

ABSTRACT OF CAPSTONE

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INSPIRING CHANGE AGENTS THROUGH TECHNOLOGY

Abstract of capstone

A capstone submitted in partial fulfillment of the
Requirements for the degree of Doctor of Education in the
College of Education
At Morehead State University

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April 1, 2016

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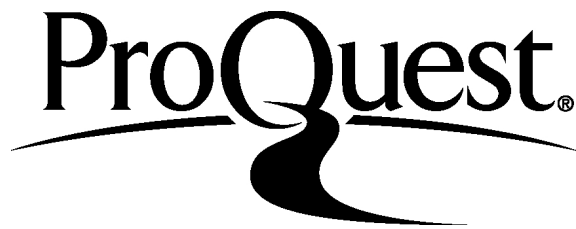
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ABSTRACT OF CAPSTONE

INSPIRING CHANGE AGENTS THROUGH TECHNOLOGY

Every child needs a champion. Every change has to have a catalyst for change. The educational opportunities students encounter may differ greatly for each individual. Education, once considered the great equalizer, must find an answer for the digital divide which is considered by some the great unequalizer. Prensky (2008) stated “it’s their after-school education, not their school education, that is preparing our kids for their 21st century lives -- and they know it” (p. 41). Teachers are faced with developing skills such as critical thinking, media literacy, communication, collaboration, information literacy and creativity. Many districts, especially rural, high poverty districts, struggle to meet the needs of their students due to limited resources as well as lack experience needed to integrate necessary technological skills into quality learning experiences. The challenge for rural, high poverty districts is to develop a framework to build and support technology rich classrooms.

The purpose of this project was to inspire change agents in a rural school district to advocate for the integration of technology in the classroom. This project describes the process used to overcome the barriers of developing a technology rich environment in a rural school setting. In addition, researchers examined the implementation of a technology rich environment in an elementary setting and in a secondary setting. In this project, a 1:1 Chromebook initiative was started with seniors in a rural, high poverty school district. In addition, the elementary component of this project involved placing a cart of Chromebooks in a fourth and fifth grade

language arts class and a fourth and fifth grade math class. Both settings occurred in the same school district.

The professional development model that was used to inspire teachers to integrate the Chromebook and Google Apps for Education (GAFE) applications into student learning is included. A survey was given to student and staff participants to collect perceptual data pertaining to the use of technology in the classroom after the Chromebook initiatives were set in motion. In addition, anecdotal data were collected to further communicate the impact of the initiative.

KEYWORDS: technology, Chromebook, accessibility, rural, integration

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CAPSTONE

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DEDICATION

Edie Bostic

I dedicate this work to the students and staff at Hannan Trace Elementary. You have been the inspiration for this capstone project, and your positive attitude and response to the project has truly been fun to watch. This doctoral journey would not have been possible without the support of the staff. Your dedication to enhancing learning for our students makes coming to work each day a joy.

Timothy Edwards

I dedicate this work to my loving wife and partner, Mandy. You have provided continual support throughout every journey I have set out to accomplish. Selflessly, you have provided me with endless support and patience.

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I must acknowledge my family and friends who have endured the last three years and offered endless encouragement, support, and genuine interest throughout this journey. I hope that you can see through this that all things are possible. To my life-long friend, Amy, I thank you for standing beside me and encouraging me along the way. I offer my deepest gratitude to my husband and children for your encouragement throughout this process. You have always supported me and given me courage to do my best. Finally, I must say a very special thank you to T. R.

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EXECUTIVE SUMMARY

What Is the Core of the Capstone?

“I believe we are on the threshold of a tipping point in public education. The moment is at hand for a 21st century model for education that will better prepare students for the demands of citizenship, college, and careers in the millennium” (Bellanca & Brandt, 2010, p. xiii). As school leaders, we are tasked with creating the environment and opportunities for students to acquire access to be able to thrive in the development of 21st Century skills, especially for those students in rural settings with high levels of poverty. The incorporation of technology into the learning process can foster the development of creativity, critical thinking and problem solving skills.

In essence, the solution consists of the integration of advances in pedagogy (especially built on how we learn), in technology (especially around engagement), and in change knowledge (especially around making change easier). If we get the combination right, the floodgates of learning will open and there will be an unstoppable explosion of energy and participation by all that will benefit individuals and the world alike. (Fullan, 2013, p. 15)

The movement of schools toward a technology rich environment is imperative in order to close the digital divide, ensuring that all students are given the capabilities of attaining the critical thinking skills necessary for the 21st Century.

To accomplish the narrowing of this divide, the greater vision of this collaborative capstone was to reimagine instruction in an elementary and secondary setting with increased access to technology, as well as increased professional

development and support needed to access electronic resources for teachers and students. Beyond the project, the long term goal of the researchers was to influence at the district level an expansion of student access to Internet accessible devices as well as teacher and student use of Google Apps for Education (GAFE) at each grade level. To achieve these goals, the researchers:

- prepared for the change by examining the readiness for a technology rich environment among students and staff and investigating the policies comparative schools used for the incorporation of a 1:1 initiative;
- integrated pedagogy and technology by investigating and developing solutions to professional development needs for staff in order to incorporate supporting software that will foster a technology rich learning environment; and
- engaged other educators in the transition through the development of teachers as change agents for incorporating technology and the impact on student learning

Statement of the Problem

Community infrastructure for connectivity was impacted by geographical terrain and dispersed populations in rural settings with limited economic resources; therefore, student connectivity was limited to the resources located within the school building. The overall purpose of this capstone was to investigate ways to maximize opportunities to integrate technology into the learning process, minimizing the effects of the digital divide in Gallia County, Ohio. The professional development and

continual support of a key group of educators in each building became a catalyst for a pedagogical shift toward a technology rich environment.

The joint capstone looked at the implementation of technology within two schools. Specifically, at the elementary level, students and teachers had full access to a cart of Chromebooks as well as Google Apps for Education (GAFE), in math and language arts classes at the 4th and 5th grade level. In the secondary building, each student in grade 12 was issued a Chromebook for 24 hour access to the technology. Courses specific to grade 12 students integrated free applications such as GAFE into the teaching and learning.

Teachers in both schools were asked to participate in professional development designed to spark interest in integrating the Chromebook and free applications into the learning process. One day of professional development focused on the pedagogical considerations of student learning in a technology rich environment. The second day allowed teachers to increase technical skills surrounding GAFE.

Ongoing professional development included a third through fifth grade technology professional learning community which met monthly to share the process and progress of the integration of GAFE and programs purchased by the district into their instruction and assessment. Third grade teachers were included since they were next to receive carts of Chromebooks for their classrooms. The researchers sent teachers included in the project periodic e-mails with tidbits of new information, ideas for further integration, or answers to questions that arose among teachers.

Updates and supporting information were added to the Google Classroom created for teacher professional development.

Elementary significance. Leadership has been identified as a key piece to the success of a 1:1 initiative (Orr, 2014). “An education leader promotes the success of every student by advocating, nurturing, and sustaining a school culture and instructional program conducive to student learning and staff professional growth” (ISLLC, 2008, p. 14). ISLLC Standard 2(h) suggested “the leader promotes the use of the most effective and appropriate technologies to support teaching and learning” (ISLLC, p. 14).

In our capstone project, a great deal of consideration was taken to select a device that would be both effective and affordable. The Chromebooks were chosen because it provided students accessibility to Internet applications and programs, and the Chromebooks were very affordable. In addition, the Chromebook apps could be accessed in the off-line mode if the internet was not available. A Chromebook was defined as “a laptop that runs Google’s Chrome operating system and browser” (Kulow, 2014, p. 25). It was a goal of the capstone to provide access to a device for every fourth and fifth grade student in the subjects of language arts and math. Before the carts of Chromebooks entered the math and language arts classrooms, students only had access to four or five computers in the back of the classroom as well as a computer lab once a week. Student use of these computers consisted of completion of test preparation programs and an occasional presentation.

Along with the carts of Chromebooks, teachers received professional development that centered on 21st century learners and skills that students need to be successful. The professional development introduced teachers to GAFE, mainly featuring Google Classroom, Google Docs, Google Sheets, Google Forms, and Google Slides. This professional development took place in the Summer of 2015 so that teachers would have the opportunity to work with the new applications and develop lessons centered on the new tools that would be available in their classrooms.

Student accessibility to Chromebooks, GAFE, and the professional development that surrounded the initiative were key pieces to the pedagogical transformation needed to foster a technology rich environment. The broader goal of the project was to assist teachers in making a shift from viewing technology as an addition to the curriculum to valuing technology as an integral tool in learning and in the development of the 21st century skills of communicating, collaborating, creative thinking, and critical thinking.

Secondary significance. The focus of the researcher was to approach the pedagogical shift from the perspective of a servant leader. The expanded access to technology empowered teachers to create student-centered classrooms which facilitated critical thinking skills. ISLLC Standard 1 stated, “An education leader promotes the success of every student by facilitating the development, articulation, implementation, and stewardship of a vision of learning that is shared and supported by all stakeholders” (Council of Chief State School Officers, 2008, p. 14).

Throughout the project, teachers were challenged to adjust their views toward teaching and learning. This view, which paralleled current shifts in the field of education, provided another opportunity for teachers to change in the role of a teacher from a distributor of information to a facilitator of learning. More specifically within the standard, indicators of success included the development of a shared vision and mission as well as promoting an environment focused on continuous improvement. The project was setup to provide opportunities for students to have extended access to technology and implement professional development to teachers to support the integration of the new technology.

The development of units using the Google Apps for Education was planned to increase the amount of time spent on quality instruction due to the access students had to resources. As reviewed in Table 1, GAFE “is a suite of products including Gmail, Calendar, Sites, Docs, Slides, Sheets, Forms, etc. that allows students to create on-line documents, collaborate in real time, and store documents, as well as, other files in the cloud” (Chardon Local Schools, 2014, p. 1)

Table 1

Google Apps for Education Descriptions

Google Application	Description
Google Docs	word processing; capability to share and edit documents with others
Google Sheets	spreadsheet; capability to share and edit spreadsheets with others
Google Slides	presentation; capability to share and edit presentations with others
Gmail	Email
Google Calendar	on-line planner; capability to share with others
Google Forms	survey software; capability to survey, assess, and collect information
Google Classroom	assignment management system with access to upload videos, documents, sheets, presentation, forms, etc.; capability to make assignments to students that are invited to the classroom

The students were able to access a multitude of resources as well as to work collaboratively with one another. Between the teachers and students, the implementation of GAFE and the 1:1 initiative supported maximization of technology use in the classroom to promote student learning. Data regarding implementation of the Google tools and Chromebooks were collected using a survey given to students and a survey given to teachers, as well as the collection of qualitative data by way of informal conversations and reflections by students, teachers, and administrators.

While there were portions of all six ISLLC Standards connected to the capstone project, ISLLC Standard 3 addressed the “safe, efficient, and effective learning environment” (Council of Chief State School Officers, 2008, p. 14). Within this standard, the building administrator allocated and aligned resources, including technical resources, to the needs of the building. The building leader worked to build capacity for distributed leadership in the building, and in the case of the project, to expand the expertise of students’ and teachers’ use of technology in order to support student learning. This shift allowed teachers to easily differentiate instruction while students used critical thinking, skills not assessed by standardized assessments. Figure 1 shows the relationship between the needed infrastructure, technological knowledge, and pedagogical knowledge for the transformation to a technology rich environment.

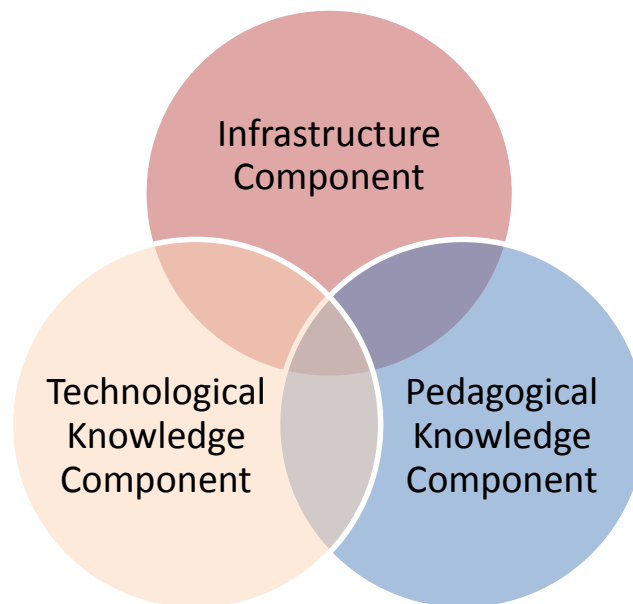


Figure 1. Components for technology rich environment.

Purpose

The purpose of the project was to provide teachers with the pedagogical, technological, and responsive professional development so students could experience and thrive in a technology rich environment. A technology rich environment “shares the features of traditional instruction, but has digital enhancements such as electronic whiteboards, broad access to Internet devices, document cameras, digital textbooks, Internet tools, Google Docs and online lesson plans” (Horn & Staker, 2015, p. 54). To accomplish this, teachers were provided on-going professional development, technological support, and essential equipment and applications for their students and themselves. The completion of this project was not intended to be the end of the movement, but rather act as the catalyst for a continued pedagogical shift toward a technology rich environment.

All elementary classrooms were equipped with a Mimio board and projector through a Title I project from six years ago. We added a cart of 24 Chromebooks to the fourth and fifth grade math and language arts classrooms and provided access to GAFE and digital resources. At the secondary level, all classrooms were equipped with a projector and minimal classrooms were equipped with an interactive whiteboard, many of which were seldom used. Students in grade 12 were given Chromebooks to be used at school and at home. Teachers and students in grade 12 were given full access to GAFE suite of tools to use for instruction. Elementary and secondary teachers attended professional development during the summer and on-

going professional development throughout the year in order to support them in the integration of Chromebooks into their classroom.

Research Questions

1. What was needed to ease the shift of teacher use of technology as an addition to the curriculum to valuing technology as an integral tool for student learning?
2. What steps were taken to integrate pedagogy and technology to foster a technology rich environment?
3. What conditions were necessary to develop change agents?

Review of Literature

Technology can be used as a vehicle to attain many of the 21st century skills. Technology provides students with “new ways to develop their problem solving, critical thinking, and communication skills. Technology can help students practice transferring those skills to different contexts, reflect on their thinking and that of peers, practice addressing their misunderstandings, and collaborate with peers” (Saavedra & Opfer, 2012, p. 11). Cradler, McNabb, Freeman, and Burchett (2002) indicate that the use of technology in instruction positively impacts content area achievement, problem-solving skills, and preparation for work, all of which are 21st century skills.

Establishing a Need

Learning institutions need to realize that learners entering public school buildings are coming from a media-rich, technical, and complex environment.

Educators must learn about what to do with the technology and how the technology affects the way students are wired to learn (Considine, Horton, & Moorman, 2009). “There is broad consensus that technology holds great promise for education. It has not yet lived up to this promise, in part, because teachers have not had the opportunity to learn to maximize its pedagogical value” (Saavedra & Opfer, 2012, p. 12).

College and career readiness. The current language in many educational arenas is to ensure students are College and Career Ready (CCR). This is measured, as described by the organization Achieve, as students being able to enter an entry-level, remediation free course in English and mathematics at the post-secondary level (College and Career Readiness, 2015). The site continues to describe College and Career Readiness as being prepared for postsecondary job training (College and Career Readiness).

According to the American Management Association and Partnership for 21st Century Skills,

Executives say they [employers] need a workforce fully equipped with skills beyond the basics of reading, writing and arithmetic (the ‘3 Rs’) to grow their businesses. Skills such as critical thinking, communication, collaboration, and creativity (the 4 C’s) will become even more important to organizations in the future. (Partnership for 21st Century, 2010, p. 9)

Reeves (2010) describes a paradigm shift when considering how to assess 21st century skills. Reeves suggests “we need practical ways to assess students in the following three ways: 1) in variable rather than standardized conditions; 2) as teams

rather than as individuals; and 3) with assessments that are public rather than secret” (Bellanca & Brandt, 2010, p. 306).

Schools are preparing students to thrive in a post-industrial world, and the skills needed vary greatly than those skills needed in the 20th century (Bellanca & Brandt, 2010). Academic institutions cannot produce students with the skills they will need because in many cases those skills have not yet been identified (Bellanca & Brandt). In its place, schools must produce consumers of information that use the information to create, innovate, and advance the status quo. The increased accessibility to technology is to be used to increase opportunities for students to collaborate, communicate and exercise creativity (Bellanca & Brandt).

Current reality. The reality for many schools currently operating in the 21st century is that many are managing from a vision promoted during the Industrial Revolution (Waks, 2014). The third goal of the National Education Technology Plan is to promote a concentration on effective teaching, not just efficient teaching such as presented in the industrial model (Department of Education, 2010). According to the Organization of Economic Cooperation and Development (2009), the transmission model, described as the transmission of facts to students through textbooks and lectures, is the leading model of instruction in compulsory school settings. Using this model, students are able to learn information, but the 21st century skills of communication, application, problem solving, technology, and creativity are minimally taught (Schleicher, 2012). In addition, factual information is much easier

to assess than the applications of 21st century skills and many compulsory schools still assess factual information (Assessment & Teaching of 21st century Skills, 2012).

To support technology initiatives, sometimes school or district policies hinder the learning environment in our schools. According to the 2010 National Technology Plan, the challenge for our schools is to create an environment that is “engaging, relevant, and personalized” (Department of Education, 2010, p. x). Technology can be the catalyst in the classroom that allows for the transition to this kind of learning to happen, but often teachers in rural schools are hesitant of the technology. In rural schools, the technology savviness of teachers and administrators can be lacking. Mora, Barragán, and Urrea (2012) stressed in a study of a Columbian 1:1 project that the move to create a technology rich environment may cause fear, since teachers may need to learn how to use the instrument as well as incorporate it into their lessons with students.

A successful technology integration took place in a rural South Carolina school district (Moss, 2011). This study was similar to the proposed Gallia County study because it investigated the barriers to integrating technology in a rural school setting using the recommendations of the Partnerships for 21st century skills (Moss). Teacher training was considered, and the use of technology by students and teachers was investigated.

Implications for securing teacher buy-in, involving teachers in the selection process and incorporating on-going professional development that would enhance the curriculum were suggested in this study (Warschauer et al., 2014). Simply adding

laptops does not increase student learning (Kemker et al., 2007; Orr, 2014; Warschauer et al.). Teachers and students have to be excited and educated about the 1:1 initiative, and the uses for the laptop have to be thoughtfully crafted with buy-in from the various stakeholders (Orr; Warschauer et al.).

Technology availability compared to technology use. The digital divide is defined by the United States Department of Commerce (1999) as “disparities in access to telephones, personal computers, and the Internet across certain demographic groups” (p. 2). E-Rate, a federally funded program which provides low cost services to districts depending upon their rural location and poverty rate, has made strides in equalizing access to computers in economically disadvantaged schools (E-Rate Program, 2015; Kemker, Barron, & Harmes, 2007). While E-Rate has improved connectivity for districts, the quality of instruction while using that connectivity is not guaranteed (Kemker et al.).

The current student to computer ratio in United States schools is approximately 4:1 and nearly 99% of schools have Internet access, yet the question remains as to the impact technology is having on teaching and learning (Clausen, Britten & Ring, 2008). At a time when schools are increasing the amount of resources pouring into technology, many schools continue to lack the vision behind technology initiatives. Even with the increase in devices, the use of computers in a school setting continues to be an episodic event, as many of the computers remain in libraries and computer labs, disjointed from the day to day learning in classrooms (Grundmeyer, 2013).

Another piece that emerged in the research involved preparing teachers for a technology rich environment. By allowing each teacher to take home the piece of technology that was to be incorporated in the classroom, teachers became more proficient using that piece of technology (Orr, 2014). In addition, teachers were encouraged to learn more about the technology along with their students (Orr). Orr understood the importance of giving teachers time to become more familiar with the piece of technology they were about to put into the hands of their students. In the Spring prior to launching the project each staff member, including support staff that worked with students, received an iPad to explore (Orr). The superintendent also gave them the expectation they bring the iPads to every staff meeting, workshop, or training (Orr). They were not required to use the iPad, but they were supposed to have the device there for use if the opportunity presented itself (Orr).

The Idaho school district in Orr's (2014) study moved from barely being identified as a 3 star district to a 4 star district in one year. Along with the increased performance, Orr listed other accomplishments that contributed to the iPad implementation at the elementary level; such as a boosted morale, increased teamwork, and improved attitudes toward innovative practices. Authentic learning environments, where students are creating, collaborating, and solving problems, are the answer to improving instruction with technology for economically disadvantaged students (Kemker, Barron, & Harmes, 2007).

Technology considerations. While the specific device is important, the more important factor is the reliability of the device and maintainability from a

technological aspect. In an interview by Demski (2012) with Bryan Weinert, Director of Technology at the Leyden Community High School District 212 in Franklin Park, Illinois, Weinert described the district goals for implementation of a 1:1 initiative. “We want teaching and students learning and not spending time dealing with tech setups, troubleshooting, and other issues. We want our teachers and students to use as many different resources, tools, and activities as they can dream up” (Demski, p. 29).

The National Technology Plan (Department of Education, 2010) advocates for a “revolutionary transformation” (p. ix.). To make this transformation, the plan urges all levels of education to “be clear about the outcomes we seek; collaborate to redesign structures and processes for effectiveness, efficiency, and flexibility; continually monitor and measure our performance; and hold ourselves accountable for progress and results every step of the way” (Department of Education, p. ix).

When faced with technology advances, schools and districts must consider multiple factors when choosing large scale purchases of technology. There are many options for schools to expand their technology resources. Bailey, Ellis, Schneider and Vander Ark (2013) states there are critical questions that must be answered before finalizing a decision on devices. First, the content that will be displayed on the device should be determined, such as flash-based content, device specific applications, or software that is not web-based (Bailey et al.). Secondly, the number of devices that will need to be purchased to begin the implementation must be weighted as well as any additional fees associated with the device such as student fees

to cover insurance (Bailey et al.). Lastly, policies need to be reviewed that apply to the use of the device, including considerations for school and home (Bailey et al.).

Accessibility is a focus of the National Technology Plan. The solutions to “digital exclusion” are a focus because, according to the Federal Communications Commission (2009), many of the applications for jobs, health information, and many other crucial information resources only come in digital sources. The following groups were identified as needing special attention: low income and minority learners, English language learners, learners with disabilities, early childhood, adult workforce, and senior citizens (Warschauer & Matuchniak, 2010).

Suggestions for helping low income learners include capitalizing on the use of the internet in the public areas of the community, such as schools, libraries, restaurants, and community centers. Offering extended hours so that the internet can be accessed in these public places may also help equal the playing field. Communities should work collaboratively to provide connectivity solutions for students to ensure that even those included in special groups are provided opportunities to develop the skills of those students.

Rural considerations. Specifically in rural areas, Gordon (2011) cites the “lack of infrastructure and funding” (p. 20) and a “shortage of tech-savvy teachers, staff, and potential community partners” (p. 20) as barriers to integrating technology into classrooms. Often rural students and teachers grasp the power of incorporating technology into learning, but the difficult task of convincing members of the

community to invest in technology initiatives hinders access to needed tools (Gordon).

While the standard in many economically disadvantaged elementary schools is a few computers in the back of the room and periodic visits a few times a week to a computer lab, laptops offer a viable option for economically disadvantaged schools to increase Internet accessible devices (Becker, Ravits, & Wong, 1999; Hill, Reeves, & Heidemeir, 2000; Schrum & Bracey, 2003). According to Kemker et al. (2007), simply putting laptops in the hands of students is not a guarantee that any significant difference in teaching or learning will take place, especially in economically disadvantaged schools. Software that fosters authentic activities includes word processors, spreadsheets, and publishing tools, which allow students to collaborate, think, and create (Kemker et al.).

Fostering a Technology Rich Environment

Whidden (2008) states that normally the academic community advocates for 1:1 initiatives to propel instruction toward meeting academic goals. These projects are not technology driven initiatives, but rather initiatives driven by educators (Thomas, 2013). Thomas (2013) further explains that these initiatives usually focus on “infrastructure, availability, and technical supports” (p.1). While Derringer (2010) recognizes that 1:1 initiatives can be taxing from an IT perspective, most districts report from the academic community that the benefits of the project, which include more relevant and student driven learning, are worth the effort.

When moving from preparation stage of the initiative to the implementation stage, the device itself must be considered. Fullan (2013) describes well-designed, educational technology products as having a “sophisticated design combined with irresistible, engrossing ease of use as you acquire deep learning competencies at an affordable cost (p. 55). When implementing new technology into instruction, the ease of use for teachers and students must be considered. A device that is simple to use reduces the amount of distraction the device itself puts on the implementation; therefore, concentration can be placed on the implementation itself. Prior to the implementation of the new technology, during the preparation stage, the impact the ease of use has on teachers and students must be considered for the application to come to fruition.

One of the features considered when selecting the Chromebook and GAFE was the ease of use, especially in regards to the incorporation of cloud computing. Cloud computing is simplistically defined as “files that are saved through websites, rather than being stored on a local computer’s hard drive” (Covili, 2012, p. 9). Cloud computing creates opportunities for teachers to collaborate with students and for students to collaborate with students by using these capabilities. Cloud computing offers students an easy way to access their work at any location. Due to the rural context of the project, offline mode allows students to continue work even if connectivity is not possible from the student’s home.

When considering device simplicity, the Chromebook was studied to determine that the efficiency of the device itself and how well the corresponding

Chrome applications met the needs for our students. “The simplified architecture means that Chromebooks are significantly easier to manage than traditional PCs” (O’Donnell & Perry, 2013). The simplistic design of the Chromebook and Chrome applications use internet connectivity and cloud storage to allow for the creation, storage, and collaboration of files and applications by the user. A Gallia County Local School District survey conducted in 2014 indicated that 28.3% of GCLS students did not have reliable internet access capabilities at home. Of those reporting with internet access, 49.0% reported that their Internet was through their cellphone carrier; therefore, a device that supported offline applications was crucial to meet the needs of all students. Features such as automatic save of changes while using Google applications were also beneficial for students since they often forget to save and the probability of losing the external storage drive is high.

At times, the world of technology and pedagogy seem to be in conflict with one another. This is not due to an incompatibility between technology and pedagogy, but because of the pace at which technology changes compared to the pace of education. Fullan (2013) suggests that “pedagogy and technology provide the directional vision; change knowledge helps us achieve it, learning while we go” (p. 66).

Developing Change Agents

Understanding the change process is essential to fostering the transition to a technology rich environment (Fullan, 2013). The four criteria of change knowledge needed to make this shift include:

(1) motivate people to engage in deep meaningful change, even when they might not want to do it at the outset; (2) help them learn from wrong paths and blind alleys; (3) use the group; and (4) do all of this on a very large scale.

(Fullan, 2013, p. 66)

Hattie (2009) identified the following as skills needed for a teacher to become a change agent: “knowledge and skills; a plan of action; strategies to overcome setbacks; a high sense of confidence; monitoring progress; a commitment to achieve; social and environment support; and, finally, freedom, control, or choice” (p. 251).

In the following, Fullan (2013) explains a Canadian study conducted by Bond and Anderson describing the change process used to move to a technology rich environment:

Since September 2009 our staff has been engaged in a change process that has taken it from no classroom technology to a digitally rich learning environment through the collaborative development of the framework, its activation, and now its assessment. We believe that if we are going to invest money, time, and other resources in purchasing and integrating technology, it needs to be hugely value added with respect to student learning. Moreover it needs to lead to the development of 21st Century skills and ways of thinking required by students to be global critical citizens who can help change the world for the better. (p. 53)

On-going, differentiated professional development. According to Fullan (2013), the key to fully implementing technology in the classroom includes sound

instructional design that is based on partnerships between and among students and teachers. Partnering, as described by Prensky (2012),

is a catchall term for approaches that include problem-based learning, case-based learning, inquiry-based learning, student-centered learning, and others. At their core, they are all variations on the same central pedagogical idea...an end to teaching by telling, and a reassignment of roles for the teacher and students. (p. 15)

To solve complex problems, Lehrer (2012) concludes that one must find the sweet spot of creative collaboration which includes a balanced mixture of experience and new ideas. Prensky (2012) and Wagner (2012) conclude that peer to peer learning orchestrated by a teacher who has become a change agent is a free resource strongly aided by technology.

Initial examinations of educational technology suggest that an increase in technology would merit an increase in skills and achievement of students; yet at times, that is not what is shown. Grundmeyer (2013) summarizes his findings of the impact of a 1:1 initiative has on high school graduates in their first year of college. Grundmeyer suggests that in order for schools to attain the most impact from the initiative, three themes must be implemented before and throughout the initiative. First, technology integration should be well timed and have the infrastructure to support the initiative (Grundmeyer). Secondly, the school should establish clear and measureable outcomes, building upon buy-in from stakeholder groups (Grundmeyer). Finally, teachers must have experiences using the technology prior to the integration

of the technology initiative (Grundmeyer). Grundmeyer (2013) included comments by students indicating that when new technology was introduced, the transition period to incorporate the technology by teachers, at times, resulted in negative effects felt by students throughout the entire year.

Moss (2011) investigated the preferred types of professional development for technology integration. In his study, Moss found that almost 60% of teachers preferred attaining skills through hands-on methods while 45% of teachers expressed that combination lecture/hands-on approach was helpful. Video-taped lessons were the least preferred professional development offered to the teachers (Moss).

Lewis (2012) identified needed supports for teachers to implement the 1:1 technology into the classrooms. Initially teachers were given a two day training (Lewis). A technology resource teacher was in the school that provided on-going support throughout the year (Lewis). This resource teacher provided participants the needed professional development when teachers were ready to learn more about the device they were implementing in the classroom (Lewis). In addition, the technology resource teacher modeled content lessons to teachers using 1:1 technology (Lewis). Teachers identified the on-site support given through the on-site professional development as essential to the success of the 1:1 project (Lewis).

Often educational leaders are concerned with the quality of professional development offered to teachers concerning the integration of technology. Fullan and Stiegelbauer (1991) speak of the frustration of teachers who are expected to sit and receive professional development on existing software, yet never allow for teachers to

experience the software themselves. As a result, “thousands of workshops and conferences led to no significant change in practice when the teachers returned to their classrooms” (Fullan and Stiegelbauer, p. 315). Teachers are more likely to incorporate technology into student learning when the professional development is recognized as applicable and useful to the content they are teaching (Kanaya, Light, & Culp, 2005). Furthermore, teachers are more likely to use technology with students when they are actively involved in their own learning process and that of their peers (Frank, Zhao, & Borman, 2004; Riel & Becker, 2000).

Warschauer et al. (2014) conducted a comparative case study consisting of Saugus, Littleton and Birmingham school districts in California, Colorado, and Alabama respectively. In all three locations 1:1 laptop initiatives, consisting of inexpensive netbooks with open source software, were implemented in fourth and fifth grade classrooms (Warschauer et al.). The goals of these initiatives were to increase use of technology among students and elevate educational equity (Warschauer et al.). These projects had different outcomes, suggesting that certain conditions must be present for a more successful 1:1 result (Warschauer et al.). Implications for this project included securing teacher buy-in, involving teachers in the selection process, and incorporating on-going professional development that will enhance the curriculum (Warschauer et al.).

As mentioned earlier, simply adding laptops will not increase student learning (Kemker et al., 2007; Orr, 2014; Warschauer et al., 2014). Teachers and students have to be excited and educated about the 1:1 initiative, and the uses for the laptop

have to be thoughtfully crafted with buy-in from the stakeholders (Orr; Warschauer et al.). Barriers to be considered and addressed that are imperative to the success of the initiative include time, beliefs, access, professional development, and culture (Kopcha, 2010).

Extrinsic to intrinsic motivation. In his work over the past 30 years, Cuban (2001) studied the history of education and the difficulty of transforming education into what it could be. Cuban argued that too many people are too eager to spend a great deal of money on technology without ensuring that the proper steps are taken to fully integrate the technology into the classroom. Hinson et al. (2005) described a five step process for professional development for teachers consisting of planning, preparation, instruction, refinement, and evaluation. Grundmeyer (2013) pointed to the hype cycle and magical thinking as two reasons theories explaining why the investment is larger than the impact.

Cuban (2014) used Gartner's (2014) hype cycle to describe the phases that technology enthusiasts go through when new innovations come along. The phases of the hype cycle included: "1) technology trigger, 2) peak of inflated expectations, 3) trough of disillusionment, 4) slope of enlightenment, and 5) plateau of productivity" (Gartner, 2014, "How Do You Use Hype Cycles", para 1-5). The disillusionment occurred when the device did not perform exactly as expected (Grundmeyer, 2013). To keep teachers from falling victim to disillusionment, professional development and support must be in place so that teachers will keep integrating the technology (Fullan, 2013).

Advocating for a new pedagogy, Fullan (2013) contrasted the current state of most schools today with the pedagogy used to foster 21st century skills. Fullan uses Wagner's description of the new pedagogy. Wagner (2012) described current schools as "rewarding individual competition, are subject motivated (versus problem based), and rely on extrinsic motivation (such as grades)" (p. 24). Wagner described this new pedagogy as having three components. The first component is expertise and knowledge (Wagner). The second component identified by Wagner is creative thinking and problem solving. The third component identified by Wagner is motivation. This new pedagogy involves inspiring students to develop purpose and passion in solving problems in an environment that encourages risk taking (Fullan).

According to Fullan (2013), evidence indicates that neither students nor teachers will learn as effectively if left to work on their own. To create the right conditions for students, teachers must have the right environment to try this new pedagogy. Fullan proclaims that studies have shown that extrinsic motivators and positive feedback matter less than students and teachers feeling that they were making progress under conditions that encourage risk taking and avoided overreaction when trials failed.

The phenomena of magical thinking occurs often in the world of education (Cuban, 2014). Cuban (2014) refers to Mike Trucano's recent blog post of the nine worst ICT practices in education. The first worst practice described is merely sending the technology into classrooms and expecting the technology to be used simply because of its presence (Trucano, 2010). He further explains that magical thinking

occurs in various aspects of life, it is part of our human make-up, and it helps explain how we rationalize the amount of money we spend on technology without the preparation that needs to go into making it matter (Cuban & Jandrić, 2015).

As compared to magical thinking, a pattern modeled by Belcher (2014) was outlined while deploying a 1:1 iPad initiative in the Mason County School System in Maysville, Kentucky. Belcher outlined the unsuccessful attempt to deploy a vision of a 1:1 environment using a top-down approach. As previously defined by Kezar (2012), top-down approaches are initiated by those in authority while bottom up initiatives come from those without positions of authority. The vision was more readily accepted by teaching staff in the Mason County School System by using a bottom-up approach (Belcher). Using a similar approach, the researchers were working to create an urgency, among a group of teachers, in the development of critical thinking skills with increased technology being the linchpin between what has been and what could be.

Managing meaningful technological and pedagogical change involved paying attention to the small wins and setbacks as the initiative is being implemented (Fullan, 2013). Amabile and Kramer (2011) describe “using small wins to ignite joy, engagement, and creativity at work” (p. 1). The secret to better change “is creating the conditions for a great inner work life - the conditions that foster positive emotions, strong internal motivation, and favorable perceptions of colleagues and the work itself” (Amabile & Kramer, p. 1). With help to make meaningful progress,

people involved in meaningful work and confident in their capabilities become more motivated and ready for upcoming challenges (Fullan).

Producing change agents involves transferring ownership. Teachers involved in small group work begin to design and guide learning. Principals help develop and lead leaders (Fullan, 2013). Leadership must drive a cohesive system that inspires others “to focus, to innovate, to empathize, to learn, to collaborate, to relish transparency, to shed non-essentials, and to develop leadership in themselves and others” (Fullan, p. 70). Developing the group fosters the development of the individual on a large scale (Fullan).

Summary

“Technology is not a panacea. Not all technology is good for pedagogy. And great pedagogy can and will exist without technology” (Fullan, 2013, p. 78). However the inclusion of technology can create many opportunities for instruction. “Technology and schooling are operating at cross-purposes and have been doing so for some time. Fullan describes that “even the most sophisticated technology still needs to be guided by strong pedagogy”; therefore, the process and procedure used to implement the technology must be considered (p. 58).

Literature suggests support is needed throughout the integration of new technology and pedagogy in order to realize a technology rich environment. “As long as digital immersion and schooling function in isolation, and are not steeped in real-life problem solving, we will not see any progress” (Fullan, 2013, p. 40). It is the responsibility of educational leaders to foster the relationship of technology in

pedagogy as well as pedagogy with technology. The educational leader should focus on recruiting the right people, supporting those recruited through professional development, and developing a desire in those teachers to continue as change agents toward a goal of improved pedagogy enhanced by technology.

Who Is the Capstone Meant to Impact?

Local Context

The Gallia County Local School District is located in rural, southeastern Ohio along the Ohio River. The district consists of 471 square miles of mostly hilly, difficult to navigate farmland. The terrain and lack of resources contributes to the county's low ranking for internet connectivity in 2013 (U.S. Department of Commerce, 2013). The population density of Gallia County is 66 persons per square mile, compared to the state average of 282 (U.S. Department of Commerce, 2013).

In conjunction with the lack of Internet capability among the county's citizens, the students and teachers in the Gallia County Local School District used technology in a very limited capacity. Schools did not have a 1:1 access to devices, and according to the district's policy, students were not permitted to bring their own devices to use in the classroom (Gallia County Local School District, 2015). The use of technology in the classroom mainly consisted of the use of intervention and assessment programs on a limited number of devices. In many classrooms across the Gallia County Local School District, this equated to a maximum of four computers in the rear of the classrooms, as well as to scheduled sessions into a computer lab.

To understand the vastness of the rural district, the makeup of the district is considered. There are 7 school buildings in our county consisting of one high school, one high school/middle school, one middle school and four elementary schools as of 2015. The neighboring city school district is in the middle of the county district. The county district is divided into a northern area and southern area. This capstone involved an elementary in the southern area of the district and the high school in the northern area of the district.

The distance between the two areas of the district present a particular challenge in the overall operation of the district. Gallia County has 29 bus routes that transport approximately 1,600 students daily. At the elementary and high school level, district buses begin picking students up at 6:00 am, resulting in some students experiencing a 2 hour morning bus ride. It takes approximately 2.5 hours to drive to all the schools in the district, with the farthest two schools requiring approximately 50 minutes of travel time. Driving from the most northern area of the GCLSD to the most southern area requires approximately 1.5 hours.

Elementary site reality. Elementary school classrooms were basically equipped with four to five computers in the back of the classroom. Most elementary classrooms had a mounted projector and Mimio board which was purchased through Title I funding. The elementary school in this study had one computer lab with 20 working computers, a cart of Xoom tablets, and 40 Kindles in the library. The XOOM cart and Kindles were checked out through the library on an as needed basis.

Around 50% of teachers used technology consistently for management of lesson delivery. Technology was used least for intervention, according to the latest Gallia County Local Schools survey. Most teachers surveyed in the 2014 Gallia County Local Technology Survey reported that more devices in the classroom would increase their use of technology in instruction.

Elementary students were not permitted to use many of the GAFE applications because they did not have a Google account. As a result of conversations between the building administrator and the Gallia County Local Schools Technology department, elementary students were given access to GAFE applications.

Secondary site reality. As of the 2014-2015 school year, high school classrooms were equipped with one teacher computer and zero to two computers in the back of the classrooms. Students had access to a lab, associated with the library, with 30 working computers. Teachers scheduled classes in the computer lab as needed, only if there was a special project or a district-wide testing that required computer use. Each classroom was equipped with a projector. Five classrooms had access to interactive whiteboards, but no training was given to teachers on the use of those whiteboards.

2014 Gallia County Local Schools Technology Survey. During the 2014-2015 academic year, the researchers began examining the data compiled in a district-wide survey of professional staff. The survey was deployed by the technology department of the Gallia County Local School District. The district staff survey was

developed by a team of principals and the Director of Technology to explore technology resources available and the perceived deficits in technological opportunities for student learning. The survey was designed to identify the current status of technology in the Gallia County Local Schools and began to explore the observed deficiencies in resources and use of technology in the classroom as perceived by the professional staff. The staff survey was developed using a few questions to gather initial information for the development of a more targeted survey.

Table 2

Number of Respondents to the 2014 GCLSD Technology Survey

Grade Level	Number of Respondents
Elementary (Kindergarten – Fifth Grade)	52
Middle School (Sixth Grade – Eighth Grade)	14
High School (Ninth Grade – Twelfth Grade)	39

The 2014 GCLSD Technology Survey garnered 105 voluntary responses. Half of the respondents were elementary (K–5) teachers, 13% were middle school (6–8) teachers, and 37% were high school teachers. Table 3 presents the number of years of experience for elementary, middle, and high school teachers of the respondents to the survey.

Table 3

Gallia County Local School District Teacher Years of Experience

Grade Level	Years of Experience			
	0-10	11-20	21-30	31+
Elementary (K-5) (n=52)	21	19	9	3
Middle (6-8) (n=14)	5	2	6	1
High (9-12) (n=39)	23	8	8	0

Current technology infrastructure in the Gallia County Local School District.

As reported on the survey, the number of devices currently in classrooms was less than the minimum number of devices perceived by the teacher needed for full implementation of technology in the classroom. An even greater disparity existed between the number of current devices and the perceived optimal number of devices needed for full implementation. Table 4 shows the percentage of classrooms with six or more computers. While less than 30% of the classrooms have six or more computers, over 60% of the teachers reported that the optimum number of computers in the classroom should be 14 or greater as shown in Table 4.

Table 4

Classrooms with at least 6 computers versus teacher optimum number of computers 14 or greater

Grade Level	Percentage of Classrooms with 6 or more computers		Teachers Perceiving the Optimum # of computer to be 14 or greater	
Elementary (K-5)	32%	(n=11)	62%	(n=32)
Middle School (6-8)	50%	(n=7)	100%	(n=14)
High School (9-12)	28%	(n=11)	77%	(n=30)

One of the barriers was accessibility to a device inside and outside of the school building. The current policies were not friendly toward students bringing their own devices to school (Gallia County Local School District, 2015). There were not enough devices at school for a majority of the population to be on a device at one time. According to the 2014 GCLSD Technology Survey, 28% of the surveyed teachers from elementary to high school had 6 or more computers in their classrooms, while 73% of those same teachers reported that the optimum number of computers would be more than 14 computers in the classroom. In addition, 28% of the students did not have access to a device or the Internet at home. With the results of this survey, the goal of the capstone was to address the lack of adequate availability of technology.

In the Gallia County Local Schools, many advances were made to support the integration of technology, such as the infrastructure in all buildings. The schools all had Wi-Fi accessibility that could support a high number of devices. Also, the district

contracted to provide one additional technician to support the integration of technology.

A challenge for educational technology has often been the limited background of the technology personnel and the background of the educator. A technician, many times, only saw the technical side of a problem or a solution. This perspective did not account for the very important educational perspective necessary to support the need of the technology. The second struggle was the lack of understanding educators had regarding the use, care, and complexity of the technology being used. Many times educators did not care to know the how or why of technology, only that it worked when they expected it to work.

Current use of available technological resources. Educators in the GCLSD reported that 94% used their teacher PC at least weekly, with 88% reporting daily use. Projectors were used by 84% of teachers at least weekly with 54% using projectors daily. Interactive whiteboards were used by 46% of teachers weekly. Tablets were only used 13% of the time weekly or daily with 75% of the teachers only using them once or twice a year. Student response systems were only used once or twice a year by 92% of the teachers.

Table 5

Teacher comfort with technology

Grade Level	Teachers self-reported comfort with technology Number	Teachers self-reported comfort with technology Percentage
Elementary (K-5)	43	82%
Middle School (6-8)	10	71%
High School (9-12)	36	92%

As seen in Table 5, 82% of elementary teachers and 92% of high school teachers were comfortable using technology for management, lesson planning, lesson delivery, and assessment. For Tables 6 and 7, teachers were asked to rate the barriers with 1 being the greatest barrier and the 4 being the least barrier. The mean of the responses was calculated in each of these categories. The lowest number indicates the greatest barrier in the tables below. Teachers reported that they need further information in the areas of Management (M=1.39) and Lesson Planning (M=1.31). This indicates teachers are comfortable with using technology for the purposes of Management and Lesson Planning, but they need further professional development on how to use the technology. The greatest concern was student concerns for Lesson Delivery (M=2.41) and Assessment (M=2.28).

Table 6

Elementary barriers to technology in the classroom reported by teachers

	Not Comfortable	Lack of Device	Need More Information	Student Concerns
Management	2.27	2.33	1.39	NA
Lesson Planning	2.98	2.33	1.31	NA
Lesson Delivery	3.96	3.39	2.73	2.41
Assessment	3.88	3.48	2.82	2.28

Table 7

High school barriers to technology in the classrooms reported by teachers

	Not Comfortable	Lack of Device	Need More Information	Student Concerns
Management	2.47	1.89	1.63	NA
Lesson Planning	3.25	2.75	1.69	NA
Lesson Delivery	3.97	3.14	2.73	2.08
Assessment	3.97	3.16	2.70	2.46

Like the elementary teachers, the high school teachers identified the need for more information in the areas of management (M=1.63) and lesson planning (M=1.69) as the greatest barriers to using technology. The greatest barrier identified in the areas of lesson delivery (M=2.08) and assessments (2.46) was student technical skill.

Table 8

Reported projector and student response system use in classroom by grade level

Grade Level	Teachers reporting weekly projector use		Teachers reporting weekly student response system use	
Elementary (K-5)	82%	(n=43)	6%	(n=3)
Middle School (6-8)	100%	(n=14)	0%	(n=0)
High School (9-12)	82%	(n=32)	5%	(n=2)

The findings indicated teachers used technology when it was readily available to them on a daily basis. One example was the use of projectors in the classroom. Based upon the survey, 82% of elementary and 82% of high school teachers reported using projectors at least weekly, which was nearly the same percentage of teachers that had access to a projector mounted in their classroom. In contrast, student response systems were reported as being used more often than once or twice a year by only 6% of elementary teachers and 5% of high school teachers. However, only one or two student response systems are available in each building. These findings support that availability of devices to teachers and students is key to increasing the integration of technology into instruction.

How Was the Capstone Project Implemented?

Introduction

The purpose of the project was to provide teachers with the pedagogical, technological, and responsive professional development so students could experience and thrive in a technology rich environment. The study used a mixed methods

approach combining quantitative data collected from questions about teacher integration and student perceptions from a teacher and student survey using a Likert type scale. Qualitative data was collected as anecdotal evidence from teacher and student work throughout the implementation process. Open-ended questions contained in the teacher and student surveys were additionally used.

Research Design

The goal of the capstone was to examine the technological, pedagogical, and infrastructure needed to inspire teachers to begin the process of developing technology rich environments. The researchers chose to implement a classroom cart concept at the elementary level in the fourth and fifth grade. A 1:1 implementation occurred at the secondary level in grade 12. The foundation of this concept was to develop a technology rich environment that would foster independent learning. The research was designed to examine both the impact of professional development on teacher integration of technology in the classroom, as well as student attitudes toward learning by having access to a 1:1 device and applications that foster critical thinking, creativity, and collaboration.

Professional development. The development of a technology rich classroom necessitated more than simply adding Chromebooks to the classroom. The professional development and continual support was as important as the devices themselves. A recent conversation with a colleague from another district revealed that they also recently purchased Chromebook carts for classrooms. Those carts sat in a teacher workroom for at least month before anyone knew they were there. In

addition the teacher, identifying herself as a tech savvy teacher, indicated she had some knowledge of how to use a Chromebook, but admitted that she had little to no training on how to incorporate these into her classroom. The lack of forethought and support for teachers potentially created a waste of capital resources and a missed opportunity to monopolize on momentum for teachers and students alike.

The inspiration for this professional development came from the thoughts of many educational innovators. The intent of the professional development was to introduce teachers to their new Chromebook and applications. However, the most important element in this professional development was the encouragement and inspiration to develop the right conditions for a technology rich classroom. Teachers were not asked to change the way they were teaching. These teachers were asked to make a “pivot.” The name for the professional development was Promoting an Innovative Vision for Outstanding Teaching with Technology, P.I.V.O.T.T.

Educational innovators. The revolution, the calling of champions, began with the inspiration to become champions for children from Rita Pierson’s TED Talk titled *Every Kid Needs a Champion* (TED, Talks Education, 2013b). This video was used to frame the thought process for the teachers involved to connect our view of them as champions within the building. Rita Pierson stated the thought of Steven Covey, to seek first to understand as opposed to being understood. This was the theme that was carried throughout the P.I.V.O.T.T. professional development. As educational leaders, we modeled this throughout the professional development, asking questions

of the participants and allowing them to have control and influence throughout the professional development

Prensky (2008) stated it's their after-school education, not their school education, that's preparing our kids for their 21st century lives and they know it" (p. 41). This quote focused the next section in the P.I.V.O.T.T. professional development. Educational leaders, such as Grant Lichtman and Heidi Hayes Jacobs, were included in order to demonstrate their advocacy for further instruction of 21st century skills. Heidi Hayes Jacobs described in the School Improvement Network (2012) presentation at the 2012 School Improvement Innovation Summit held in Salt Lake City the need for including those skills for all students. There cannot be a delineation of those that have and those that do not have; making a case for the elimination of the digital divide. Jacobs challenged teachers to look at the skills necessary for students in the 21st century not as 21st century skills, but rather as "right now" skills (School Improvement Network). The 21st century is partially over, and, therefore, we must look at skills as being essential to students in the moment.

Another primary innovator used in the P.I.V.O.T.T. professional development was Sir Ken Robinson. Sir Ken Robinson was used to facilitate the reflection process for teachers on education in general, as well as for those practices being implemented currently in their school or classroom. In Robinson's TED Talk "How to Escape Education's Death Valley" (TED Talks Education, 2013c), he references the high precipitation during the winter of 2004 and resulting flowering in the spring of 2005

to parallel the dormant nature of educational systems. In schools, students and teachers may have many seeds of possibilities just below the surface.

P.I.V.O.T.T Creation. The hardware and software applications expected to be used were incorporated into the professional development. Google Classroom was used to deploy the professional development. Other applications that could be employed through GAFE were also used in the planned activities. The introduction included *Every Kid Needs a Champion* (TED Talks Education, 2013b). A discussion about the importance of building relationships with students and providing them with a technology rich environment was planned. The first assignment involved using a Google Form to decide what kinds of toppings participants wanted on their pizza. After filling out the survey form, responses were readily available to customize the pizza order. This activity was designed to allow practice with Google Forms before participants filled out the technology survey designed to gather information for the capstone project.

Following the first assignment, participants were asked to take a survey using Google Forms once again. This was the initial survey used in the capstone to gather information about teacher usage of the hardware and software provided by the district, professional development preferences, and teacher perception of technology on student performance. The teacher technology survey consisted of four demographic questions, seven hardware integration questions, nine software integration questions, seven level of teacher use of software tools questions, six

Google applications questions, eight teacher perception of student learning questions, two teacher technology skills questions, and 10 professional development questions.

The next activity involved three videos surrounding the topic of 21st century learning. Teachers involved in the professional development were asked to choose and listen to one of the videos on 21st century learning. While listening, they were asked to choose a one minute segment of the video that reflected their thinking, answered a question they may have had, or involved information that needed further discussion. A discussion surrounding the minute video clips was planned to explore the current status of 21st century learning in the classroom.

Following the 21st century learning activity, participants listened to an 11-minute presentation by Sir Ken Robinson discussing changing educational paradigms (TED Talks Education, 2010). During the viewing of this video, teachers were assigned a Google Doc through the Google Classroom assignment which asked them to add comments under the 'agree' and 'disagree' columns on the document. The activity was designed to generate discussion and reflection of current teaching practices. After the video, teachers participated in a planned discussion of current practice compared to using GAFE activities which were presented during the professional development.

After establishing the need for increased access to technology and GAFE, the remainder of the professional development introduced participants to the GAFE applications. As noted in the technology survey, few felt comfortable with these applications; therefore, the researchers loaded tutorials onto the Google Classroom

that included the basics surrounding the Chromebook and GAFE. These tasks were designed to give the teachers an introduction to the applications. The plan included allowing the participants to try to develop docs, forms, slides, and classroom assignments on their own while we were there to support them.

The second day of training was designed as a continuation of the first day. Teachers were greeted with theme songs from movie and television. Again, we used Google Classroom and a Google Form to order lunches. Then, participants were asked to choose a theme song that matched their current status of work on their plans to create a technology rich classroom. The choices were: *Mission Impossible* - I'm struggling. I have worked with it, but I'm not getting very far; *Dukes of Hazard* - I haven't really thought about this too much. I am just enjoying my summer; *Gilligan's Island* - I started on course, but I have taken a little detour; *Green Acres* - I'm living successfully in this new world, but I am not liking it much; or *Happy Days* - I have it under control, and I am looking forward to incorporating it into my classroom.

After participants completed the form, another video featuring Sir Ken Robinson describing the importance of creating the right environment for learning was shown (TED, 2013b). This video was designed to spark discussion surrounding the creation of technology rich environments that would foster learning and creativity in the classroom. The rest of the professional development was planned to allow teachers to explore the tutorials shared during the first day of professional development. Time was scheduled for teachers to explore the GAFE applications and

develop lessons, docs, forms, sheets, and slides that would be used in the upcoming school year.

Implementation of P.I.V.O.T.T. The researchers secured and offered the usual stipend extended to Gallia County Local School Teachers for summer professional development using Title IIA funds. The two-day training was scheduled from 9:00 a.m. to 3:00 p.m. each day. The first day of training was held in mid-July at the elementary building with elementary teachers attending. We repeated that training with the high school teachers at the high school building the first week of August. The second day of training was held at the high school with elementary and high school teachers in attendance.

Response to the activities presented in Google Classroom by the elementary teachers during the first day of training was positive. Discussion was generated and teachers seemed to appreciate the perspectives presented by the educational innovators. The elementary teachers were especially interested in the use of Google Forms and the potential for the add-on, Flubaroo, to grade the responses. Teachers were encouraged to revisit the classroom to review the tutorials and try to create assignments using GAFE applications before the second day of training in mid-August.

The first day of training with the high school teachers was full of discussion and perspectives on student engagement and the need to include technology and higher order thinking in the classroom. Teachers brainstormed ideas for using some of the activities presented with GAFE for their students in the upcoming year. Again,

teachers were encouraged to try to create lessons and activities using the GAFE applications before the mid-August training.

The second day of training for elementary and high school teachers was full of activity and self-paced learning. By the second day, participants expressed the need to develop technology rich environments in their classrooms. Most of the day was filled with teachers working together to use the GAFE tools to create documents and assignments. The researchers were there to assist teachers with any questions they had as they were developing their activities.

Elementary subjects and sampling

The subjects in the elementary portion of this project included 32 fourth grade students and 24 fifth grade students who had 1:1 access to Chromebooks in their language arts and math classes. All students in the 4th and 5th grade were given the same access to the Chromebooks throughout the 80-minute language arts and math classes. In addition, six teachers assigned to third through fifth grade classrooms were involved in a professional development opportunity to familiarize them with the Chromebooks, GAFE, and other available free applications. These six teachers were surveyed to measure how the professional development affected their use of free applications introduced in the professional development.

The fourth and fifth grade math and language arts teachers each had access to a cart containing one Chromebook for each student. The language arts teacher had 18 years of teaching experience while the math teacher had 17 years of teaching experience. The other four teachers were given the professional development in

anticipation of receiving access to two more Chromebook carts to share among them. These four teachers had access to five computers in the back of the classroom and a computer lab which they had access to three times a week. The fourth and fifth grade science teacher had 22 years teaching experience while the other three teachers, consisting of two third grade teachers and the fourth and fifth grade social studies teacher, range in teaching experience from zero to four years. The mean age of the teachers in the study was 38.5.

Secondary subjects and sampling

The subjects of the secondary portion of this project consisted of 12th grade students and their teachers. Approximately 70 twelfth grade students were enrolled at River Valley High School in grade 12, which consisted of all academic levels including students participating in dual enrollment courses as well as students with Individual Education Plans (IEP). The prior technology access to these students consisted of limited opportunities for computer lab access in the form of an established lab or as a mobile lab used on a limited basis.

The study examined the six educators teaching the 12th grade students. The median years teaching experience of these six teachers was 5.5 years with a mean of 16.5 years experience. The median age of the teacher population was 41.5 with a mean age of 41.3. The instructional classrooms were equipped with student workstations in the rear of the classroom, most containing a maximum of four computer stations.

The group of six secondary teachers received professional development including one session prior to school and various mini-lessons throughout the year. No teachers had previously worked in a 1:1 setting and only one teacher used GAFE during the 2014-15 academic year. The one teacher that used GAFE completed a PILOT opportunity in the secondary building during the 2014-15 academic year and was used as a resident expert for the incorporation of the Google Apps for Education tools for instruction.

Instrumentation

The *Instructional Technology in the Classroom: A Training Needs Assessment* developed by the University of South Carolina Center for Teaching Excellence was used in part to develop the Gallia County Local Schools Staff Technology Survey. The staff survey asked questions investigating the integration of hardware and software in the classroom. Many questions regarding 21st century skills, the use of technological tools for 21st century skills, and the associated professional development related to expanding and refining the instruction of 21st century skills. In addition, questions regarding preferences for professional development among staff were asked. Staff perceptions of student learning with technology was investigated through the staff survey.

The student survey involved questions regarding student perceptions concerning technology in the classroom. Questions seeking student perceptions of technology use in the classroom after professional development was provided to

classroom teachers. In addition, questions regarding student preferences regarding technology were included.

Procedures

The staff survey was administered during the first day of professional development to both elementary and secondary staff members attending professional development before the Chromebook initiative began. Staff members were asked to answer a survey considering their use of technology during the 2014-15 school year. At the end of the first semester of school, staff took the survey again, considering their usage of technology during the first semester of the 2015-16 school year. The staff survey investigated the perceptions of integration of technology in the classroom, teacher use of technology, and professional development needs. Data were collected from both surveys using Google Forms.

The student survey was administered to students in 4th, 5th, and 12th grades at Hannan Trace Elementary and River Valley High Schools at the end of the first semester of the 2015-16 school year. The student survey investigated student access to technology, academic use of technology, perceptions toward proper use of technology, as well as future plans and perceptions toward responsible digital citizenship. The student survey was administered and data collected using Google Forms.

Why Were This Capstone and Related Strategies Selected?

The capstone was developed in tiered deployment stages. First was an inspection of the infrastructure within each building to determine if such a program

was possible given the current status. Next, a survey was conducted to gather information for a greater understanding of current technology available to teachers, teachers' current use of that technology, and to what level it is being implemented in classroom instruction. The survey was conducted to identify disconnects between the current technology programs and the equipment available, as well as the use of those programs and equipment. Using these data, the plan for implementation of the capstone project was developed. Next, a subset of teachers with varying levels of technology expertise were selected to serve as champions for a technology rich classroom.

When Was the Capstone Implemented?

An analysis of infrastructure to support wireless connectivity throughout the district was conducted in the Fall of 2014 after a recent upgrade by the district. It was determined that both the elementary and high school buildings had the wireless infrastructure to support the number of Chromebooks proposed for the project. Prior to beginning the capstone, during the 2014 school year, two carts of Chromebooks were purchased by the school to be kept in two high school classrooms. One teacher began to integrate the GAFE tools into her instruction and students were provided access to GAFE tools. The teachers and students reported very few problems with the Chromebooks during this trial, and building and district technical support personnel provided minor support.

The elementary portion of the capstone project began in the Spring of 2015. Two carts of Chromebooks were purchased for the 4th and 5th grade math and

language arts classes at the elementary building through the school's Title I funds. At the high school, the district for the 1:1 project purchased 75 Chromebooks for seniors through grant funds. In addition to the Chromebook purchases, provisions were made to provide professional development for six elementary teachers and 10 high school teachers during the Spring of 2015. Additionally, the district's Technology Director and the researchers developed policies and procedures defining responsibilities of the students, parents and district in regard to the 1:1 initiative. In late May 2015, both elementary and high school teachers involved in the professional development were given a Chromebook to take home. They used this opportunity to become familiar with the Chrome operating system and GAFE tools.

In late July and early August 2015, the elementary and high school teachers attended two days of professional development. During the first day of professional development, a need for shifting to a technology rich environment was established. Teachers were given ideas and time to design a technology rich environment in their classrooms. Teachers completed the survey on their current use and attitudes toward technology at the beginning of this first day of professional development. On the second professional development day, teachers were given specific instruction and support on the GAFE. Teachers were given time to explore and create work on various apps with support from the researchers.

In August 2015, senior students and their parents were invited to a meeting to assign students their Chromebook. Parents and students signed the Acceptable Use Policy (AUP) while at the meeting. Within two weeks of school starting, every senior

in the high school had a Chromebook to use at school and home. Within the first two weeks of school at the elementary level, all students had their AUP forms turned in and were assigned a specific Chromebook in their math and language arts classrooms.

From September 2015 to January 2016, teachers and students used the Chromebooks at the high school and elementary levels. At the elementary level, a Technology PLC was formed, and teachers that were involved in the technology professional development met monthly to discuss ideas for Chromebook integration in the classroom. High school and elementary teachers involved in the initial professional development received e-mails encouraging new apps and were provided support for the apps used through GAFE. In January 2016, teachers responded to a second survey after using the Chromebooks in their classrooms for the first semester of the 2015-16 school year. High school and elementary students were given a survey in January 2016 to gather information concerning their use of technology at school and home.

Impact of the Capstone

Results and Findings of the Capstone

Teachers participating in the capstone project completed a survey, once prior to the first professional development session and once after the completion of one semester incorporating the skills acquired throughout the professional development. This survey asked questions regarding hardware integration, software integration, level of teacher use of district purchased software, level of teacher use of GAFE, perception of 21st century skills in a technology rich environment, and amount of

professional development needed to make the transition to a technology rich environment.

Teacher Data

For each possible response, a numerical value was assigned for calculation purposes to indicate if an increase or decrease in use occurred (Table 9). The purpose of this numerical value was to be used to indicate an increase or decrease in use, comparing use prior to the beginning of the capstone compared to the conclusion of the capstone. The numerical values should not be used to compare the use of one tool to another tool, as some tools may be applicable to the associated discipline of one teacher and not an applicable discipline of another teacher.

Table 9

Hardware Integration Survey Response Point Values

Response	Point Value
Not Applicable	0
Not Used	0
Quarterly	1
Monthly	2
Weekly	3
Daily	4

Hardware integration. The data presented in Table 10 reports teacher integration of hardware devices into classroom instruction. The use of the personal computer for both elementary teachers and secondary teachers decreased from the

survey prior to the professional development and deployment of the Chromebooks compared to the survey results after the professional development and deployment of Chromebooks in both the elementary and secondary classrooms. Teacher use of Chromebooks increased, in some cases due to the availability of Chromebooks for teachers in both the elementary and secondary settings. The use of other devices such as Kindles and tablets decreased between Summer 2015 and Winter 2016.

Table 10

Hardware Integration

Hardware	Elementary		Secondary	
	Summer 2015 (n=5)	Winter 2016 (n=5)	Summer 2015 (n=8)	Winter 2016 (n=8)
Personal Computer	2.80	2.00	2.50	2.13
Chromebook	0.00	3.80	0.00	3.50
Interactive Smartboard	1.40	0.80	0.00	0.25
Student Response System	0.00	0.00	0.00	0.25
XOOM (Tablet)	0.60	0.40	0.13	0.13
Kindles	0.80	0.20	0.00	0.66
Mimio	3.00	3.00	0.00	0.50

Software integration. Participants were asked to rate software integration into instruction before and after the addition of Chromebook carts and 1:1 implementation. No further professional development was provided to teachers pertaining to the software included in this section. A point value was assigned for the degree of integration of district-purchased software as reported by the participants.

Table 11 states the values assigned to each of the responses. Table 12 shows the level of integration reported by the teachers.

Table 11

District Purchased Software Integration Survey Response Point Values

Response	Point Value
Not Applicable	0
Not Used	0
Quarterly	1
Monthly	2
Weekly	3
Daily	4

The purchased software integration for Study Island, an online test preparation software for students, increased at both the elementary and secondary level between the Summer 2015 survey and the Winter 2016 survey. The software integration level for the math program ALEKS, Assessment and Learning in Knowledge Spaces, was reported to have also increased at both the elementary and secondary level. Other increases were recorded in district-purchased word processing software at both the elementary and secondary level, spreadsheet and presentation software at the elementary level, and Prezi at the secondary level. No changes were recorded in integration of InfOhio at the secondary and elementary level, Cicero and Prezi at the elementary level, and spreadsheet at the high school level. Decreases in integration were recorded for integration of Cicero and presentation at the secondary level.

Table 12

District Purchased Software Integration

Hardware	Elementary		Secondary	
	Summer 2015	Winter 2016	Summer 2015	Winter 2016
	(n=5)	(n=5)	(n=8)	(n=8)
Study Island	2.20	2.80	0.13	0.38
ALEKS	0.80	1.40	0.50	1.63
CICERO	0.60	0.60	0.13	0.00
Prezi	0.00	0.00	0.00	0.38
Presentation	0.80	1.20	1.25	1.00
Software				
Word Processing	1.00	1.20	2.00	2.63
Spreadsheet	0.00	0.60	0.50	0.50

District purchased software level of use. Beyond software integration, participants were asked about district-purchased software level of use. Participants were asked to rate their experience and attitudes toward using district-purchased software. Table 13 states the choices participants had in describing their level of use and the point values assigned to those choices. Table 13 shares the point values used in Tables 14 and 15.

Table 13

Software Level of Use Survey Response Point Values

Response	Point Value
I don't know what this is	0
Not Applicable	0
Not Available	0
Don't want to use	1
Want to use, but need additional help	2
Used, but need new ideas	3
Comfortable with use	4

Table 14

Level of District Purchased Software Use

District Purchased Software	Elementary		Secondary	
	Summer 2015 (n=5)	Winter 2016 (n=5)	Summer 2015 (n=8)	Winter 2016 (n=8)
Study Island	3.40	3.40	0.50	1.13
ALEKS	1.00	1.80	1.50	1.13
CICERO	1.40	0.80	1.88	1.38
Prezi	1.40	0.80	2.13	1.75
Presentation Software	3.00	2.60	2.88	2.75
Word Processing	3.40	3.80	3.38	3.50
Spreadsheet	2.40	3.00	3.25	3.38

Current use of Google Apps for Education (GAFE). Teachers were asked to rate each of the following GAFE tools based upon the following responses and values listed in Table 18. Each GAFE utilization was calculated based upon the teacher reported level of use. A point value was calculated to determine the level of

increase, if any, in the use of GAFE as a result of the professional development and access to Chromebooks carts in the elementary grades and the 1:1 Chromebook initiative with seniors. The elementary results indicate an increase in GAFE use by teachers for all applications except for Google Hangouts. Google Docs was indicated with the most change in teacher use as reported by teachers. Secondary teachers indicated an increase in GAFE use for all applications, with the largest increase in Google Docs and Google Classroom.

Table 15

Level of GAFE Use

Hardware	Elementary		Secondary	
	Summer 2015 (n=5)	Winter 2016 (n=5)	Summer 2015 (n=8)	Winter 2016 (n=8)
Google Docs	1.20	3.80	2.00	3.25
Google Sheets	1.20	3.20	2.00	2.75
Google Slides	1.20	3.20	2.38	2.88
Google Classroom	1.20	3.40	2.13	3.63
Google Forms	1.20	3.40	1.88	2.50
Google Hangouts	1.20	1.20	1.88	2.63

Attainment of 21st century skills. A portion of the professional development teachers received prior to the implementation of the capstone focused on the need for students to attain 21st Century Skills. These skills included critical thinking, problem solving, communication, collaboration, information and technological literacy, innovation and creativity, technology competence and responsibility, as well as flexibility and adaptability. Teachers at the elementary level

indicated an increase in all the previously identified skills except for innovation and creativity. Secondary teachers indicated an increase in all areas other than communication.

Table 16

Teacher Perception of 21st Century Skill Attainment by Students Response Point Values

Response	Point Value
Decrease	1
No change	2
Increase some	3
Increase a lot	4

Table 17

Perception of 21st Century Skill Attainment When Using Technology

District Purchased Software	Elementary		Secondary	
	Summer 2015	Winter 2016	Summer 2015	Winter 2016
	(n=5)	(n=5)	(n=8)	(n=8)
Critical Thinking	2.75	3.60	2.63	3.25
Problem Solving	3.00	3.60	2.88	3.13
Communication	2.50	3.50	2.50	2.13
Collaboration	3.00	3.20	2.88	3.13
Information and Technological Literacy	3.50	3.80	3.13	3.50
Innovation and Creativity	3.75	3.60	2.75	3.00
Technology Competence and Responsibility	3.75	4.00	3.00	3.38
Flexibility and Adaptability	2.75	2.80	2.88	3.38

Student Data

Students in grades 4 and 5 as well as students in grade 12 were asked to complete a survey regarding their use of computers at school, and the impact the technology had on their educational experience. All students at both buildings indicated they had access to computers or a computer lab at school. Table 18 shows the results of students being asked what they feel are obstacles to using technology at school. Students were able to choose as many conditions that apply. According to the results in Table 18, 12th grade students indicated that the most major obstacle to

using technology at school was school rules. Elementary students in grades 4 and 5 rated primarily that they do not feel limited in using technology at school, followed by a belief that the school has different computer and software than they are accustomed to at home. Students in grades 4 and 5 indicated that school assignments require the use of a computer at least weekly 100%, of those 96.4% requiring use daily, as shown in Table 19. Twelfth grade students indicated that assignments required the use of a computer at least weekly 93.7% of the time, of which 70.1% reported a daily requirement of technology.

Table 18

Major Obstacles to Using Technology at School

	Grades 4-5	Grade 12
School technology is not good enough	0.0%	2.6%
My classes do not require technology	0.0%	10.5%
The school rules limit my technology use	17.9%	34.2%
School has different computer software	39.3%	26.3%
I don't have the necessary skills	5.4%	18.4%
I don't feel comfortable using a computer	0.0%	5.3%
I don't feel limited using technology at school	64.3%	31.6%

After the implementation of the capstone, 60.8% of students in grades 4 and 5 responded to the survey that they had choice in how they use a computer to work on assignments at least weekly. As for students in grade 12, 86.9% of students responded that they have choice in how they use a computer to work on assignments at least weekly. These data points are similar to other data in regards to whether the students'

teachers use technology for classroom instruction. Elementary teachers, as perceived by 75% of their students, are using technology for instruction at least weekly.

Similarly, 65.8% of students in grade 12 indicated that their teachers use technology for instruction at least weekly.

Table 19

Frequency School Assignments Require Computer Use

	Grades 4-5	Grade 12
Daily	96.4%	70.1%
Weekly	3.6%	23.7%
Monthly	0.0%	2.6%
1 or 2 times per year	0.0%	2.6%
Never	0.0%	0.0%

Table 20

Frequency of Teacher Use of Technology For Classroom Instruction

	Grades 4-5	Grade 12
Daily	71.4%	50.0%
Weekly	3.6%	15.8%
Often	16.1%	26.3%
Sometimes	8.9%	5.3%
Rarely	0.0%	0.0%

As shown in Table 21, when students were asked to rate the importance of technology to their learning 55.4% of students in grades 4 and 5 rated technology as very important to their learning. As for students in grade 12, 65.8% of respondents rated technology as very important to their learning. Only three students' total, representing 5.4%, in grades 4 and 5, either indicated that technology was not very

important or not important to their learning as indicated in Table 21. No students in grades 12 indicated that technology was not very important or not important to their learning.

Table 21

Student Perception of the Importance of Technology on Learning

	Grades 4-5	Grade 12
Very important	55.4%	65.8%
Fairly important	39.3%	34.2%
Not very important	3.6%	0.0%
Not important	1.8%	0.0%

According to data collected in Table 22, 66.1% of students in grades 4 and 5 rate that computer use has made learning in the classroom much more interesting. Of those students in grade 12, 63.2% indicate they believe that the addition of the device makes learning in the classroom much ore interesting.

Table 22

Impact Use of Computer Has on Learning in the Classroom

	Grades 4-5	Grade 12
Much more interested	66.1%	63.2%
Slightly more interested	28.8%	31.6%
No change in interest	7.1%	5.3%
Slightly less interested	0.0%	0.0%
Much less interested	0.0%	0.0%

Table 23

Student Response of Computer Use For Collaboration and Interaction With Others

	Grades 4-5	Grade 12
Often	52.8%	21.4%
Sometimes	38.9%	58.9%
Not often	8.3%	5.4%
Rarely	0.0%	14.3%

Those students in the 12th grade also responded to questions regarding their perception of being prepared for postsecondary college or career. Students were asked if they felt the technology helped them understand their classes better, and 92.1% of students responded that it did help them understand their classes better. All students also indicated that they currently believed that the district was working to prepare them for the digital age. Finally 97.4% of grade 12 students and 91.1% of students in grades 4 and 5 felt as though the addition of the Chromebook has enhanced their classroom learning.

Anecdotal Data

Elementary student reactions to a technology rich environment. Students were asked to write articles of their choice about exciting things happening at Hannan Trace Elementary. The school newspaper published an article written by a fifth grade student featuring the Chromebook carts in the fourth and fifth grade language arts and mathematics classrooms. This article described the function of the Chromebook and shared ways in which the Chromebooks are being used in the classroom. In addition,

the article expressed the enthusiasm the students had for the new addition to their classroom's learning environment.

In addition to student interest in the Chromebook, the student reaction to being able to collaborate on the Google Apps for Education document app was notable. For their first interactive activity, the fifth grade language arts teacher had students complete a table together using their Chromebook and the whiteboard. The students were so excited when they saw their answers alongside other students' answers popping onto the screen. The teacher challenged them to write a unique answer. One of the rules was that their answer could not be the same as another person's. All students, even a couple students that are poorly motivated, were engaged and working hard to put their answer in the document.

Comments included, "That's cool. Oh, you took my answer. There is mine. Where is yours? Let's do it again" (anonymous, personal communication, October 29, 2015). After students filled in all the lines in each column, the teacher asked students questions that caused them to reflect upon and evaluate their answers. All students' answers were considered, and all students were engaged.

Each fifth grade student in the Gallia County Local School District is required to complete an academic fair project. This year, a majority of students elected to complete their projects using Google Slides instead of the traditional project boards used in the past. Teachers commented that more students willingly completed projects this year than in previous years, and the projects were much more polished. The judges for the school's academic fair were impressed with the skills the students

exhibited in presenting their projects. Multiple judges expressed an appreciation for the students' use of technology in completing the project and then commented on the quality of the multimedia projects compared to the traditional project board.

High school student reaction to a technology rich environment. Prior to the release of the capstone project, one teacher began a pilot program the preceding year at the high school. This was the result of three years of frustration for teachers and students completing a newly developed senior capstone course. In order for the course to be successful, students desperately required access to technology. In turn, the school found funds to create a cart of devices to remain in one classroom all day, every day. This one action created an excitement among those students as well as teachers. That one teacher became the first champion for technology in the classroom. This teacher worked through frustrations, encouraged students to use the technology and showcased the use of technology to other teachers in the building. Her interest and excitement for the use of these devices spread even beyond the school and to the other high school in the district.

From this point, with the cooperation and support of the district, all seniors were provided a device to use in a newly developed 1:1 program. The district also allowed a subset of teachers, considered a group of champions for technology rich classrooms, to obtain professional development to order to establish a need for the inclusion of technology as well as specific professional development regarding the use of the device and the use of Google Apps for Education in the classroom.

One of the secondary outcomes expected from the initial professional development was the creation of a team of champions to implement and encourage expansion of the possibilities for students using the technology. Through the expanded use and collaboration about technology rich classrooms, teachers began to take ownership of the opportunities the technology opened. Ideas for opportunities were shared through follow up conversations and emails periodically sent to teachers.

Teachers were provided with periodic emails either offering ideas, support or follow up from questions other teachers generated. One email included an explanation of BookTrack Classroom, a free application available for the Chromebook through the Google webstore. BookTrack Classroom is a program that allows sound effects, background sounds and ambience to be added to text. One teacher added the BookTrack to her Google Classroom and asked the students to explore the program for a portion of a period.

At the time, the teacher was studying mood and tone of writing, in this case a particular poem. As an extension to the lesson, the students were asked to take a stanza from the initial poem and write their own poem. After students wrote the poem, the students were to select background music to enhance their poem. The next day, students read the poem to the entire class and used words to describe the tone and mood of the poem that was written. The student then reread the poem that they wrote with the background music playing. After the poem was read the entire class discussed the mood the author was trying to convey with the auditory cues from the background music.

After this teacher completed the activity, the BookTrack application was shared with other teachers participating in the project. This collaboration was from a secondary teacher to an elementary teacher, both noting the value of the application. Other teachers found the resource valuable, shared the application with their students and incorporated the resource into their instruction. This was accomplished without mandates from building administration, but rather through providing an opportunity for educators and students to use innovation and creativity through access to a technology rich classroom.

At the high school, all senior students were issued a Chromebook to have full access to their device in a 1:1 program. The initial thoughts by students and teachers alike were that students would continue to rely on a windows based desktop or laptop machine to complete their assignments as long as those devices were available. It was observed that those students issued a personal Chromebook used only by them on a daily basis preferred the Chromebook to the desktop computer. Senior students have been observed placing their Chromebook in front of the desktop in the computer lab. It has been observed that the factor of student ownership has impacted the physical care of the device, the use of the device as well as an attitude that their current school has an impact on their future.

It was also observed that students made productive choices in regard to time management when they used the issued piece of technology to complete assignments. Many times outside of class, senior students were observed using their Chromebook in the Career Center attached to the Guidance Office in order to apply for

scholarships, to reply to emails related to their senior research project, and to complete assignments outside of class that were posted on the Google Classroom. When asked about how access to the Chromebook has made a difference for them, one senior student responded with “This has made all the difference” (anonymous, personal communication, October 7, 2015). This senior student, a high performing student coming from a home with limited technology resources, stated his personal computer at home was old and slow, but with the device provided, he has access not previously available.

Teacher reactions to a technology rich environment. With Chromebooks and professional development in place in some classrooms in the elementary building, many other teachers were interested in the function of the Chromebook. A Chromebook was purchased for each of the elementary teachers in the building. These were purchased so that teachers would have some knowledge of how the Chromebook functioned before the professional development was to be offered to them the following summer. In addition, since teachers have had the Chromebook in their hands, they have expressed interest in wanting to learn how to use particular apps on the Chromebook.

At both the secondary and elementary level, all teachers have used the Google Classroom App in Teacher Based Team (TBT) Meetings. TBT’s were groups of teachers that met according to grade level or subject area to discuss progress on common assessments or to identify and discuss needs of students shared among the group. Minutes of these meetings were taken and housed in Google Classrooms

developed especially for specific grade level and subject area TBTs. This allowed the principal or leader of the TBT to share information and keep a record of the work of the team in one location. Articles and videos were easily shared with team members using the Google Classroom. In the spirit of building champions, teachers that had training in the Google Classroom were able to help other teachers navigate the app.

During random walkthroughs and observations in the elementary school, teachers were providing students with a technology rich environment. One of the observed activities during random observations included students collaborating on Google Slide presentations explaining the demise of the Mayan culture. Teachers have also been observed using Google Classroom for assignments and independent work. In addition, teachers were noted daily using Chromebooks to access the programs, such as Study Island and ALEKS, purchased by the school district.

In one particular observation, the math teacher was able to differentiate instruction based on the scores posted in ALEKS. All of the students were able to show their progress on attaining the skill of reducing fractions in a timely manner. The teacher was able to take this information and show those students that mastered reducing fractions, according to ALEKS results, a shortcut when multiplying fractions. She was able to work on reducing fractions with the students that had not mastered that task yet. This simple example of differentiation would not have been as timely or effective in years past when it would have taken weeks for all of the students to complete the ALEKS assessment when students had access to four computers in the back of the classroom.

Conclusion

Reflecting upon the data in light of the research questions posed in this study, the researchers identified a common thread. The limitation of barriers was crucial to the development of a technology rich environment. Before we started this capstone, we analyzed data from the district technology survey and worked toward addressing teachers' perceived barriers.

Research question 1. What was needed to ease the shift of teacher use of technology as an addition to the curriculum to valuing technology as an integral tool for student learning? The data indicated that teachers increased their use of technology when each student had access to a Chromebook as shown by the increased usage of district purchased software, Study Island and ALEKS, as well as GAFE. Giving each student access to a reliable piece of technology was needed to shift teachers to a daily use of technology as part of student learning.

Research question 2. What steps were taken to integrate pedagogy and technology in order to foster a technology rich environment? In addition to student access to Chromebooks, teacher mindsets toward the integration of technology and teacher familiarity of GAFE needed to be shifted. The P.I.V.O.T.T. professional development offered participants the opportunity to experience GAFE as a student, as well as plan for the use of GAFE as a teacher. This was done in a supportive environment. Teacher use of GAFE applications increased when teachers had the opportunity to use the GAFE applications in a non-threatening environment.

Teachers were encouraged to try applications in their classroom with the understanding that some lessons would work better than others.

Research question 3. What conditions were necessary to develop change agents? First, various conditions had to be met. Student and teacher connectivity, Chromebook reliability, and creating conditions for seamless use in the classroom were necessary to build the foundation that would foster change toward a technology rich environment. Next, an excitement for the transition had to be created among the teachers and students that were beginning the transformation that would surpass the novelty of the device itself. Finally, capacity was built in each of the buildings through those involved in the capstone project demonstrating success and sharing ideas among their colleagues.

Limitations of the Study

This study was limited to data from one elementary and one high school in the Gallia County Local School District (GCLSD). The GCLSD is made up of four elementary schools, two middle schools, and two high schools. The GCLSD is a rural district in southeastern Ohio. Limitations of this study include the duration of the study, the number of participants, the lack of achievement data, and perception data by willing participants.

Duration of the Study

This study was conducted over an 8-month period. One limitation was the duration of the study. The novelty of the Chromebook and GAFE applications could

affect the perception data collected in the project. The results of the survey data may be skewed due to the short time frame between the pre and post survey.

Number of Participants

The number of teacher participants was limited to 5 elementary teachers, of which 2 had a Chromebook cart in their classroom all day every day. The 8 secondary teachers instructed students participating in the 1:1 initiative. Student participants were limited to 67 students in grades 4 and 5 as well as 60 students in grade 12. The results of the survey indicated that all teachers participating in the project completed the survey. Only 56 out the 67, or 83.58% of the elementary students, and 38 out the 60, or 63.33% of the seniors completed the survey.

Lack of Achievement Data

The question of the integration of technology into instruction and the affect this integration has on student achievement was not answered in this study. Multiple factors, including changes in state testing instruments, the validity of local assessment data, and the duration of the capstone project limited the ability to gather meaningful achievement data. While the perception data gathered tells some of the story, achievement data would add insight to the effectiveness of the project.

Perception Data

Although the tone of the capstone was to establish a group of champions within each school to build upon, the results of the capstone are limited to only those participants. Also, the results of the survey data are limited to those teachers and students who were willing to complete the survey. Survey data was not collected

beyond these subgroups within each of the two buildings. Also, the perceptions of parents in regard to the implementation at the elementary building and the secondary building were not considered in the results of the capstone.

Delineation of Work

The capstone features work completed by an elementary and high school principal. Each principal conducted the work with students and staff in their individual school buildings. The researchers chose the device that would be used in the capstone project along with the district technology coordinator. The development of the professional development modules and presentation of the professional development was a joint effort. Each researcher contributed to the research section of the capstone by finding general information regarding the integration of technology, as well as research specific to the integration of technology at the elementary and secondary level. Jointly, the elementary and high school principals developed the staff and student surveys and compiled the results.

Elementary Project

After the device was selected, the elementary researcher discussed the project with 4th and 5th grade math and language arts teachers. Participants were told that they would receive a cart of Chromebooks that would stay in their classroom at the beginning of the 2015-16 school year. The carts were not shared with other grade levels or teachers. After the 4th and 5th grade math and language arts teacher agreed to participate in the project, the researcher secured the funds through Title I to purchase two carts with 24 Chromebooks in each cart. The carts were delivered in

the Spring of 2015. The elementary principal contacted the district technology team to put the Chromebooks on the Google console.

After researching the project, the elementary principal decided that two more carts would be purchased using the following year's Title I funds. These carts would be shared between the 4th and 5th grade science and social studies teachers and the 3rd grade teachers. Since the 4th and 5th grade science and social studies teachers and third grade teachers would be receiving carts of Chromebooks later in the school year, it was decided to include them in the professional development over the summer. The elementary researcher secured funding through Title IIA funds with the district federal programs director for two days of professional development. Elementary and secondary participants in the P.I.V.O.T.T. professional development received the usual stipend for summer professional development.

A date for the initial elementary training was communicated with the third through fifth grade teachers. Each teacher participating in the professional development received a Chromebook at the end of the 2014-15 school year to use over the summer. The elementary and high school researcher worked on developing the professional development during early summer. The elementary researcher ensured that the professional development would meet the needs of the participants in the capstone project. Together, the researchers presented the first P.I.V.O.T.T. professional development to the elementary teachers in mid-July.

In late July, the elementary researcher joined the high school researcher in deploying the initial P.I.V.O.T.T. training to the 12th grade teachers. Jointly, the

elementary and high researcher planned the second day of training and deployed it in mid-August. Elementary and 12th grade teachers participated in a joint professional development at the high school.

During the summer, the elementary researcher met with the district technology department to secure student Google accounts for elementary students. The discussion included internet usage for elementary students. The decision was made that elementary students would be able to have personal Google accounts rather than logging on using a kiosk mode. In kiosk mode, students would have only been allowed accessibility to internet programs, and they would not have been able to take full advantage of the GAFE applications.

During the first two weeks of schools, the elementary researcher worked with the 4th and 5th grade math and language arts teachers to assign a Chromebook to each student. Each Chromebook was numbered and up to four students were assigned to each Chromebook. It was understood that a student would use the same numbered Chromebook in each class. Within the first two weeks of school, the elementary researcher ensured that the Chromebooks were fully operational in the 4th and 5th grade reading and math classes.

The establishment of a 3rd through 5th grade technology professional learning community (PLC) was the responsibility of the elementary school researcher. This PLC met monthly to discuss the progress of the project and share ideas for integrating technology in the classroom. This PLC was made up of all five participants that attended the summer professional development. In addition to the PLC, the

elementary researcher stayed engaged with the project by providing assistance and encouragement to staff throughout the semester. At the end of the semester, the elementary researcher administered the staff and the student survey. After the survey was administered, the elementary researcher compiled and analyzed the data with the secondary researcher.

Secondary Project

During the 2014-15 school year, the secondary school principal conducted a pilot project involving the use of a cart of Chromebooks in a senior seminar class. After considering the affordability and effectiveness of the Chromebook in this project, the secondary researcher concluded that the Chromebook would be the best device to use in a 1:1 initiative. After a discussion with the district technology department, it was determined that the capstone would involve providing a Chromebook for each senior to be used at school and home in order to complete assignments and conduct research.

Further discussions were held with the district technology department to develop procedures and protocols for the deployment of the 1:1 initiative in the Spring of 2015. Through these meetings, the student-parent agreement form and the GCLS Chromebook Policies and Procedures Handbook were developed. Discussions were held between district leadership and the secondary principal to secure the district's purchase of the Chromebooks for the 1:1 initiative for high school seniors.

Once the Chromebook purchase was secured, planning for the P.I.V.O.T.T. professional development to be held with elementary and senior teachers was planned

with the elementary researcher. During the planning process, the high school researcher tailored the professional development so that it would meet the needs of the senior teachers involved in the 1:1 initiative. The first P.I.V.O.T.T. sessions were held separately during the month of July, and the high school and elementary researcher contributed to the first elementary and secondary professional development sessions. The elementary and secondary participants were brought together for the second P.I.V.O.T.T. session and both researchers contributed to professional development.

Within the first two weeks of school, the secondary researcher conducted parent meetings which were held to explain the 1:1 initiative and the responsibilities of students and parents concerning the use and liability for the Chromebook. Students were not allowed to check out a Chromebook until parents came to the meetings and signed the agreement.

Throughout the first semester, the secondary researcher provided support to teachers and students for the hardware and associated software. When a hardware issue occurred, the students were issued a replacement Chromebook until their Chromebook was fixed. The secondary researcher also ordered replacement screens and coordinated the upkeep of the Chromebooks. Throughout the semester, additional support was given to the participating staff related to the use of the software and device. Informal conversations occurred intermittently with staff members throughout the semester to provide clarification, collaboratively generate ideas, and resolve concerns of implementation.

Reflections

You can't just sprinkle 21st century skills on a 20th century doughnut...it requires a fundamental reconception of what we are doing" (Walser, 2011, p. 45). Reflecting upon the research and the 2010 National Technology Plan, some key components emerged throughout the capstone project. The 2010 National Education Technology Plan (NETP) addressed technology trends such as accessibility, collaboration, and engaged learning (Department of Education, 2010). The NETP recognizes that technology in the classroom only works when paired with effective teaching (Department of Education).

The capstone project and the P.I.V.O.T.T. professional development were designed to build a group of champions within the respective buildings that would create technology rich classrooms. The prior summer, infrastructure upgrades unrelated to the capstone project were installed in each building in the school district which allowed this project to come to fruition. Without the proper infrastructure, teachers and students could not concentrate on the use of the device due to focus being shifted to constant concern about connectivity. In addition, through a 2014 technology survey, the GCLSD staff expressed a need for increased accessibility and professional development so that they could meet the needs of their students. Along with the infrastructure and the staff's interest in the integration of technology in the classroom, some key components that led to increases in the use of technology and specifically GAFE applications included:

- gathering data from the staff and designing the project to meet the needs expressed by those involved in the project,
- selection of the Chromebook which was affordable, durable, and reliable,
- ensuring the availability of a reliable technology to each student and teacher in the capstone project,
- identifying a subset of teachers to serve as champions for the creation of technology rich classrooms,
- providing professional development to the targeted group of champions.

The development of the P.I.V.O.T.T. professional development module was a key component in the increase in GAFE use and the successful integration of technology into student learning. The key elements of the professional development included:

- allowing participants in the capstone project to explore and become proficient users of the Chromebook before they were expected to use it with students,
- establishing the need to develop a technology rich environment by exposing participants to ideas generated by educational innovators,
- shifting mindsets by giving participants the opportunity to challenge their current practice by comparing their current practice to the innovative ideas shared by experts in the field,
- developing the professional development so that participants experienced the ease of using GAFE through the activities designed in the P.I.V.O.T.T module,

- modeling activities in P.I.V.O.T.T. that could be easily adapted to classroom activities at any level,
- encouraging risk taking on new strategies using the technology while providing a supportive, collaborative environment,
- creating a cohort of participants that could grow together in their use of hardware and software provided.

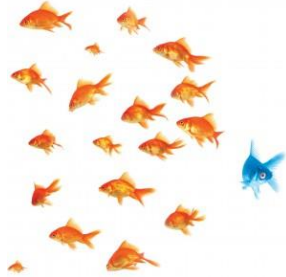
At the conclusion of the project, the researchers reviewed the 2016 National Technology Plan (NETP) reflecting upon the work completed in the study. The 2016 NETP addressed learning, teaching, leadership, assessment and infrastructure. The 2016 plan considered more than accessibility and connectivity, in light of the digital use divide. The 2016 NETP defines the digital use divide as one that “separates many students who use technology in ways that transform their learning from those who use the tools to complete the same activities but now with an electronic device” (Department of Education, 2016).

While researching the capstone project, the researchers considered the digital divide of those students they serve. For those involved in the capstone project, the students and teachers have shifted across the continuum and are now more equipped to attack the digital use divide. The results of the study indicated that teachers increased their use of software and tools in their instruction. The next steps for the researchers include providing support to the participants to continue momentum that had begun by being a part of the capstone project.

Next Steps

Along with the continuation of support for the technology champions developed through the capstone project, an expansion in accessibility to other grade levels is scheduled. Along with the expansion, the P.I.V.O.T.T. professional development is planned to be delivered to teachers scheduled to receive the Chromebooks in their classrooms. The inclusion of current technology champions is a new element of the P.I.V.O.T.T. professional development that will be incorporated. By equipping the staff in the elementary and high school buildings to be champions for the integration of technology in the classroom, the hope is that the district will recognize the need and begin the process of expanding technology opportunities for staff and students in other schools in the GCLSD.

Capstone Project



P.I.V.O.T.T.

Promoting an Innovative Vision for
Outstanding Teaching with Technology

P.I.V.O.T.T. is, at minimum, a two-day professional development journey for teachers exposing, exploring and understanding the uses of Google Apps for Education along with continuous support. The framework used for the professional development was Google Classroom, but due to the sharing capabilities and privacy settings, the classroom itself cannot be shared publically. Therefore, this document will house links to the various resources used throughout the journey. The journey comprised of:

- Establishing a need for increased use of technology for learning
- Shifting the mindset of
- Allow teachers an authentic experience of GAFE during the training
- Encourage risk taking in an effort to try new strategies
- Create a cohort of Champions for technology in each building

Day 1 Activities

P.I.V.O.T.T. Day 1 Presentation

<https://docs.google.com/presentation/d/1ARYA8o8KHxKMD6F-UT7BpjZq5Xv0zUxViVDbooSH7uU/pub?start=false&loop=false&delayms=5000>

- Are you a champion?
 - Watch Rita Pierson video in Day 1 Presentation
 - Discuss thoughts surrounding becoming a champion for student learning.
- What's for Lunch Activity
 - <http://goo.gl/forms/HSDE0hhjsn>
- Survey and Pre Assessment
 - <http://goo.gl/forms/IPsUgZW08g>
 - <http://goo.gl/forms/rIPYrZmWey>
- Establish a Need - Slides 5-9
 - Teachers respond within comments to "21st Century Skills" they incorporate regularly in their classroom and how that manifests itself.
- 21st Century Skills (Think/Pair/Share Activity Slide 10)
 - Video Links

- <https://www.youtube.com/watch?v=ghx0vd1oEzM>
- <https://www.youtube.com/watch?v=xvOnha7XnaQ>
- <https://www.youtube.com/watch?v=UZEZTyxSl3g>
- Teachers choose one of the three possible videos to watch. They are to select a one minute segment to share with the group with the most important concept presented in the video. (Slides 10-11)

- Student Engagement - Shifting Educational Paradigms
 - Sir Ken Robinson Video (Slide 12)
- Google Apps for Education
 - Google Apps for Education 101
 - <https://www.youtube.com/watch?v=uXFUI0KclKA>
 - Classroom 101
 - https://www.youtube.com/watch?v=K26iyyQMp_g

Day 2 Activities

Use the following link for P.I.V.O.T.T. Day 2 Presentation

<https://docs.google.com/presentation/d/13NruOjYwvBn35Hd7vp59dvXktDKJ89nXr1d8iLENUbQ/pub?start=false&loop=false&delayms=5000>

- Awakening the Seed - Sir Ken Robinson
 - <https://www.youtube.com/watch?v=wX78iKhInsc>
- Complete the following form to provide direction for the remainder work session. The remainder of the day will be used to provide individualized feedback based upon responses to the
 - <http://goo.gl/forms/rwKkjBIPWR>
- Additional resources
 - [Google Apps Learning Center](#)
 - <https://apps.google.com/learning-center/>



References

Executive Summary References

Assessment & Teaching of 21st-century Skills. (2012). What are 21st-century skills?

Melbourne, Australia

Amabile, T. & Kramer, S. (2011). *The progress principle: Using small wins to ignite joy, engagement, and creativity at work*. Harvard Business Press.

Bailey, J., Ellis, S., Schneider, C., & Vander Ark (2013). Blended learning implementation guide. *Foundation for Excellence in Education*.

Becker, H. J., Ravitz, J. L., & Wong, Y. T. (1999, November). *Teacher and teacher-directed student use of computers and software*. Report #3. Teaching, Learning, and Computing: 1998 National Survey. Irvine, CA: University of California at Irvine, Center for Research in Information Technology in Organizations.

Belcher, K. E. (2014) *Transforming education into the 21st Century by integrating 1:1 iPads (Order No. 36119801)*. Available from ProQuest Dissertations & Theses Global (1537049183). Retrieved from <http://search.proquest.com/docview/1537049183?accountid=12553>

Bellanca, J., & Brandt, R. (2010). *21st Century Skills: Rethinking how students learn*. Bloomington, IN: Solution Tree Press

Chardon Local Schools. (2014). *Chardon schools Chromebook policies and procedures*. Chardon, OH: author.

Clausen, J. M., Britten, J., & Ring, G. (2008). Envisioning effective laptop initiatives.

Learning & Leading with Technology, 36(1), 18-22.

College and Career Readiness | Achieve. (n.d.). Retrieved July 11, 2015, from

<http://www.achieve.org/college-and-career-readiness>

Considine, D., Horton, J., & Moorman, G. (2009). Teaching and reaching the

millennial generation through media literacy. *Journal of Adolescent & Adult Literacy*, 52, 471-481.

Council of Chief State School Officers. (2008). *Educational Leadership Policy*

Standards: ISLLC 2008. Retrieved June 13, 2015, from

http://www.ccsso.org/Resources/Publications/Educational_Leadership_Policy_Standards_ISLLC_2008_as_Adopted_by_the_National_Policy_Board_for_Educational_Administration.html

Covili, J. (2012). *Going Google: Powerful tools for 21st century learning*. Thousand

Oaks, CA: Corwin.

Cradler, J., McNabb, M., Freeman, M., & Burchett, R. (2002). How does technology

influence student learning? *Learning & Leading with Technology*, 29(8), 47-50.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge,

MA: Harvard University Press.

Cuban, L. (2014) No end to magical thinking when it comes to high-tech schooling.

In: Larry Cuban on School Reform and Classroom Practice. Available at

<http://larrycuban.wordpress.com.2013/03/18/no-end-to-magical-thinking-when-it-comes-to-high-tech-schooling/> (accessed 23 March 2014).

Cuban, L., & Jandrić, P. (2015). The dubious promise of educational technologies: Historical patterns and future challenges. *E-Learning and Digital Media*, 2042753015579978.

Demski, J. (2012). The hard(ware) Choice. *THE Journal*, 39(9), 28-35.

Department of Education (ED), O.T. (2010). Transforming American education: Learning powered by technology. National Education Technology Plan, 2010. *US Department of Education*.

Department of Education (ED), O.T. (2016). Future ready learning: Reimagining the role of technology in education. National Education Technology Plan, 2016. *US Department of Education*.

Derringer, P (2010). Making 1:1 Work. *Technology Learning*, 30(7), 28-34.

E-Rate Program - Discounted Telecommunications Services -- Office of Non-Public Education. (n.d.). Retrieved June 13, 2015, from <http://www2.ed.gov/about/offices/list/oii/nonpublic/erate.html>

Federal Communications Commission (2009). *Recovery Act Broadband Initiatives* <http://www.fcc.gov/recovery/broadband>

Fullan, M. (2013). *Stratosphere*. Don Mills, ON: Pearson Canada Inc.

Fullan, M. & Stiegelbauer, S. (1991). *The new meaning of educational change* (2nd ed.). New York: Teachers College Press.

Frank, K. A., Zhao, Y., & Borman, K. (2004). Social capital and the diffusion of innovations within organizations: Application to the implementation of computer technology in schools. *Sociology of Education*, 77(2), 148–171.

Gallia County Local School District (2015). Gallia County Local School DistrictBoard Policy. Retrieved from:
<http://www.gallialocal.org/docs/district/gcls%20board%20policy%20121115.pdf>

Gartner (2014) Hype Cycles 2014: Research Methodologies. Available at:
www.gartner.com/technology/research/methodologies/hype-cycle.jsp
(accessed 11 March 2014).

Gordon, D. (2011). Rural schools: off the beaten path. *T.H.E. Journal*, 38(9), 18-20.

Grundmeyer, T. (2013). Adopting technology: Using student qualitative data and Gartner’s Hype Cycle. *Journal of Education and Training Studies*, 2(1), 207-216.

Hattie, J. A. C. (2009). Visible learning: A synthesis of 800+ meta-analyses on achievement. *Abingdon: Routledge*.

Hill, J., Reeves, T. C., & Heidemeier, H. (2000). *Ubiquitous computing for teaching, learning, and communicating: Trends, issues and recommendations*. Athens, GA: Department of Instructional Technology, College of Education, The University of Georgia.

- Hinson, J., LaPrairie, K., & Heroman, D. (2005). One size does not fit all: The technology integration model. *THE Journal, Technology Horizons in K-12 Education*, 32(11), 26-30.
- Horn, M., & Staker, H. (2015). *Blended: Using disruptive innovation to improve schools*. San Francisco, CA: Jossey-Bass
- Interstate School Leaders Licensure Consortium. (2008). Educational leadership policy standards: *ISLLC 2008*. Washington, DC.
- Kanaya, T., Light, D., & Culp, K. (2005). Factors influencing outcomes from a technology-focused professional development program. *Journal of Research on Technology in Education*, 37(3), 313–329.
- Kemker, K., Barron, A., & Harmes, J., (2007). Laptop computers in the elementary classroom: Authentic instruction with at-risk students. *Educational Media International*, 44(4), 305-321.
- Kezar, A. (2012). Bottom-up/top-down leadership: Contradiction or hidden phenomenon. *Journal of Higher Education*, 83(5), 725-760.
- Kopcha, T. J., (2010). A systems-based approach to technology integration using mentoring and communities of practice. *Educational Technology Research and Development*, 58(2), 175-190.
- Kulow, C. (2014). *The impact of using Chromebook technology on student engagement and student achievement of elementary students* (Order No. 3637331). Available from ProQuest Dissertations & Theses Global.

(1617518695). Retrieved from

<http://search.proquest.com/docview/1617518695?accountid=12553>

Lehrer, J. (2012). *Imagine: How Creativity Works*. New York: Houghton Mifflin Harcourt.

Lewis, D. H. (2012). *Enhanced one-to-one technology integration through elementary teachers' technological, pedagogical, and content knowledge (Order No. 3547440)*. Available from ProQuest Dissertations & Theses Global. (1282398893). Retrieved from

<http://search.proquest.com/docview/1282398893?accountid=12553>

Mora, A., Barragán, S. & Urrea, C. (2012). The one to one model, one laptop per child, on the strengthening of education and culture. In T. Amiel & B. Wilson (Eds.), *Proceedings of World Conference in Educational Media and Technology 2012* (pp. 1534-1543). Association for the Advancement of Computing in Education (AACE).

Moss, A. (2011). *A study of teachers using 21st century tools in a rural South Carolina school district*. Ph.D. thesis. Gardner Webb University.

O'Donnell, B. & Perry, R. (2013). *Quantifying the economic value of chromebooks for K-12 education*. Framingham, MA: IDC Information and Data

Organization of Economic Cooperation and Development. (2009). *Creating effective teaching and learning environments: First results from TALIS*. Paris, France: Author.

- Orr, C. (2014). Leading through changing times: breaking down barriers to get results - A Rural School District's Successful iPad Project. In M. Searson & M. Ochoa (Eds.), *Proceedings of Society for Information Technology & Teacher Education*.
- Partnership for 21st Century Skills. (2010). Up to the challenge: The role of career and technical education and 21st century skills in college and career readiness. *Partnership For 21st Century Skills*
- Prensky, M. R. (2012). *From digital natives to digital wisdom: Hopeful essays for 21st century learning*. Corwin Press.
- Prensky, M.R. (2008, November/December). The role of technology in teaching and the classroom. *Educational Technology*, 48(6), 64.
- Reeves, D. (2010). A framework for assessing 21st Century skills. *21st Century skills: Rethinking how students learn*, 305-326.
- Saavedra, R. & Opfer, D. (2012). Learning 21st-century skills requires 21st-century teaching. *Phi Delta Kappan*, 94(2), 8-13.
- Schleicher, A. (2012). *Preparing Teachers and Developing School Leaders for the 21st Century Lessons from around the World: Lessons from around the World*. OECD Publishing.
- School Improvement Network. (2012, August). *Heidi Hayes Jacobs: 21st century teaching and learning within the common core*. [Video File]. Retrieved from <http://www.siis2012/com>

- Schrum, L. & Bracey, B. (2003). Empowering all learners: Creating technology rich, student centered curriculum. In G. Solomon & P. E. Resta (Eds.), *Toward digital equity: Bridging the divide in education*. Boston, MA: Pearson Group.
- TED Talks Education. (2010, October). *Shifting educational paradigms: Sir Ken Robinson*. [Video File] Retrieved from https://www.ted.com/talks/ken_robinson_changing_education_paradigms
- TED Talks Education. (2013a, March). *What 60 schools can tell us about teaching 21st century skills: Grant Lichtman at TEDxDerwer teachers*. [Video File]. Retrieved from <https://www.youtube.com/watch?v=UZEZTyxS13g>.
- TED Talks Education. (2013b, May). *Every kid needs a champion: Rita Pierson*. [Video File]. Retrieved from https://www.ted.com/talks/rita_pierson_every_kid_needs_a_champion?language=en.
- TED Talks Education. (2013c, May). *How to escape education's death valley: Sir Ken Robinson*. [Video File]. Retrieved from <https://youtube/wX78iKhInsc>
- Thomas, M. W. (2013). *Identifying effective strategies to providing technical support to one-to-one programs* (Order No. 3596052). Available from ProQuest Dissertations & Theses Global. (1447016364). Retrieved from http://search.proquest.com/docview/_1447016364?accountid=12553
- Trucano, M. (2010, April, 30). Worst practices in ICT use in education. Retrieved from <http://blogs.worldbank.org/edutech/worst-practice>

- US Department of Commerce. (1999). Falling through the net: Defining the digital divide. Washington, DC: National Telecommunications and Information Administration. Retrieved April 16, 2007, from www.ntia.doc.gov/ntiahome/fttn99/fttn.pdf
- US Department of Commerce. (2013). U.S. broadband availability: June 2010-June 2012. 2012. Retrieved from http://www.ntia.doc.gov/report/2013/us-broadband_availability-june-2010-june-2012
- Wagner, T. (2012). *Creating innovators: The making of young people who will change the world*. New York: Simon & Schuster.
- Waks, L. J. (2014). *Education 2.0: The learningweb revolution and the transformation of the school*. Boulder, CO: Paradigm Publishers.
- Walser, N. (2011). Teaching 21st century skills. In N. Walser (Ed.), *Spotlight on technology in education* (pp. 37-46). Cambridge, MA: Harvard Education Press
- Warschauer, M. & Matuchniak, 2010. New technology and digital worlds: Analyzing evidence of equity, access, use, and outcomes. *Review of Research in Education* 34: 179-225.
- Warschauer, M., Zheng, B., Niiya, M., Cotten, S., & Farkas, G. (2014). Balancing the one-to-one equation: Equity and access in three laptop programs. *Equity & Excellence in Education*, 47(1), 46-62. doi:10.1080/10665684.2014.866871
- Whidden, F. (2008). The impact of technology access on educational achievement. Ph.D. dissertation, Walden University, United States-Minnesota. Retrieved

November 29,2010, from Dissertations & Theses: A&I. (Publication No. AAT
3297205).

Capstone References

- Curts, E. (2012). *Great Google growth in Ohio Apps User Group*. Retrieved from <http://www.appusergroup.org/news/grea-google-growth-in-ohio>.
- EdLeader21. (2012, February). *The four C's: Making 21st century education happen*. [Video File]. Retrieved from <https://www.youtube.com/watch?v=ghxOvdloEzM>
- Google Apps Learning Center*. (2016, March). Retrieved <https://apps.google.com/learning-center>
- Google for Education. (2014, April). *Google apps for education 101*. [Video File] Retrieved from <https://www.youtube.com/watch?v=uXFU10KclkA>
- Google for Education. (2014, June). *Classroom 101*. [Video File]. Retrieved from https://www.youtube.com/watch?v=K26iyyQMp_g
- Prensky, M. (2008, November/December). The role of technology in teaching and the classroom. *Educational Technology*, 48(6), 64.
- Reeves, D. (2010). A framework for assessing 21st Century skills. *21st Century skills: Rethinking how students learn*, 305-326.
- Rich Colosi Media. (2014, June). *The SAMR model explained by students*. [Video File]. Retrieved from <https://youtube.com/watch?v=OBce25r8vto>
- School Improvement Network. (2012, August). *Heidi Hayes Jacobs: 21st century teaching and learning within the common core*. [Video File]. Retrieved from <http://www.siis2012.com>

- TED Talks Education. (2010, October). *Shifting educational paradigms: Sir Ken Robinson*. [Video File] Retrieved from https://www.ted.com/talks/ken_robinson_changing_education_paradigms
- TED Talks Education. (2013a, March). *What 60 schools can tell us about teaching 21st century skills: Grant Lichtman at TEDxDerwer teachers*. [Video File]. Retrieved from <https://www.youtube.com/watch?v=UZEZTyxS13g>.
- TED Talks Education. (2013b, May). *Every kid needs a champion: Rita Pierson*. [Video File]. Retrieved from https://www.ted.com/talks/rita_pierson_every_kid_needs_a_champion?language=en
- TED Talks Education. (2013c, May). *How to escape education's death valley: Sir Ken Robinson*. [Video File]. Retrieved from <https://youtube/wX78iKhInsc>
- Teknolojileri, B. (2013, March). *21st century skills*. [Video File] Retrieved from <https://www.youtube.com/watch?v=qwJIhZcAdOI>

Appendix A

GCLS Staff Technology Survey 2014

GCLS Staff Technology Survey 2014

1. Do you consent to participate in the following survey regarding use and attitude toward technology in classroom instruction? The results of this survey will be used to inform the school district of technology needs, and may be used as part of a research study. Your responses will remain anonymous.
 - a. Yes
 - b. No

2. Which grade band test represents your primary teaching assignment?
 - a. Elementary (K-5)
 - b. Middle (6-8)
 - c. High (9-12)

3. Which subject area best represents your teaching assignment?
 - a. Elementary (Generalist)
 - b. English / Language Arts
 - c. Mathematics
 - d. Science
 - e. Social Studies
 - f. Intervention Specialist
 - g. Art
 - h. Music
 - i. PE / Health
 - j. Family and Consumer Science
 - k. Vocational Agriculture
 - l. Other elective
 - m. Administrator

4. Which band best represents your total years teaching experience?
 - a. 0-10
 - b. 11-20
 - c. 21-30
 - d. 30 +

5. How many computers / electronic devices do you have in your classroom?

6. What is the minimum number of computers / electronic devices you would need access to in your classroom to fully implement technology in your instruction?

7. If funds were unlimited, what would be the optimum number of computers / electronic devices you would have in your classroom?

8. Rank the following from 1 (greatest) to 5 (least) reflecting your use of technology in the classroom.
 - a. Classroom Management (Infinite Campus, Webgrader, etc.)
 - b. Lesson Planning
 - c. Lesson Delivery
 - d. Assessment
 - e. Intervention

9. Select how each of the following represents your use of technology using the following frequencies: Never, Daily, Weekly, Monthly, 1-2 times per year.
 - a. Teacher PC (for management)
 - b. Webgrader / Infinite Campus (grades/attendance)
 - c. Projector (for lesson delivery)
 - d. Teacher PC (for lesson planning)
 - e. COW / Xooms (for lesson delivery)
 - f. COW / Xooms (for assessment)
 - g. Interactive Whiteboard (for lesson delivery)
 - h. IIS (for assessments and intervention grouping)
 - i. Clickers (for assessment)
 - j. Study Island (for assessment)
 - k. Study Island (for lesson delivery)
 - l. Electronic Textbook Resources (for lesson planning)
 - m. Electronic Textbook Resources (for lesson delivery)
 - n. Electronic Textbook Resources (for assessment)
 - o. Electronic Textbook Resources (for intervention)
 - p. Intervention Programs (Headsprout, Reading Eggs, Read 180, Study Island, ALEKS)

10. The greatest barrier I have at school to using technology in Management is (Rank the following 1 as the greatest barrier and 3 as the least barrier).
 - a. I am not comfortable using technology
 - b. I do not have a reliable teacher device to use
 - c. I need more information about programs that are available to manage my classroom.

11. The greatest barrier I have at school using technology in Lesson Planning is (Rank the following 1 as the greatest barrier and 4 as the least barrier).
 - a. I am not comfortable using technology
 - b. I do not have a reliable teacher device to use

- c. I need more information about programs that are available to assist in lesson planning.
 - d. I do not have access to on-line teacher resources and/or do not know how to use it.
12. The greatest barrier I have at school to using technology in Lesson Delivery is (Rank the following, 1 as the greatest barrier and 5 as the least barrier).
- a. I am not comfortable using technology
 - b. I do not have a reliable teacher device to use
 - c. My students are not able to fluently use technology
 - d. My students do not have adequate access to technology for use in the classroom
 - e. I need more information about programs that are available to deliver appropriate lessons
13. The greatest barrier I have at school to using technology in Assessment is (Rank the following, 1 as the greatest barrier and 5 as the least barrier).
- a. I am not comfortable using technology
 - b. I do not have a reliable teacher device to use
 - c. My students are not able to fluently use technology
 - d. My students do not have adequate access to technology for use in the classroom
 - e. I need more information about programs that are available to deliver appropriate lessons
14. If there is one thing that would increase your use of technology in your classroom, what would that be?
15. If there is one thing that would increase your students' use of technology in your classroom, what would that be?
16. What kind of device do you use at home?
- a. Personal Computer (includes laptop, desktop, tablet)
 - b. Cell Phone
 - c. Both Personal Computer and Cell Phone
 - d. None
17. Do you have reliable internet access at home?
- a. Yes
 - b. No (if no, skip to question 19)

18. If you have reliable internet access at home, which provider do you use?
19. Is an internet connection available for purchase at your residence?
- Yes
 - No
20. If a high speed broadband connection were available, would you subscribe?
- Yes
 - No
21. What would you consider a fair price for a high speed internet connection?
- \$25 / month
 - \$50 / month
 - \$75 / month
 - \$100 / month

Appendix B
Hannan Trace Student Survey

Hannan Trace Student Survey

Title of Project: Promoting 21st Century Skills through the Integration of Technology of the Classroom

Investigators: T.R. Edwards and Edie Bostic, Morehead State University, Doctoral Students

Purpose of this Research: The results of this survey may be used as part of a study conducted to examine the impact increased access to technology has on student attitudes toward technology and use of technology by students and teachers.

Research Population: The population of the student consists of students in grades 4 and 5 at Hannan Trace Elementary and students in grade 12 at River Valley High School. The population of teachers consists of 6 teachers, teaching grades 3-5 and 8 secondary teachers.

Anticipated Time: The anticipated time to complete this survey is approximately 15 minutes.

Risks or Benefits: There are no benefits to completing the survey, nor perceived risks. Any questions may be skipped and you may stop the survey at any time without penalty.

Data Storage: All information collected will be used only for my research and will be kept confidential. There will be no connection to you specifically in the results or in future publication of the results. Once the study is completed, we would be happy to share the results with you if you desire. In the meantime, if you have any questions please ask or contact either: Edie Bostic via email to ebostic@moreheadstate.edu or T.R. Edwards via email to tedwards@moreheadstate.edu.

- 1) Do you consent to participate in the following survey regarding use and attitude toward technology in classroom instruction? The results of this survey will be used to inform the school district of technology needs, and may be used as part of a research study. Your responses will remain anonymous. By proceeding, you are agreeing to participate.

Yes
 No

Student Demographic Data

- 2) What is your student ID number? _____
- 3) What is your current grade level?
- a) 3
 - b) 4
 - c) 5

School Access to Computers

- 4) Do you have access to a computer or a computer lab at school?
 - a) Yes
 - b) No

- 5) In an average school year, how often do assignments require you to use a computers?
 - a) Never
 - b) Once or twice per year
 - c) Once a month
 - d) Once a week
 - e) Daily (or almost daily)

- 6) How often do you have choice in when and how you use a computer to work on assignments?
 - a) Never
 - b) Once or twice per year
 - c) Once a month
 - d) Once a week
 - e) Daily (or almost daily)

- 7) What limits your use of technology at school? (Check all that apply)
 - a) I don't have the necessary skills
 - b) I don't feel comfortable using a computer for my school work
 - c) My classes don't require using technology
 - d) School technology isn't good enough
 - e) School rules limit my technology use
 - f) My school has different computers and/or software than I am used to

- 8) How often do you use a computer at school?
 - a) Never
 - b) Not very often
 - c) Sometimes
 - d) Often
 - e) Daily
 - f) Weekly

- 9) How often does your teacher use technology for classroom instruction?
- Daily
 - Weekly
 - Often
 - Sometimes
 - Not very often
 - Never
- 10) How important to your learning is having access to technology?
- Very important
 - Fairly important
 - Not very important
 - Not Important
- 11) Which of the areas below have you used a computer to complete?
(Check all that apply)
- Internet access
 - Research - looking up resources for assignments
 - Writing papers using a word processor
 - Learning materials
 - Watching video
 - Collaboration
 - Homework
 - Completing online tests
 - Other
- 12) On average, how much time per day do you spend using your computer on your schoolwork?
- Not at all
 - Less than one hour per day
 - 1 or more hours, but less than 2 hours per day
 - 2 or more hours, but less than 5 hours per day
 - 5 or more hours per day
- 13) How does your current use of the computers affect your interest in learning in the classroom compared to classes in which you do not use the computer?
- Much more interested
 - Slightly more interested
 - No change in interest
 - Less interested
 - Not interested at all

- 14) How satisfied are you with your overall school experience?
- a) Very satisfied
 - b) Somewhat satisfied
 - c) Neutral
 - d) Somewhat dissatisfied
 - e) Very dissatisfied
- 15) On average, about how much time per day do you spend using a computer at school?
- a) Little or no time
 - b) Less than 30 minutes
 - c) 30 to 60 minutes
 - d) Over 60 minutes
- 16) Check all the classes for which you used a computer this past semester.
- a) language arts
 - b) math
 - c) science
 - d) social studies
 - e) art
 - f) music
 - g) gym
- 17) I used computer to collaborate, interact and publish with others online for classroom work.
- a) Rarely
 - b) Not often
 - c) Sometimes
 - d) Often
- 18) Using technology in the classroom makes it more interesting
- a) Yes
 - b) No
- 19) Technology helps me understand my classes better.
- a) Yes
 - b) No
- 20) The use of technology has _____ my learning and achievement in the classroom.
- a) Increased
 - b) Decreased
 - c) Had no effect on

21) The use of technology in the classroom has _____ classroom instruction.

- a) Enhanced
- b) Lessened
- c) Had no effect

22) The Chromebook has enhanced my classroom learning.

- a) Yes
- b) No

Appendix C

River Valley High School Student Survey

River Valley Student Survey

Title of Project: Promoting 21st Century Skills through the Integration of Technology of the Classroom

Investigators: T.R. Edwards and Edie Bostic, Morehead State University, Doctoral Students

Purpose of this Research: The results of this survey may be used as part of a study conducted to examine the impact increased access to technology has on student attitudes toward technology and use of technology by students and teachers.

Research Population: The population of the student consists of students in grades 4 and 5 at Hannan Trace Elementary and students in grade 12 at River Valley High School. The population of teachers consists of 6 teachers, teaching grades 3-5 and 8 secondary teachers.

Anticipated Time: The anticipated time to complete this survey is approximately 15 minutes.

Risks or Benefits: There are no benefits to completing the survey, nor perceived risks. Any questions may be skipped and you may stop the survey at any time without penalty.

Data Storage: All information collected will be used only for my research and will be kept confidential. There will be no connection to you specifically in the results or in future publication of the results. Once the study is completed, we would be happy to share the results with you if you desire. In the meantime, if you have any questions please ask or contact either: Edie Bostic via email to ebostic@moreheadstate.edu or T.R. Edwards via email to tedwards@moreheadstate.edu.

1. Do you consent to participate in the following survey regarding use and attitude toward technology in classroom instruction? The results of this survey will be used to inform the school district of technology needs, and may be used as part of a research study. Your responses will remain anonymous. By proceeding, you are agreeing to participate.
 - a. Yes
 - b. No

Student Demographic Data

2. What is your student ID number?
3. What is your current grade level?
 - a. 9
 - b. 10
 - c. 11
 - d. 12

School Access to Computers

4. Do you have access to a computer or a computer lab at school?
 - a. Yes
 - b. No

5. In an average school year, how often do assignments require you to use a computers?
 - a. Never
 - b. Once or twice per year
 - c. Once a month
 - d. Once a week
 - e. Daily (or almost daily)

6. How often do you have choice in when and how you use a computer to work on assignments?
 - a. Never
 - b. Once or twice per year
 - c. Once a month
 - d. Once a week
 - e. Daily (or almost daily)

7. What about using a computer to work with graphics and pictures?
 - a. Never
 - b. Once or twice per year
 - c. Once a month
 - d. Once a week
 - e. Daily (or almost daily)

8. What are the major obstacles to using technology in school?
Check all that apply.
 - a. I don't have the necessary skills
 - b. I don't feel comfortable using a computer for my school work
 - c. My classes don't require using technology
 - d. School technology isn't good enough
 - e. School rules limit my technology use
 - f. My school has different computers and/or software than I am used to

9. How often do you use a computer at school?
 - a. Never
 - b. Not very often
 - c. Sometimes
 - d. Often
 - e. Daily
 - f. Weekly

10. How often does your teacher use technology for classroom instruction?
- Daily
 - Weekly
 - Often
 - Sometimes
 - Not very often
 - Never
11. How important to your learning is having access to technology?
- Very important
 - Fairly important
 - Not very important
 - Not Important
12. Which of the areas below have you used a computer to complete?
- Check all that apply*
- Internet access
 - Research - looking up resources for assignments
 - Writing papers using a word processor
 - Learning material
 - Watching video
 - Collaboration
 - Homework
 - Completing online tests
 - Other
13. My RVHS experience is preparing me to join the workforce after I graduate
- Strongly Agree
 - Agree somewhat
 - Neutral
 - Disagree somewhat
 - Strongly disagree
14. My RVHS experience is preparing me to attend college after I graduate.
- Strongly Agree
 - Agree somewhat
 - Neutral
 - Disagree somewhat
 - Strongly disagree

15. On average, how much time per day do you spend using your computer on your schoolwork?
- Not at all
 - Less than one hour per day
 - 1 or more hours, but less than 2 hours per day
 - 2 or more hours, but less than 5 hours per day
 - 5 or more hours per day
16. How does your current use of the computers effect your interest in learning in the classroom?
- Much more interested
 - Slightly more interested
 - No change in interest
 - Less interested
 - Not interested at all
17. How satisfied are you with your overall high school experience?
- Very satisfied
 - Somewhat satisfied
 - Neutral
 - Somewhat dissatisfied
 - Very dissatisfied
18. What do you envision doing after you graduate?
- Entering workforce
 - Attending two-year college
 - Attend four-year college
 - Attending trade school
 - Military
 - Other
19. Do you have access to these at home?
Check all that apply
- Computer
 - Cell Phone
 - Internet Access

20. On average, about how much time per day do you spend using a computer at school?
- Little or no time
 - Less than 30 minutes
 - 30 to 60 minutes
 - Over 60 minutes
21. On average, about how much time per day do you spend using a computer at home?
- Little or no time
 - Less than 30 minutes
 - 30 to 60 minutes
 - Over 60 minutes
22. Check all the classes for which you used a computer this past semester.
- English
 - Tech Ed
 - History / Social Studies
 - PE / Health
 - Science
 - Math
 - Business Education
 - Family and Consumer Sciences
 - Foreign Languages
 - Visual and performing arts
23. I used computer to collaborate, interact and publish with others online for classroom work.
- Rarely
 - Not often
 - Sometimes
 - Often
24. I am aware of internet security and privacy issues while online.
- Yes
 - No
 - Unsure

25. I advocate and practice ethical use and follow copyright laws.
- Always
 - Sometimes
 - Never
26. Using technology in the classroom makes it more interesting
- Yes
 - No
27. Technology helps me understand my classes better.
- Yes
 - No
28. Is the district working to prepare students to learn, work and live successfully in the Digital Age?
- Yes
 - No
29. I have been instructed to be reminded about online safety at school.
- Always
 - Sometimes
 - Never
30. I am aware that inappropriate use of technology has serious legal and personal consequences.
- Yes
 - No
 - Unsure
31. The use of technology has _____ my learning and achievement in the classroom.
- Increased
 - Decreased
 - Had no effect on
32. The use of technology in the classroom has _____ classroom instruction.
- Enhanced
 - Lessened
 - Had no effect on

33. The Chromebook has enhanced my classroom learning.
- a. Yes
 - b. No

Appendix D

P.I.V.O.T.T. Staff Technology Survey

Staff Technology Survey P.I.V.O.T.T.

Title of Project: Promoting 21st Century Skills through the Integration of Technology of the Classroom

Investigators: T.R. Edwards and Edie Bostic, Morehead State University, Doctoral Students

Purpose of this Research: The results of this survey may be used as part of a study conducted to examine the impact increased access to technology has on student attitudes toward technology and use of technology by students and teachers.

Research Population: The population of the student consists of students in grades 4 and 5 at Hannan Trace Elementary and students in grade 12 at River Valley High School. The population of teachers consists of 6 teachers, teaching grades 35 and 8 secondary teachers.

Anticipated Time: The anticipated time to complete this survey is approximately 15 minutes.

Risks or Benefits: There are no benefits to completing the survey, nor perceived risks. Any questions may be skipped and you may stop the survey at any time without penalty.

Data Storage: All information collected will be used only for my research and will be kept confidential. There will be no connection to you specifically in the results or in future publication of the results. Once the study is completed, we would be happy to share the results with you if you desire. In the meantime, if you have any questions please ask or contact either: Edie Bostic via email to ebostic@moreheadstate.edu or T.R. Edwards via email to tedwards@moreheadstate.edu.

1. Do you consent to participate in the following survey regarding use and attitude toward technology in classroom instruction? The results of this survey will be used to inform the school district of technology needs, and may be used as part of a research study. Your responses will remain anonymous. By proceeding, you are agreeing to participate.
 - a. Yes
 - b. No

2. What is your current building assignment(s)? *Check all that apply.*
 - a. Addaville
 - b. Vinton
 - c. Southwestern
 - d. Hannan Trace
 - e. River Valley Middle
 - f. South Gallia Middle
 - g. River Valley High
 - h. South Gallia High

3. How many years' experience have you completed in the classroom?

4. Choose your current grade level assignment.
 - a. K
 - b. 1
 - c. 2
 - d. 3
 - e. 4
 - f. 5
 - g. 6
 - h. 7
 - i. 8
 - j. 9
 - k. 10
 - l. 11
 - m. 12

10. What is your current use of Google Applications for instruction?

	I don't know what this is	Not applicable for my classroom	Not available	I don't want to use	I want to use, but need help	I use, but need new ideas	I use and am comfortable; I do not need help
Google Docs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Spreadsheet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Forms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Hangouts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. When students use technology in my classroom, I observe...

	1 decreases	2 no change	3 increases a little	4 increases a lot
critical thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
problem solving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
informational and technological literacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
flexibility and adaptability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
innovation and creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
technology competence and responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Teacher Use of Technology

12. If I am using a computer at home, I am able to

Check all that apply

- a. do online shopping
- b. pay bills
- c. use internet to research topics of interest
- d. engage social media
- e. access music, pictures and videos

13. If I am using a computer at school, I am able to...

Check all that apply.

- a. develop lesson plans
- b. research topics of interest for classroom use
- c. develop presentation
- d. access videos for instructional purposes
- e. allow students to work on independent learning topics
- f. provide targeted intervention for students
- g. assess student learning
- h. disaggregate student data
- i. use email to communicate with colleagues and administrators
- j. use video chatting to communicate with colleagues and administrators

Professional Development

14. Preferred Mode of Professional Development

Mark only one oval per row.

	Not Helpful	Somewhat Helpful	Helpful	Very Helpful	Extremely Helpful
On going Face to Face Training Sessions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Series of Self Paced Modules (similar to FIP)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Face to Face Training Sessions with Ongoing Support in Classroom Integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self Paced Modules with Ongoing Support in Classroom Integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
One Time Training Sessions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video Sessions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Written Manual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Do you feel like you've received enough professional development to integrate technology into your classroom?

- a. Yes
- b. No
- c. Not sure at this time

16. Would you attend additional training for integrating and using technology in your classroom?
 - a. Yes
 - b. No
 - c. Not sure at this time

17. If you answered yes to the previous question, what additional professional development would you like to receive?

18. Which apps (Google or other free applications) do you use most in your classroom?

19. Please provide any other feedback regarding using Chromebooks in your classroom.

VITA

Edie J. Bostic

EDUCATION

May, 1991	Bachelor of Science University of Rio Grande Rio Grande, Ohio
December, 1998	Master of Arts Ohio University Athens, Ohio
Pending	Doctor of Education Morehead State University Morehead, Kentucky

PROFESSIONAL EXPERIENCES

2008 - Present	Principal, Hannan Trace Elementary Gallia County Local School District Crown City, Ohio
2002 - 2008	Title I/Literacy Coordinator Gallia County Local Schools Gallipolis, Ohio
1993 - 2002	Teacher, Hannan Trace Elementary Gallia County Local Schools Crown City, Ohio

VITA

Timothy Edwards

EDUCATION

May, 2005	Bachelor of Arts Morehead State University Morehead, KY
May, 2008	Master of Arts Marshall University South Charleston, WV
Pending	Doctor of Education Morehead State University Morehead, Kentucky

PROFESSIONAL EXPERIENCES

2011 - Present	Principal, River Valley High School Gallia County Local Schools Bidwell, Ohio
2008 - 2011	Title I / Literacy Coordinator Gallia County Local Schools Gallipolis, Ohio
2005 - 2008	Teacher, River Valley High School Gallia County Local Schools Cheshire, Ohio