with other students on projects
Other

17 Internationally there is tremendous interest in having more students pursue careers in science, technology, math or engineering. Right now, are you interested in a job or career in any of these fields?

No, those subjects are too hard for me
No, my strengths are in other areas

No, my parents say that other jobs are better
No, those subjects are not interesting to me
Maybe, I would like to know more about those jobs or careers
Yes, I am somewhat interested in a job or career in those fields
Yes, I am very interested in a job or career in those fields
Other

18 Which of the following would help increase your interest in a career you might be thinking about? (Check all that apply)

Have a summer or part-time job or internship in my field of interest
Have a program at school about future careers
Learn about careers through "Day in the Life" podcasts or videos
Learn about the job through volunteer opportunities
Learn from teachers who have worked in the professional field I'm interested in
Let career professionals teach lessons at school
Meet successful role models
Participate in career exploration programs after school
Participate in career exploration programs during the summer
Participate in competitions that allow me to assess my skills against other students
Participate in virtual tours of companies
Provide access to websites with information about careers
Receive scholarships to college
Take a career technical education class at school to learn about careers
Take a field trip to visit companies
Take a self-assessment test to identify my career interests or strengths
Take an online class where I learn about careers
Talk to career professionals about their jobs
Use a mobile application to explore careers
Use the same tools in my classroom that professionals use at work
Work with mentors who can help me with my college & career planning
Other

19 Which of these Internet based tools or applications do you use outside of school? (Check all that apply)

Communicate with others through email, IM or text message
Communicate with others through discussion boards, social networking sites, chat or online communities
Contribute to a wiki (such as: Wikipedia)
Create new work using pre-existing text, graphics, audio, video or animation (MashUp)
Participate in 3D virtual reality worlds (such as: Second Life, Whyville)
Participate in online games
Update my profile (such as: MySpace, Facebook)
Upload or download videos, podcasts or photos to/from the Internet
Use web tools to create a list of resources I want to share or remember (such as: del.icio.us, digg, diigo,reddit)

Use web tools for writing collaboratively with others (such as: GOOGLE docs, writeboard or letterpop)
Use web tools to create or modify videos, music, audio or animation
Use web tools (such as: GOOGLE reader) to notify me about things I'm interested in (such as news or magazine articles, or changes to websites)
Write or contribute to a blog (my own or someone else's)
None of the above

20 Which of these information and media literacy skills are most important to be successful in the 21st century? (Check all that apply)

Ability to identify a research question
Ability to identify information sources and how to locate resources
Ability to organize information
Ability to prepare written or verbal reports of research
Ability to produce blogs, vlogs, podcasts, digital storytelling, or video reports
Know how to analyze and interpret stories, commercials, or ads in the media (TV, magazines, newspapers, blogs etc)
Know how to detect bias, censorship or propaganda in resources
Know how to evaluate my own work to improve my effectiveness
Know how to summarize research
Know how to use technology and digital content responsibility.
Understand how to evaluate the relevance, authenticity, and credibility of resources
None of the above
Other
Know how to evaluate the quality of online courses or digital content

21 What is the best way for you to learn about digital citizenship and being safe on the Internet? (Select one)

By using technology as part of my regular class
From a teacher
From my friends
From my parents or other family members Learn on my own just by using technology Learn through a special class at my school
Learn through activities at school (Internet safety assembly, presentations, guest speakers)
Learn through activities I have participated in outside of school (such as an afterschool program, church, library, club)
Learning from my own (or other's) mistakes
Listen to podcasts or watch videos about Internet safety
Take an online class
Other

22 If you had to write a research paper or report about a topic that you knew little or nothing about, what would you do first? (Select one)

Ask a friend for help
Ask a family member for help

Ask a tutor or after school club leader for help
Ask my teacher for help
Ask the librarian for help Check my teacher's webpage
Enter my research topic in a search engine (e.g. Google, Bing, Yahoo etc)
Find a book in the library
Go to a website with original source material (e.g. Library of Congress, museums)
Go to Wikipedia to find basic information
Look in my textbooks for information
Post a question on my social networking site (e.g. MySpace, Facebook) about the topic
Search online databases or resource portals provided by my school
Use Twitter to post a message asking for help Visit a social bookmarking site
Visit a website recognized for its expertise in the topic (such as: NASA, National Geographic Society)
Visit an online university library
Visit media sites (such as: newspapers, magazines, television)
Other

23 In the past year, which of these things have you done on your own (not teacher directed, not homework) to improve your education? (Check all that apply)

Created my own video or podcast to help me share my knowledge with others
Found a tutor online
Found a website that helped me better understand a topic we were studying in class
Found experts online who could answer my questions
Found information on the Internet
Listened to podcasts or watched videos about a topic I was interested in
Posted to a blog
Sought help from other students through my social networking site
Started a wiki or blog to share my ideas and connect with others
Took a self-paced tutorial on a subject
Took an online class
Took an online test or assessment
Took part in an online game or simulation Tutored other students who needed help
Used cell phone applications to help with my self-organization
Used online writing tools to improve my own writing
Used Twitter to send a tweet about something I was studying
Wrote and submitted stories or original writings to an online site
None of the above
Other

24 Which of these statements do you agree with? (Check all that apply)

Homework helps me practice what I have learned I am having problems with my schoolwork
I am interested in what I'm learning in school
I am motivated to do well in school because I like school
I am motivated to do well in school because I want to please my teachers or parents
I am succeeding academically
I believe my school cares about me as a person

I do not feel safe at school
I don't like school
I feel I am prepared to succeed in school
I feel safe at school
I have too much freedom in my classes
I know how to be safe and protect myself when I am online
I know what subjects I need to do more studying in to be successful
I wish my classes were more interesting
My parents are very involved in my education
My test scores don't match what I know
Teachers or my parents expect me to do well in school
There is at least one adult at school that I can talk to about school or personal problems

25 Which of these have been problems for kids at your school? (Choose any that apply)

Approached by strangers online
Being harassed online with hurtful texts or photos
Seeing websites with inappropriate content
Sharing too much personal information online
Spending too much time online
Students using others' ideas as their own (plagiarism)
Sharing suggestive texts or photos
Strangers asking to meet in person
Students' mobile devices have been stolen
Students using mobile devices to cheat
None of the above
Other

26 Imagine you are designing the ultimate school. Which of these tools would have the greatest positive impact on your learning? (Check all that apply)

Ability to access the Internet anywhere at school
Ability to use my own mobile devices
Chat rooms to discuss topics with students while in class
Collaboration tools (such as: blogs, social networking sites, wikis, bookmarking)
Computer projection devices
Digital media tools (video, audio)
Digital reader (such as: Kindle, Sony Digital Reader)
Digital content (such as: databases, electronic books, animations, videos etc)
Document camera (such as: ELMO)
Electronic portfolios for students
Email tools
Handheld digital video camcorder (Flip Camera)
Games or virtual simulations
Handheld student response systems Instant messaging or text messaging tools
Interactive whiteboards (such as: Smartboard, Polyvision)
Learning management systems (such as: Blackboard, Moodle, Angel)
Mobile computer for every student (such as: laptop, mini-notebook)

Mobile devices (such as: cell phones, MP3 players, iPods)
Online classes
Online textbooks
Online tutors
School website or portal Simulations
Software customized to my learning needs Tablet PC (such as iPad)
Tools to help me organize my work (such as: organize my assignments, take notes, organize my ideas)
Video conferences and webinars
Virtual or online whiteboard
Virtual reality games or environments Webcam
Wireless microphone system for the teacher
Other

27 How would you like to be more involved in education decisions at your school? (Check all that apply)

Be a student representative on my local school board
Be part of a club that researches problems and proposes ideas
Be part of a student advisory council for the principal
Do a presentation to the school board or parent group Give input through surveys like this
Have class discussions
Let students vote on decisions that affect us
Set up a school blog or wiki to share ideas
Share ideas online with other students at other schools
Submit suggestions to the school board or principal for review
Talk to the superintendent about issues that are important to students
I would be more involved if our teachers and administrators considered our ideas
I am not interested in being more involved in this at my school
Other

28 How much do you agree with this statement: My school is doing a good job of using technology to enhance my learning? (Select one)

Strongly agree
Agree
Disagree
Strongly disagree
No opinion
I don't know

29 Imagine that you have been given the job to design a new application for a smartphone or iPad to help students learn more or be better organized with their schoolwork. Tell us about your "mobile app" – what problem would it solve, what would it do, how would it help students just like you. Be creative! Who knows? Your ideas may influence real product development!

30 Technology has changed the way people communicate, shop, play games, make friends and follow sports. And it is starting to change the way kids learn, both in school and out of school. As you look into the future, do you think school will be different five years from now because of new technologies? What will "going to school" mean in 2015? Will the way you learn be different? What about the role of your teacher – will that be different too?

Appendix B: 2011 Speak Up Survey Questions

2011 Speak Up Student Survey
Grades 9-12

1.) What grade are you in?

☐ Grade 9
☐ Grade 10
☐ Grade 11
☐ Alternative program or other

2.) Gender

☐ Girl/Female
☐ Boy/Male

3.) Thinking about the other students in your class, do you consider yourself…

☐ An advanced tech user – more expert than most of the students at my school
☐ An average tech user – the same as most of the students at my school
☐ A beginner – below the skills of most of the students at my school

4.) What types of electronic devices do you have access to for your own use? (Check all that apply)

☐ Cell phone (without Internet access)
☐ Smartphone (with Internet access such as: Blackberry, Droid, iPhone)
☐ Computer that is provided to me by my school
☐ Home computer or laptop
☐ Tablet computer (such as iPad)
☐ Digital reader (such as: Kindle, Nook)
☐ Music or video device (such as: MP3 player,iPod or iPod Touch)
☐ Handheld game (such as: GameBoy, Nintendo DS)
☐ Video Gaming System (such as: Xbox, Playstation, Wii)
☐ Other

5.) When you are outside of school, what access do you have to the Internet?

☐ My home computer has slow or dialup Internet access
☐ My home computer has fast Internet access (such as: DSL, Broadband, or cable)
☐ I access the Internet through a Wifi or 3G/4G mobile device
☐ I access the Internet at home through a mobile computer or tablet that was provided to me by my school
☐ My access to the Internet is through computers at the public library, after school program or community recreation center
☐ My only access to the Internet is at school

6.) How do you use technology for schoolwork? (Check all that apply)

☐ Access online databases or real time data such as from maps
☐ Communicate with other students via email, IM, text messaging
☐ Communicate with other students via video conference, webcam or skype
☐ Communicate with teachers via email, IM or text messaging
☐ Complete writing assignments
☐ Conduct Internet research
☐ Conduct virtual experiments or simulations
☐ Create slide shows, videos or web pages for an assignment
☐ Get help from an online tutor
☐ Listen to a podcast for a class
☐ Play educational games
☐ Post to blogs or wikis
☐ Record or video a teacher lecture or lab
☐ Take tests online
☐ Turn in papers for plagiarism check (such as: TurnItIn)
☐ Upload assignments and homework to school portal
☐ Use mobile applications to keep organized
☐ Use my social networking site (such as Facebook) to collaborate with classmates on a project
☐ Use online textbooks or other online curriculum
☐ Use Twitter to communicate or to follow others
☐ Other

7.) In the future, some schools may be required to implement online tests in place of paper-based standardized tests. How comfortable are you with the idea of having your academic achievement measured through an online test?

☐ Very comfortable
☐ Somewhat comfortable
☐ No opinion
☐ Somewhat uncomfortable
☐ Very uncomfortable

8.) Besides not having enough time in your school day, what are the major obstacles to using technology in your school? (Check all that apply)

☐ Cannot access Facebook or other social networking sites
☐ Cannot communicate with classmates using email, text or IM
☐ Cannot use my own cell phone, smartphone, tablet computer or MP3 player
☐ Cannot use my own laptop in school
☐ My assignments don't require using technology
☐ Not enough computers or they don't often work
☐ Teachers don't know how to use the technology

☐ Teachers limit our technology use
☐ The Internet is too slow
☐ There are too many rules against using technology at my school
☐ Websites that I need are blocked (through school filters or firewalls)
☐ Not a big deal. I rarely use the technology at my school
☐ Other

9.) How could your school make it easier for you to use technology for schoolwork? (Check all that apply)

☐ Allow greater access to websites I need
☐ Let me access the school network from home or school
☐ Let me recharge my devices at school
☐ Let me use my own cell phone, tablet computer, smartphone or MP3 player
☐ Let me use my own laptop or netbook during the school day
☐ Provide 24/7 access to my teachers
☐ Provide access to an online tutor
☐ Provide access to social networking sites (such as Facebook)
☐ Provide class work, assignments and resources online
☐ Provide me a laptop or other mobile device that I can use at school
☐ Provide me with unlimited Internet or Wi-Fi access throughout the school
☐ Provide tools for me to communicate with my classmates
☐ Provide tools for me to communicate with my teacher(s)
☐ Provide tools for me to organize my schoolwork
☐ Provide tools to help me collaborate with my classmates on schoolwork
☐ Nothing - I like the way things are
☐ Other

10.) How much do you agree with this statement: My school is doing a good job of using technology to enhance my learning. (Select one)

☐ Strongly agree
☐ Agree
☐ Disagree
☐ Strongly disagree
☐ No opinion
☐ I don't know

11.) Many schools are exploring how to leverage mobile devices such as smartphones and tablet computers (iPads) to improve student achievement. How would you like to use a mobile device to help you with your schoolwork? (Check all that apply)

☐ Access online textbooks
☐ Access social networking sites (such as Facebook)
☐ Access the school network from home or school

☐ Check grades
☐ Communicate with classmates and teachers
☐ Create or share documents, videos or podcasts
☐ Learn about school activities
☐ Look up information on the Internet
☐ Organize my schoolwork assignments
☐ Play educational games
☐ Receive reminders and alerts about upcoming tests or assignment due dates
☐ Record or video lectures or labs so that I can review them later
☐ Take notes for class
☐ Upload or download information from my teachers' website and/or the school's portal
☐ Use mobile apps to make me more productive
☐ Use the calendar
☐ Work on projects with my classmates
☐ Write papers or do homework assignments
☐ Other

12.) What has been your experience with taking an online class where the instruction and content was delivered primarily over the Internet?

☐ I am in an online school where all of my classes are delivered over the Internet
☐ I have taken at least one self-study online class for school credit in addition to taking traditional classes in school
☐ I have taken at least one teacher-led online class for school credit in addition to taking traditional classes in school
☐ I have taken at least one online class on my own to pursue my own interests
☐ I have not taken an online class but would be interested in doing so
☐ I am not interested in taking an online class

13.) What would be the most significant benefits to you of taking an online class? (Check all that apply)

☐ Class could better fit my schedule
☐ I could earn college credit
☐ I would be in control of my learning
☐ I would be more comfortable asking my teacher questions
☐ I would be more motivated to learn
☐ I would feel more connected to school
☐ I would get extra help in a subject that is hard for me
☐ I would graduate early
☐ I would have a greater sense of independence
☐ I would receive more attention from my teacher(s)
☐ It would be easier for me to succeed
☐ It would be easier to review class materials as many times as I want
☐ It would be easier to share ideas with my classmates

☐ My technology skills would improve
☐ Take a class not offered at my school
☐ To work at my own pace
☐ I am not interested in taking an online class
☐ I do not know
☐ Other

14.) In what subject would you be most interested in taking an online class?

☐ English/Language Arts
☐ Science
☐ Math
☐ Statistics
☐ History/Social Studies
☐ Computer Science
☐ Art History
☐ Health
☐ Foreign Language
☐ Career training
☐ I am not interested in taking an online class
☐ Other

15.) Some schools now require students to take at least one online class as part of their education. Do you agree or disagree with this policy?

☐ Strongly agree
☐ Agree
☐ Disagree
☐ Strongly disagree
☐ No opinion

16.) Thinking about one of your math or science classes this year, which of these best describes that class?

☐ Traditional class with teacher lectures and textbook assignments
☐ Traditional class with teacher lectures, textbook assignments and group projects and/or labs
☐ Traditional class where teacher uses technology tools such as interactive white boards, PowerPoint presentations and projectors to support instruction
☐ Traditional class where teacher and students regularly use digital content, virtual labs, simulations and animations within instruction
☐ Traditional class where students direct their own learning through the use of laptops, mobile devices and social media tools
☐ Blended class where some class periods are spent in a traditional format and others involve self-paced online instruction

☐ Online class in a special lab at school with Internet-based lessons and onsite teacher
☐ Online class taken in a special lab at school with Internet-based lessons and remote online teacher
☐ Online class taken at home with Internet-based lessons and an online teacher
☐ Online class taken at home with self-study Internet-based lessons
☐ I am not taking a math or science class this year
☐ Other

17.) Now, imagine your ultimate math classroom. Which of these would be most effective in helping you be more successful in that class?

☐ Being able to text or email my teacher with my questions
☐ Collaborating with my classmates on problem solving tasks
☐ Having access to an online math tutor
☐ Learning from a teacher who I feel a connection with
☐ Learning from a teacher who is excited about math
☐ Learning math by solving real-world problems
☐ Playing online or computer based math games
☐ Practicing problems from my textbook
☐ Taking an online math class
☐ Understanding the context of math through a virtual reality environment
☐ Using a class blog or wiki to share ideas with my classmates
☐ Using a mobile device to video math lessons to review later
☐ Using an online textbook that I can access through a mobile device
☐ Using animations or simulations to help me visualize difficult math concepts
☐ Using real time data to understand the context for math
☐ None of the above
☐ Other

18.) Internationally there is tremendous interest in having more students pursue careers in science, technology, math or engineering. Right now, are you interested in a job or career in any of these fields?

☐ No, those subjects are too hard for me
☐ No, my strengths are in other areas
☐ No, my parents say that other jobs are better
☐ No, those subjects are not interesting to me
☐ Maybe, I would like to know more about those jobs or careers
☐ Yes, I am somewhat interested in a job or career in those fields
☐ Yes, I am very interested in a job or career in those fields

19.) Our national leaders would also like to have more students pursue careers in teaching. Right now, are you interested in a job or career in teaching or a related education field?

☐ No, my strengths are in other areas
☐ No, my parents say that other jobs are better
☐ No, teaching does not interest me
☐ Maybe, I would like to know more about the different kinds of jobs or careers in teaching
☐ Yes, I am somewhat interested in a job or career in teaching
☐ Yes, I am very interested in a job or career in teaching

20.) Which of the following would help increase your interest in a career you might be thinking about? (Check all that apply)

☐ Have a program at school about future careers
☐ Have a summer or part-time job or internship in my field of interest
☐ Learn about careers through "Day in the Life" podcasts or videos
☐ Learn about the job through volunteer opportunities
☐ Learn from teachers who have worked in the professional field I'm interested in
☐ Let career professionals teach lessons at school
☐ Participate in career exploration programs after school
☐ Participate in career exploration programs during the summer
☐ Participate in competitions that allow me to assess my skills against other students
☐ Participate in virtual tours of companies
☐ Provide access to websites with information about careers
☐ Take a career technical education class at school to learn about careers
☐ Take a field trip to visit companies and meet successful role models
☐ Take a self-assessment test to identify my career interests or strengths
☐ Use a mobile application to explore careers
☐ Use the same tools in my classroom that professionals use at work
☐ Work with mentors who can help me with my college and career planning
☐ Other

21.) Which of these social based media tools or applications do you use outside of school? (check all that apply)

☐ Communicate with others through discussion boards, social networking sites, chat or online communities
☐ Communicate with others through email, IM or text message
☐ Contribute to a wiki
☐ Create videos to post and share with others
☐ Participate in 3D virtual reality worlds (such as: Second Life, Whyville)
☐ Participate in online games
☐ Update my social networking profile (such as Facebook)
☐ Upload or download videos, podcasts or photos to/from the Internet
☐ Use web tools for writing collaboratively with others (such as: GOOGLE docs, writeboard or letterpop)

☐ Use web tools to create a list of resources I want to share or remember (such as: delicious, digg, diigo,reddit)
☐ Use web tools to notify me about things I'm interested in (such as news or magazine articles, or changes to websites)
☐ Write or contribute to a blog (my own or someone else's)
☐ None of the above
☐ Other

22.) How do you define success with your schoolwork?

☐ Achieving your personal learning goals
☐ Being looked up to by your classmates
☐ Class rank
☐ Development of critical thinking and problem solving skills
☐ Getting a good job after graduation
☐ Getting into a good college
☐ Getting special privileges
☐ Good grades
☐ Knowing more than others about a subject that interests you
☐ Learning more than you thought you would
☐ Your parents or family are proud of you
☐ School honors or recognitions
☐ Self - satisfaction of working hard and trying your best
☐ Other

23.) How much do you agree with this statement: I prefer to do the majority of my reading for my schoolwork online rather than reading from a printed page of text.

☐ Strongly agree
☐ Agree
☐ Disagree
☐ Strongly disagree
☐ No opinion
☐ Not sure

24.) Thinking about reading to support homework and class assignments, which of these statements are true for you?

☐ I read longer when I am reading a printed book or article
☐ I prefer to read short articles online
☐ It is better for me to print long or complex articles to read
☐ I would rather study for a test using printed materials
☐ I remember more when I read from a printed text
☐ I feel like I am making a contribution to protecting the environment when I read online
☐ Reading online is a better fit for my learning style

☐ Reading a printed text is a better fit for my learning style
☐ Too much online reading creates eyestrain for me
☐ I get easily distracted when reading an online article
☐ I like that I can easily search terms or words when I am reading an online article
☐ I prefer to use a printed text because it is easier to make notes on the page
☐ I think you need to learn different skills to effectively comprehend information from an online article

25.) In the past year, which of these things have you done on your own (not teacher directed) to improve your education? (Check all that apply)

☐ Created my own video or podcast to help me share my knowledge with others
☐ Found a tutor online
☐ Found information online that helped me better understand a topic we were studying in class
☐ Found experts online who could answer my questions
☐ Listened to a podcast about a topic I was interested in
☐ Posted to a blog or wiki
☐ Sought help from other students through my social networking site
☐ Took a self-paced tutorial on a subject
☐ Took an online class
☐ Took an online test or assessment
☐ Tutored other students who needed help
☐ Used mobile applications to help with my self-organization
☐ Used online writing tools to improve my own writing
☐ Used Twitter to send a tweet about something I was studying
☐ Watched a video to learn something or to help me with my homework
☐ None of the above
☐ Other

26.) Which of these statements do you agree with? (Check all that apply)

☐ Homework helps me practice what I have learned
☐ I am having problems with my schoolwork
☐ I am interested in what I'm learning in school
☐ I am motivated to do well in school because I like school
☐ I am motivated to do well in school because I want to please my teachers or parents
☐ I am succeeding academically
☐ I am worried about my future
☐ I believe my school cares about me as a person
☐ I don't like school
☐ I feel I am prepared to succeed in school
☐ I feel safe at school
☐ I know how to be safe and protect myself when I am online
☐ I know what subjects I need to do more studying in to be successful

☐ I wish my classes were more interesting
☐ My parents are very involved in my education
☐ My test scores don't match what I know
☐ Teachers or my parents expect me to do well in school
☐ There is at least one adult at school that I can talk to about school or personal problems

27.) Which of these have been problems for kids at your school? (Choose any that apply)

☐ Approached by strangers online
☐ Being harassed online with hurtful texts or photos
☐ Seeing websites with inappropriate content
☐ Sharing suggestive texts or photos
☐ Sharing too much personal information online
☐ Spending too much time online
☐ Strangers asking to meet in person
☐ Students' mobile devices have been stolen
☐ Students using mobile devices to cheat
☐ Students using others' ideas as their own (plagiarism)
☐ None of the above
☐ Other

28.) Imagine you are designing the ultimate school. Which of these tools would have the greatest positive impact on your learning? (Check all that apply)

☐ Ability to access the Internet anywhere at school
☐ Ability to use my own mobile devices
☐ Adaptive learning software which adjusts levels of difficulty and content to address your needs
☐ Chat rooms to discuss topics with students while in class
☐ Collaboration tools (such as: blogs, social networking sites, wikis, bookmarking)
☐ Computer for every student to use at school (such as: laptop, netbook)
☐ Digital content (such as: databases, electronic books, animations, videos etc)
☐ Digital media creation tools (video, audio)
☐ Digital reader (such as: Kindle, Nook)
☐ Electronic portfolios for students
☐ Games or virtual simulations
☐ Handheld student response systems
☐ High speed color printers
☐ Instant messaging or text messaging tools
☐ Interactive whiteboards (such as: Smartboard, Polyvision)
☐ Learning management systems (such as: Blackboard, Moodle, Angel)
☐ Mobile devices such as smartphones and MP3 players
☐ Online classes
☐ Online tests and assessments

☐ Online textbooks
☐ Online tutors
☐ School website or portal
☐ Tablet computer (such as iPad)
☐ Tools to help me organize my work (such as: organize my assignments, take notes, organize my ideas)
☐ Video conferences and webinars
☐ Virtual or online whiteboard
☐ Virtual reality games or environments
☐ Other

Open Ended:

29.) Pretend that you are "Principal for the Day" at your school. Your #1 goal as Principal is to make sure every student feels that they are an important member of your school community and that they are well prepared for going to college or getting a good job. How would you use technology tools including social media to accomplish this goal? What new technology would your school need? How would students and teachers use these new tools? Remember - you are in charge now and your classmates are counting on you!

30.) The skills students are learning through experiences with the arts, in all of its different forms, are in high demand by employers – creative thinking, self-discipline, collaboration and innovation. How can technology/social media tools and applications help you develop your creativity skills? What kinds of artistic content, products or work are you already creating or producing (in school and out of school) that would not be possible without technology tools? How would you like to use more technology to explore different kinds of artistic experiences (music, dance, visual art, writing, film etc.)? What types of technology should be available in your school to help you develop those important creativity skills? Be creative – share your ideas with us!

Appendix C: 2014 Speak Up Survey Questions

2014 Speak Up Student Survey

Grades 9-12

1.) What grade are you in?

Grade 9

Grade 10

Grade 11

Grade 12

Alternative program or other

2.) Gender

Girl

Boy

3.) How would you rate your technology skills compared to other students in your class?

Advanced – I know more than others

Average - I know about the same as others

Beginner - I am still learning how to use technology

4.) What class format best represents the majority of your classes this year?

Traditional classroom - teacher and students together is a physical classroom

Blended learning class where part of the time I am in an online learning environment and other times I am in a traditional face-to-face class away from home (like a school)

Flipped class where students watch/listen to lectures or lessons at home and then use class time to do projects and get homework help

Virtual class where my learning is done fully online

Other

5.) Which of these things do you regularly do using technology for schoolwork? (Check all that apply)

Use a school portal for information like grades or to upload homework

Post to class blogs or class discussion board

Use online textbooks

Take tests or quizzes online

Use educational mobile apps (like graphing calculator, language translator, vocabulary lists)

Use Internet-based services (like Google drive, Dropbox, Turnitin.com)

Create presentations

Take photos of school assignments or textbook pages

Text message other students for class or homework help

Text message my teacher with class or homework related questions

Use email to communicate with my teachers

Use my social networking sites to collaborate with classmates on a project (like Facebook, Twitter)

Find online video lessons to help with homework/studying (like YouTube, Kahn Academy)

Watch an online video created by my teacher

Listen to an audio recording or audio book

Use digital study games (like Quizlet, Coolmath.com)

Post content I create online (like writings, videos, artwork)

6.) What obstacles do you face using technology at your school? (Check all that apply)

Cannot use the school Internet with my mobile device

Not allowed to go on social media (like Twitter or Facebook)

Not allowed to text message with classmates

Not allowed to use any of my mobile devices on campus

Not enough computers or they don't often work

I cannot get online when I am at school

Websites that I need for schoolwork are blocked (through school filters or firewalls)

Internet speed is too slow

Teachers don't know how to use the technology

Teachers limit our technology use

Too many rules against using technology

Too much fear about the dangers of the Internet

Concerns about how my school is protecting my personal data

Technology is not needed to complete my assignments

I rarely use technology at my school

No obstacles

7.) How often do school filters or firewalls block you from using websites that you want to use for schoolwork assignments or projects?

Likert Scale: Frequency

Never

Rarely

Sometimes

Often

All of the time

8.) Which of these mobile devices do you have for your own use (but not provided to you by your school)? (Check all that apply)

A phone with no internet

A Smartphone with internet (like iPhone, Samsung Galaxy)

Laptop

2-in-1 laptop (a laptop that can turn into a tablet)

Web-based laptop (like a Chromebook)

Tablet (like an iPad)

Digital reader (like Kindle or Nook)

9.) What kind of Internet access do you have at home? (Check all that apply)

A slow Internet connection (like dialup through a landline)

A fast Internet connection (like DSL, Broadband, or cable)

A Wi-Fi connection

A mobile data plan (like 3G/4G/LTE)

No home access. I use free internet (like the public library, after school program or wifi hotspot)

10.) Imagine that you were going to design the ideal mobile app for your class or school. What types of features or functionality should your mobile app have? (Check all that apply)

Interactive school calendar

Class schedule organizer

Sports schedules and scores

School information (like contact information, student handbook)

School newsfeed

Emergency alerts (like school closures)

Notifications (like upcoming tests or due dates)

Student portal to access grades and assignments

Interactive forms for parents (report absences, permission slips)

Parent portal (PTA information)

School payment system

Lunch menus

Ability to connect with teachers

Class group messages

Tip line to report concerns (like bullying, cheating)

Mental health/crisis hotline

Links to school social media accounts

Study games or apps

Photo gallery

Book list

Other

11.) How important do you think it is for every student to be able to use a mobile device like a laptop, tablet or Chromebook during the school day to support schoolwork?

Likert Scale: Importance

Very unimportant

Unimportant

Neither important nor unimportant

Important

Very important

12.) Which of these are true for you most of the time when you are at school? (Check all that apply)

I use my own mobile device in class to help with schoolwork

I use a laptop in class that is provided by my school

I use a tablet in class that is provided by my school

I use a Chromebook in class that is provided by my school

I use computers in the computer lab, library or media center to help with schoolwork

I do not regularly use technology when I am at school

13.) What would be the BEST device to use for each of these schoolwork tasks?

Likert: Devices

Smartphone

Laptop

Tablet

Digital Reader Options:

Write a report

Take notes

Take an online test

Create a PowerPoint

Create a video

Access an online textbook

Research online

Read online articles

Check grades

Watch a video (YouTube)

Take an online class

Connect with classmates

Connect with teachers

Collaborate on a school project

Access social media

14.) If you could take a fully online or virtual class in any school subject, what subjects would you like to take online? (Check all that apply)

Career Technical Education classes

Computer Science / Programming

Digital media production

English/Language Arts

Health

Journalism or Yearbook

Math

Physical Education

Science

Social Studies/History

Visual or performing arts

World or foreign languages

All of my classes

None of my classes

I have already taken an online class in one or more of these subjects

15.) How important do you think it is for every student to take a fully online or virtual class before graduating from high school?

Likert Scale: Importance

Very unimportant

Unimportant

Neither important nor unimportant

Important

Very important

16.) In some schools, teachers have set up blended learning classrooms. In those classrooms, students spend part of the class week in a regular teacher led class at a school and the rest of the week the students are using online content with some level of control over the time, place, path, and/or pace of learning. Do you think that this would be a good way for you to learn?

Yes

No

17.) Many people around the world are interested in having more students pursue careers in science, technology, math or engineering. Are you interested in a job or career in any of these fields?

Likert Scale: Interest

Not at all interested

Somewhat uninterested

Neither interested nor uninterested

Somewhat interested

Very interested

18.) How would you like to explore future careers or get prepared for a future job? (Check all that apply)

Take career preparation classes at school or a local college or trade school

Take field trips to visit companies and meet successful role models

Learn about careers through social media like Twitter and Facebook

Learn from teachers who have worked in the professional field

Let career professionals teach lessons at school

Play an online or video game about a career

Use a quiz to identify my career interests or strengths

Watch "Day in the Life" podcasts or videos about different jobs

Use mobile apps or websites to explore careers

Participate in competitions that allow me to assess my skills against other students

Work with mentors who can help me with my college and career planning

Use technology tools to make things (like 3D printers and maker software)

Take a class in programming and coding

19.) If your school offered a class or after school activity to learn how to program or code, how interested would you be in taking that class or participating in that activity?

Likert Scale: Interest

Not at all interested

Somewhat interested

Neither interested nor uninterested

Somewhat interested

Very interested

Already doing that

20.) How often do you access these social media tools or online activities in your free time (not for schoolwork)?

Likert Scale: Interest

Never

Rarely

Sometimes

Often

All of the time Options:

Facebook

Instagram

Pinterest

Snapchat

Tumblr

Twitter

Vine

YouTube

Social messaging apps (like Facebook messenger, WhatsApp, KIK)

Video messaging (like Skype, FaceTime)

Blogging sites (your own or others)

Stream TV/movies (like Hulu, Netflix)

Online games/apps (like Quiz Up, Candy Crush)

Massively multiplayer online games (MMOG, MMORPG)

Special interest forums (like for games)

21.) What would be the benefits of having video, online, or digital games as a part of your regular schoolwork or classroom activities? (Check all that apply)

Games would make it easier to understand difficult topics

I would develop critical thinking and problem solving skills

I would be more interested in the subject

I would feel more challenged in my schoolwork

I would get immediate feedback on how much I learned

It would be a more interesting way to practice problems

I would go beyond the basic assignment and try new things through the game

I would learn how to work in teams

I would learn more about the subject

I would be charge of my learning

Schoolwork could be personalized to my learning style

Games could adapt to what I know and make it harder or easier for me

Games would help show how I would use the topic in the real world

I would learn skills that I can use in college or the workplace

School would be more fun

I don't think I would like playing games in school

22.) Read these sentences. Check the box if you agree with them. As a result of using technology to support my learning...

I collaborate more with my classmates

I communicate more with my teacher

I participate more in class discussions

I am developing critical thinking and problem solving skills

I am developing creativity skills

I gain a better understanding of the class materials

I spend more time mastering a skill or learning something

I am able to learn at my own pace

I have more control over my learning

I am learning in a way that better fits my learning style

I am more interested in what I am learning in class

My test scores and grades are better

I am more likely to complete homework assignments

My learning does not stop at the end of the class period or school day

23.) How often do you engage in the following activities because you want to learn a skill or know more about something educational that interests you (but not just because it was an assignment or homework)?

Likert Scale: Frequency

Never

Rarely

Sometimes

Often

All of the time Options:

Research a website to learn more on a topic

Read an online news story or report

Watch a video to learn how to do something

Watch a TedTalk or similar short videos about people's ideas

Post a question on a discussion board or forum

Use social media to identify people who share my interests

Use social media to learn what others are doing or thinking about a topic that interests me

Find experts online to answer my questions

Took a self-paced tutorial or online class

Play an online game or virtual simulation activity

Use online writing tools to improve my writing

24.) Imagine you are designing your dream school. Which of these tools would have the greatest positive impact on your learning? (Check all that apply)

Internet access anywhere at school

Freedom to use my own mobile devices

School provides every student with a mobile device

Mobile device accessories (like attachable keyboards, covers)

Things like databases, digital books, animations, and videos to help with schoolwork

Digital games or virtual simulations

Software that changes the level of difficulty and content to match your needs

"Digital backpack" to help organize your work and access important information (like take notes, organize, and view assignments)

Mobile apps for learning

Interactive whiteboards (like Smartboard, Polyvision)

Learning management systems (like Blackboard)

A handheld device to answer questions in class (like clickers)

3D printer

Digital reader (like Kindle, Nook)

Digital media creation tools (like video, audio)

School mobile app

Online or virtual classes

Online tests and assessments

Online textbooks

Online tutors

Social media tools to connect and work with others (like blogs, wikis, social networking sites)

Text messaging

Google hangouts or other online group messaging in class

Other

25.) How much do you agree with these statements?

Likert Scale: Agreement

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

Options:

There is at least one adult at school that I can talk to about school or personal problems

I believe that my school cares about me as a person

Teachers are important to my learning

Doing well in school is important to me

I am interested in what I am learning at school

Using technology in my classes increases my engagement in learning

I like learning how to do things

I like learning about new ideas

I wish my classes were more interesting

I would learn more if my classes used more technology to support my learning

I am learning important things for my future on my own outside of school

I like learning when I can be in control of when and how I learn

The subjects that I am learning at school are important for my future

The skills that I am learning at school are important for my future

I am often bored in my classes at school

I don't like school

26.) Which of these have been problems for other students at your school? (Check all that apply)

Approached by strangers online

Sharing too much personal information online

Seeing websites with inappropriate content

Students using others' ideas as their own (like plagiarism)

Being harassed online with hurtful texts or photos

Sharing suggestive texts or photos

Strangers asking to meet in person

Spending too much time online

Students using mobile devices to cheat

Students' mobile devices have been stolen

Students using their mobile devices in class when it is not allowed or appropriate

Students' personal school data has been shared without their permission

27.) Has your school explained to you how they are protecting the confidentiality of your personal school data that is stored digitally (grades, test scores, discipline records, etc)?

Yes

No

28.) Some students are using social media tools, videos, and online games outside of school to explore or teach themselves about academic or school topics that interest them. How are you using technology outside of school to learn new things or skills? Tell us what you are learning about and the types of digital tools or resources that you are using.

29.) Pick a school subject and tell us how using technology in that class could make that subject more interesting for you. Some things to think about for your response: what type of class would it be, what type of technology would you like to use, and how would that technology help you learn more.

30.) Are you participating in any of these programs at your school this year? (Check all that apply)

Apprenticeship Programs

AVID (Advancement Via Individual Determination)

Computer program club (coding)

Future Teacher Academies

Gear UP

IB (International Baccalaureate)

JROTC (Junior Reserve Officer Training Corps)

MUN (Model United Nations) or Model Congress

School Video Production Team

STEM (Science, Technology, Engineering, and Mathematics) Academies

Student Government

Student Tech Support Team

Talent Search

Visual and Performing Arts Academies

None of the above

Appendix D: 2015 Speak Up Survey Questions

2015 Speak Up Student Survey

Grade 6-12 Survey

1. What grade are you in?

• Grade 9

• Grade 10

• Grade 11

• Grade 12

• Alternative program or other

2. Gender

• Girl

• Boy

3. How would you rate your technology skills compared to other students in your class?

• Advanced - I know more than others

• Average - I know about the same as others

• Beginner - I am still learning how to use technology

4. What class format best represents the majority of your classes this year?

• Traditional class - the teacher provides instruction to a class of students in a physical classroom on a regular schedule

• Blended learning class - a formalized structure where the teacher provides instruction part of the time in a physical classroom with a class of students, and part of the time the students follow an online curriculum at their own pace at home or at a school

• Flipped class – the teacher assigns online videos of lessons, labs, and lectures for students to watch as homework, and then the in-school class period is used for doing projects, in-depth discussions, remediation, and individualized schoolwork help

• Virtual class – the teacher provides instruction to students who are all online

• Other

5. Which of these things do you do for schoolwork? (Check all that apply)

• Create videos to demonstrate what I have learned

• Play or create digital games for learning

• Post content I create online (like writings, videos, art work)

• Post to class blogs or class discussion board

- Read e-books or online articles on a mobile device

- Take an online class

- Take notes on a mobile device

- Take photos of school assignments or textbook pages using a mobile device

- Take tests or quizzes online

- Text my teacher with questions

- Text other students for class or homework help

- Use a mobile device to look up information in class

- Use educational mobile apps (like graphing calculator, language translator, vocabulary lists)

- Use Google Apps for Education

- Use online curriculum as part of my class

- Use online textbooks

- Use social networking sites to work with classmates on a project

- Watch an online video created by my teacher

- Watch online videos I find myself to help with homework/studying

6. What obstacles do you face using technology at your school? (Check all that apply)

- Internet access is not schoolwide

- Internet is too slow or inconsistent

- Lack of computers for students to use at school

- My school blocks websites I need for schoolwork

- Not allowed to text with classmates

- Not allowed to use my mobile devices at school

- Not allowed to use social media

- Teachers don't know how to use technology for learning

- Teachers limit our technology use

- Too many rules against using technology

- I rarely use technology at school

- Other

7. Which of these mobile devices do you have for your own use (but not provided to you by your school)? (Check all that apply)

• Cell phone without Internet

• Smartphone with Internet (like iPhone, Samsung Galaxy)

• Laptop

• 2-in-1 laptop (a laptop that can turn into a tablet)

• Web-based laptop (like Chromebook)

• Tablet (like an iPad)

• Digital reader (like Kindle or Nook)

8. What kind of Internet access do you have at home? (Check all that apply)

• A slow internet connection (like dialup through a landline)

• A fast internet connection (like DSL, Broadband, or cable)

• Wifi connection

• No home access. I use free Internet (like the public library, after school program, or WiFi hotspot)

9. Agree or disagree: It is important for students to have consistent, safe Internet access outside of school time to be successful in school.

• Strongly disagree

• Disagree

• Neither agree nor disagree

• Agree

• Strongly agree

10. Where do you most often use the Internet to do homework or schoolwork assignments that require an Internet connection?

• Where I live

• Where other family members live

• At a friend's house

• Public library

• After school recreational or tutoring center

• Fast food restaurant or coffee shop

• School bus or public transportation

• At school – before the start of class

- At school – after school day has ended

- Outside of school, I do not have access to the Internet to do homework

- Other

11. Which of these are true for you most of the time when you are at school? (Check all that apply)

- I use my own mobile device (smartphone, tablet, lap top) to help with schoolwork

- I use a laptop in class that my school gives me to use

- I use a tablet in class that my school gives me to use

- I use a Chromebook in class that my school gives me to use

- I use computers in the computer lab, library, or media center to help with schoolwork

- I do not regularly use technology when I am at school

12. What would be the BEST device to use for each of these schoolwork tasks?

Scale:

- Smartphone

- Laptop

- Tablet

- Digital Reader

Options:

- Access an online textbook

- Access social media

- Check grades

- Connect with classmates

- Connect with teachers

- Create a PowerPoint

- Create a video

- Do Internet research

- Read online articles or books

- Take an online test

- Take notes in class

- Watch an online video

- Work on a school project with a group

- Write a report

13. Which of these statements are true for you about your experiences in school? (Check all that apply)

- Doing well in school is important to me

- I am interested in what I am learning at school

- I am often bored in my classes

- I believe that my school cares about me as a person

- I wish my classes were more interesting

- I would learn more if my classes used more technology to support my learning

- Teachers are important to my learning

- The skills that I am learning at school are important for my future

- The subjects that I am learning at school are important for my future

- There is at least one adult at school that I can talk to about school or personal problems

- Using technology in my classes increases my interest in learning

14. How important do you think it is for every student to be able to use a mobile device like a laptop, tablet, or Chromebook during the school day to support schoolwork?

- Very unimportant

- Unimportant

- Neither important nor unimportant

- Important

- Very important

15. Imagine your ultimate science classroom. Which of these learning experiences would be most effective to help you become more engaged in learning science? (Check all that apply)

- Conducting real research on a topic that interests me

- Creating presentations of scientific findings

- Having access to an online science tutor

- Having experts speak in my class

- Learning from a teacher who is excited about science

- Learning from a teacher who is well trained in science

- Learning from a teacher who worked in a scientific field before becoming a teacher

- Learning from other students who are excited about science

- Participating in science competitions

- Playing digital or online games about science topics

- Reading the science textbook

- Taking an online class in science

- Taking field trips to places where science happens

- Through interdisciplinary projects that combine science, history, art, etc.

- Using a class blog or discussion board to share ideas with classmates

- Using lab tools and devices to conduct scientific investigations and experiments

- Using mobile devices in class to look up information as needed

- Using online databases to do research projects

- Watching animations, videos, or movies about science topics

- Working with online simulations that demonstrate science concepts

- Working with other students on science projects

- Other

16. Many people around the world are interested in having more students pursue careers in science, technology, math, or engineering. Are you interested in a job or career in any of these fields?

- Not at all interested

- Somewhat uninterested

- Neither interested nor uninterested

- Somewhat interested

- Very interested

17. What is your level of interest in becoming a teacher or having a job or career in an education field?

- Not at all interested

- Somewhat uninterested

- No opinion

- Somewhat interested

- Very interested

18. How would you like to explore future careers or get prepared for a future job? (Check all that apply)

• Earn a micro-credential or digital badge

• Get real life experience (like working a part-time job, internship, or volunteering)

• Go to summer camp (like space camp)

• Learn about careers through social media

• Learn from teachers who have worked in the professional field before becoming a teacher

• Let career professionals teach lessons at school

• Participate in an after school program

• Participate in competitions to see how I rank compared to other students interested in that career

• Play an online or digital game about a career

• Shadow a career professional for a day

• Take career technical education classes at my school or local college

• Take field trips to see and talk with people working in those jobs

• Use an online quiz to identify my career interests or strengths

• Use mobile apps or websites to explore careers

• Watch videos about different jobs

• Work with mentors who can help me with my college and career planning

19. If your school offered a class or after school activity to learn how to do computer programming or coding, how interested would you be in that?

• Not at all interested

• Somewhat uninterested

• Neither interested nor uninterested

• Somewhat interested

• Very interested

• Already doing that

20. How often do you engage in the following activities because you want to learn a skill or know more about something educational that interests you (but not just because it was an assignment or homework)?

Scale:

• Never

• Rarely

• Sometimes

• Often

• All of the time

Options:

• Research a website to learn more about a topic

• Read an online news story or report

• Watch a video to learn how to do something

• Watch a TedTalk or similar short videos about people's ideas

• Post a question on a discussion board or forum

• Use social media to identify people who share my interests

• Use social media to learn what others are doing or thinking about a topic that interests me

• Find experts online to answer my questions

• Take a self-paced tutorial or online class

• Play an online game or virtual simulation activity

• Use online writing tools to improve my writing

21. Imagine you are designing your dream school. Which of these tools would have the greatest positive impact on your learning? (Check all that apply)

• 3D printers

• Chromebook for every student

• Cloud based productivity tools (like Google Apps for Education)

• Digital reader (like Kindle, Nook)

• Google hangouts or other online group messaging in class

• Interactive whiteboards

• Internet access anywhere at school

• Laptop for every student

- Learning management systems (like Blackboard)

- Mobile apps for learning

- Mobile device accessories (like attachable keyboards, covers)

- Online or digital educational games

- Online or virtual classes

- Online tests and assessments

- Online textbooks

- Online tools that help organize your work and access important information (like take notes, organize, and view assignments)

- Online tutors

- Online videos and movies

- School mobile app

- Social media tools for students to connect and work with others (e.g. blogs, wikis, social networking sites)

- Subscriptions to digital content such as databases, e-books, journals and online resources

- Tablet for every student

- Text messaging

- Tools to help students create media projects (e.g. video, audio)

- Other

22. Check the box if you agree with these statements. As a result of using technology, I am...

- Applying knowledge to practical problems

- Collaborating with other students more

- Communicating with my teacher more often

- Getting better grades and test scores

- Developing creativity skills

- Developing critical thinking and problem solving skills

- Gaining a better understanding of the class material

- In control over my learning

- Learning at my own pace

- Learning in a way that fits my learning style

- More likely to complete homework assignments

- More interested in what I am learning in class

- Participating more in class discussions

- Spending more time mastering a skill or learning something

- Taking ownership for my learning

- Using time at home for extended learning

23. Many people are talking about digital footprints. A digital footprint is the information that is available online about you, your ideas, and comments. Which of these statements are true about your digital footprint? (Check all that apply)

- I am careful about what I post about myself or others online

- I have advised my friends not to post certain things online

- I have stopped interacting with someone online based on what they posted online

- I look at people's online profiles before I connect with them

- I think it is important to have a positive online profile

- I worry about what may still be online about me 5 years from now

- I worry about what others post online about me

- I worry what others will think about me based upon whom I am connected with online

- I do not regularly post much about myself online

- I have not thought about this before

24. How often do you use these social media tools or online activities in your free time (not for schoolwork)?

Scale:

- Never

- Rarely

- Sometimes

- Often

- All of the time

Options:

- Facebook

- Instagram

- Pinterest

- Snapchat

- Tumblr

- Twitter

- Vine

- YouTube

- Social messaging apps (e.g. Facebook messenger, WhatsApp, KIK)

- Video messaging (e.g. Skype, FaceTime)

- Blogging sites (your own or others)

- Stream TV/movies (e.g. Hulu, Netflix)

- Online games/apps (e.g. Candy Crush)

- Massively multiplayer online games (MMOG, MMORPG)

- Special interest forums (e.g. for games)

25. In what subjects have you watched online videos or movies to help you with homework, research projects or studying? (Check all that apply)

- Career Technical Education classes

- Computer Science/Programming

- Digital media production

- English/Language Arts

- Health

- Journalism or Yearbook

- Math

- Physical Education

- Science

- Social Studies/History

- Visual or performing arts

- World or foreign languages

- Other

26. Why do you think watching online videos or movies is a good way for you to learn or to support your schoolwork? (Check all that apply)

- Complements what my teacher is sharing in class

- Connects what I am learning to the real world

- Easy to access on any type of mobile device

- Easy to find all kinds of videos online to help with schoolwork

- Fits my learning style

- Helps me overcome my learning difficulties

- Makes it easier to understand difficult concepts

- More engaging and keeps my attention

- Provides a different learning approach than offered by my teacher

- I learn more quickly when watching videos

- I can watch it as many times as I need to

- I can watch it simultaneously with classmates and discuss it with them

- I feel more in control of my learning

- I learn more from watching a video than reading a book

- I don't think this is a good way for students to learn

- Other

27. Which of these statements are true for you about your experiences outside of school? (Check all that apply)

- For personal reading, I would rather read digital text (such as reading an online story on a tablet) than read a hardcopy, printed book

- For schoolwork reading, I would rather read digital text (such as reading an online article on a tablet) than read a hard copy, printed textbook

- I am learning things that are important for my future on my own outside of school

- I like learning about new ideas

- I like learning how to do things

- I like learning when I can be in control of when and how I learn

- Sometimes I cannot do my homework because I don't have access to the Internet outside of school

- Using technology helps prepare me for future jobs

28. Are you participating in any of these programs at your school this year? (Check all that apply)

- Apprenticeship Programs

- AVID (Advancement Via Individual Determination)

- Computer programming club (coding)

- Future Teacher Academy

- IB (International Baccalaureate)

- JROTC (Junior Reserve Officer Training Corps)

- Model United Nations or Model Congress

- School Video Production Team

- STEM (Science, Technology, Engineering, and Mathematics) Academy

- Student Government

- Student Tech Support Team

- Talent Search

- Visual and Performing Arts Academy

- None of the above

29. Thinking about all of your classes in school this year, in which class is technology used the most effectively to engage students in learning? Tell us about that class. What types of technology are you using in that class (such as mobile devices, social media, digital games, videos or other online tools), and what is the impact of that technology usage on your learning?

30. Now, help us predict the future of learning! What will "school" be like five years from now in 2020? How will emerging technologies change the way students go to school, take classes, interact with their teachers and classmates, and learn about the world? Share your ideas with us and we will share them with the futurists who are thinking about this same topic – your ideas are important to those discussions!

Appendix E: District Request to Conduct Research

Request to Conduct Research

████████████████████████████

Submitted by Kevin Gerke

Principal Investigator:	Kevin Gerke
Address:	419 Mesa Canyon Drive, Belton, MO. 64012
Phone:	(816) 769-9170 / (913) 239-3407
Email:	kgerke003@gmail.com / ████████████████████

Purpose: This research will be used to complete the dissertation I am writing to complete my doctoral work through Baker University.

Advisor: Dr. Russ Kokoruda, (913) 344-1221, Russ.Kokoruda@bakeru.edu

████████ Staff: I have spoken to ████████████ about my ideas regarding this dissertation topic. I have also spoken to varying degrees with █████████████████████████ ████████████ regarding my topic and my ability to access Speak Up survey data.

Research: The following is my "working" purpose statement for the research I hope to conduct. "The purpose of this study was to analyze data collected over time from students in the ██████████████████████████████████ to determine the extent to which students have access to their own digital device, as well as the impact these devices have on students' perceptions of classroom learning. The second purpose of this study was to determine the extent to which access to a digital device impacts the way students utilize technology in the classroom, as well as the types of schoolwork assigned to students. The final purpose of this study was to identify obstacles that prevent students from utilizing technology in the classroom."

Data: I am requesting access to any Speak Up survey data from secondary students (middle/high). This would include any data collected in the last several years at the secondary level.

Time/When/Where/Permissions: None. The students have already completed the survey.

IRB: No IRB has been completed. Once approved, I will submit a copy of the IRB.

Appendix F: District Authorization to Conduct Research

June 26, 2017 7:51 AM

Hi, Kevin.

We have approved your research request. Attached you will find the results from our Speak Up Surveys. You will note that it is not identical each year. If you have any questions about it, ██████████, our new Director of Blended Learning will be your contact (he starts July 1st). **The ████████████████████, all staff members, and all students cannot be identifiable in any way in the report of your findings.** If you decide to take an alternative approach to your research, a new request must be submitted. We are excited and expect to hear your results. Please send a copy of them to me within 30 days of the conclusion of your research.

Best luck to you in your research.

Happy writing!

Appendix G: Permission to Use Speak Up Data

Permission to Use Speak Up Data

15707 Rockfield Blvd. Ste 250 | Irvine, CA 92618 | 949 609-4660 | www.tomorrow.org

Organization Name	██████████████████████
Contact:	Kevin Gerke
Mailing Address	████████
City	████████ **State** ██ **Zip** ████
Email address	███████████ **Phone** ████████
Speak Up Years	2010, 2011, 2014, 2015 **Usage** Dissertation
When will data be published:	TBD- Tentative Date December, 2017

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APA Citation for research publications or articles:

> Use standard APA Citation standards when referencing Speak Up data. Cite the year of the Speak Up Research Project for Digital Learning and attribute the source as Project Tomorrow. For example, Speak Up Research Project for Digital Learning 2016, facilitated by Project Tomorrow.

We respectfully request that you send us a link to or copy of your published materials within 30 days of the publication date. If you have questions regarding your use of the materials, please contact us at any time.

Julie Evans
Chief Executive Officer
Date Permission Granted: July 31, 2017

Appendix H: IRB Request

BAKER
UNIVERSITY

SCHOOL OF EDUCATION
GRADUATE DEPARTMENT

Date: _____
IRB PROTOCOL NUMBER _____
(IRB USE ONLY)

IRB REQUEST
Proposal for Research
Submitted to the Baker University Institutional Review Board

I.   **Research Investigator(s)** (Students must list faculty sponsor first)

Department(s)   **School of Education Graduate Department**

       Name   Signature

1. Russ Kokoruda   _____,   Major Advisor

2. Margaret Waterman   _____,   Research Analyst

3.   University Committee Member

4.   External Committee Member

Principal Investigator: Kevin Gerke
Phone: (816)769-9170
Email: ███████████████████
Mailing address: 419 Mesa Canyon, Belton, MO 64012

Faculty sponsor:
Phone:
Email:

Expected Category of Review: _X_ Exempt   ___ Expedited   _ __Full

II: Protocol: **(Type the title of your study)**

The Impact of Student-Owned Technology on Student Learning Practices and Classroom Instruction

Summary

In a sentence or two, please describe the background and purpose of the research.

The purpose of this study is to analyze archived survey data to determine the extent to which a Bring Your Own Device (BYOD) technology initiative has an impact on student learning practices and classroom instruction.

Briefly describe each condition or manipulation to be included within the study.

No condition or manipulation is included in this study. This study used quantitative analyses of archived survey data from a student survey administered to students in five high schools (grades 9-12) to determine the extent to which student learning practices and classroom instruction has changed over time.

What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.
Will the subjects encounter the risk of psychological, social, physical or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

This study uses archived Speak Up survey data gathered by a district technology department. The Speak Up survey is an online survey given to students around the country to measure the impact of technology on student learning. The district conducted the survey and released the data to the researcher. Subjects will encounter no psychological, social, physical, or legal risk.

Will any stress to subjects be involved? If so, please describe.

No stress to subjects is involved. The online survey was administered within the confines of the school day and was monitored by classroom teachers.

Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

The subjects will not be deceived or misled in any way. The survey asked a series of questions about student's use of technology and its impact on student learning and classroom instruction.

Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

No personal or sensitive information is requested. The survey was completed anonymously and submitted online.

Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.

No offensive, threatening or degrading materials will be presented.

Approximately how much time will be demanded of each subject?

The survey was administered within the confines of the school day and took approximately twenty minutes to complete.

Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

The online survey was completed by all students in grades 9-12 in five high schools within a single school district. The students were not solicited or contacted. The survey was administered by classroom teachers who provided students the link required to access the online survey. The teacher asked students to answer each question honestly and to the best of their ability.

What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

Students were asked to complete the survey voluntarily but there was no consequence if they chose not to participate. No inducements were offered to students to complete the survey.

How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

Student participation was voluntary therefore; completion of the survey was considered consent.

Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No aspect of the data will be made part of any permanent record that can be identified with a student. The survey was submitted online and completely anonymous.

Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.

No. The survey was voluntary and completed anonymously. The fact that a student did or did not participate in the survey will not be made part of any permanent record.

What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with it after the study is completed?

The data was submitted anonymously therefore; confidentiality is not an issue. The data will be kept in the district technology office for periodic review. All data will be kept confidential and will be stored on a password-protected computer. Data will be destroyed five years after completion of the study.

If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

No. There were no risks to students completing this survey.

Will any data from files or archival data be used? If so, please describe.

Yes. The district release archived survey data to the researcher.

Speak Up Survey Questions

Question: What class format best represents the majority of your classes this year?

Possible Responses:

<u>Traditional Class</u>- Teacher provides instruction to a class of students in a physical classroom on a regular schedule.

<u>Blended Learning Class</u>- Formalized structure where the teacher provides instruction part of the time in a physical classroom with a class of students, and part of the time the students follow an online curriculum at their own pace at home or at school.

<u>Flipped Class</u>- Teacher assigns online videos of lessons, labs, and lectures for students to watch as homework, and then the in-school class period is used for doing projects, in-depth discussions, remediation, and individualized schoolwork help.

<u>Virtual Class</u>- Teacher provides instruction to students who are all online.

<u>Other</u>

Question: Which of these things do you do for schoolwork? (Check all that apply)

Possible Responses:

- Create videos to demonstrate what I have learned.

- Play or create digital games for learning.

- Post content I create online (like writings, videos, artwork).

- Post to class blogs or class discussion board.

- Read e-books or online articles on a mobile device.

- Take an online class.

- Take notes on a mobile device.

- Take photos of school assignments or textbook pages using a mobile device.

- Take test or quizzes online.

- Text my teacher with questions.

- Text other students for class or homework help.

- Use a mobile device to look up information in class.

- Use educational mobile apps (like graphing calculator, language translator, vocabulary

lists).

- Use Google Apps for Education.

- Use online curriculum as part of my class.

- Use online textbooks.

- Use social networking sites to work with classmates on a project.

- Watch an online video created by my teacher.

- Watch online videos I find myself to help with homework/studying.

Question: What obstacles do you face using technology at your school? (Check all that

apply)

- Internet access is not schoolwide.

- Internet is too slow or inconsistent.

- Lack of computers for students to use at school.

- My school blocks websites I need for schoolwork.

- Not allowed to text with classmates.

- Not allowed to use my mobile devices at school.

- Not allowed to use social media.

- Teachers do not know how to use technology for learning.

- Teacher limits our technology use.

- Too many rules against using technology.

- I rarely use technology at school.

- Other

Question: Which of these mobile devices do you have for your own use (but not provided to you by your school)? (Check all that apply)

Possible Responses:

Cell phone without Internet.

Smartphone with Internet (like iPhone, Samsung Galaxy).

Laptop

2-in-1 laptop (a laptop that can turn into a tablet).

Web-based laptop (like Chromebook).

Tablet (like an iPad).

Digital Reader (like Kindle or Nook).

Appendix I: IRB Approval

Baker University Institutional Review Board

August 27, 2017

Dear Kevin Gerke and Dr. Robins,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at EMorris@BakerU.edu or 785.594.7881.

Sincerely,

Erin Morris PhD
Chair, Baker University IRB

Baker University IRB Committee
  Joe Watson PhD
  Nate Poell MA
  Susan Rogers PhD
  Scott Crenshaw