5-1-2011

One-to-One Laptop Project: Perceptions of Teachers, Parents, and Students

Matthew D. Constant
Western Kent, matthew.constant@daviess.kyschools.us

ONE-TO-ONE LAPTOP PROJECT:
PERCEPTIONS OF TEACHERS, PARENTS, AND STUDENTS

A Dissertation
Presented to
The Faculty of the Educational Leadership Doctoral Program
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Matthew D. Constant
May 2011

ONE-TO-ONE LAPTOP PROJECT:
PERCEPTIONS OF TEACHERS, PARENTS, AND STUDENTS

Date Recommended 2/21/2011

Marge Maxwell, Director of Dissertation

Tony Norman

Nedra Atwell

Chris Wagner

Richard G. Brown April 14, 2011

Dean, Graduate Studies and Research Date

I dedicate this dissertation to my wife and son, Miriam and Noah Constant respectively. Miriam was the silent partner in this work. Knowing how involved I would become in this program, she was extremely apprehensive about my moving forward. However, she supported me every step of the way. Long hours from home left her with holding down the family fort as I researched and wrote. Our son, Noah, also spent many hours missing his Dad but also idolizing him in the work. Hopefully, he has seen the value of what this degree will bring and will aspire to continue doing his best in all he tries. They made many sacrifices to enable me to complete this degree.

Also, I dedicate this work to my parents, James and Faye Constant, who always instilled the priority and value of continuing education. Finally, I dedicate this work to my fellow Vanguard Cohort I Doctoral students of Western Kentucky University. Without their collegial support, the work would not have been completed.

ACKNOWLEDGEMENTS

Five instructors stand out in my mind throughout my P-24 experience. Without their support and belief in my abilities, I surely would not have made it this far. Sr. Barbara Jean Head was my inspiration to become a teacher. She saw and cultivated the spark during her Algebra II classroom at Owensboro Catholic High School. Dr. Rose Howard and Dr. Serra Goethals continued this passion during my undergraduate work at Bellarmine University. Dr. Jay Fiene and Dr. Chris Wagner helped me to find the servant leader in myself and use it for good in public education.

Being the first cohort through the doctoral program at Western Kentucky University carried much responsibility and just as much trailblazing navigation. Without the leadership of Dr. Jay Fiene, Dr. Chris Wagner and Dr. Tony Norman, I could not have waded through the bureaucracy it took to get to graduation. Dr. Marge Maxwell has been my absolute cornerstone and strength throughout my dissertation journey. She took on the chairperson role without batting an eye. Thanks to the grace of God, we will forever be connected as kindred spirits.

Thanks to the rest of my committee for reading, editing, replying, re-reading, and calming my fears. Dr. Tony Norman acted as my methodologist. Dr. Nedra Atwell and Dr. Chris Wagner were shepherds on the journey.

My colleagues at the Daviess County Public Schools were invaluable to me. My superintendent, Dr. Tom Shelton, understood the stresses placed on me while writing and worked accordingly to support every step of the way. Dr. Vicki Riley also was my guardian angel, watched over my progress and gave great advice.

Finally, I would be remiss without mentioning some of my peers in the Vanguard Cohort. In particular, Dr. Angela Gunter, is amazing. Without her supporting words, compassionate ear, firm encouragement, and unmatched dedication I would not have made it. She has been my best friend throughout and is an amazing person. Soon-to-be Dr. Kelly Davis has also been my rock. Her academic specialty was data analysis but her real strength was in her frequent progress check-ups and solid friendship. She, too, is an incredible person.

Western Kentucky University sought to create an innovative Doctoral Program and I was blessed to be a part of the first cohort. I could write 23 pages for the 23 people in our cohort. The strength of this group is awe-inspiring. I could not imagine being on an individual journey, and am quite sure I would not have completed the degree without the cohort. These 23 people are an absolute inspiration to me on a daily basis and I cannot begin to enumerate their contributions to my work. Their names will forever live in my heart:

John Baker
Dianne Bowles
Stephanie Cornwell
Dan Costellow
Wes Cottongim
Kelly Davis
Cindy Ehresman
Terry Elliott
Eric Gregory
Angela Gunter
Tracy Inman
Penny Logsdon
Jace Lux
Lee Maglinger
Sheri McGuffin
Chris Mueller
Eugene Patsalides
Donna Renaud
Holly Ross
Carol Schreiber
Lee Ann Smith
Kevin Thomas
Wesley Waddle

TABLE OF CONTENTS

LIST OF TABLES

ONE-TO-ONE LAPTOP PROJECT:

PERCEPTIONS OF TEACHERS, PARENTS, AND STUDENTS

Matthew Constant May 2011 128 Pages

Directed by: Marge Maxwell, Tony Norman, Nedra Atwell, Chris Wagner

Educational Leadership Doctoral Program Western Kentucky University

One-to-one laptop programs are becoming more prevalent across the world in K-12 institutions. School districts are searching for more engaging tools that seek to have impact on school success, such as grade achievement, college/career preparation, and/or 21st-century skill preparation and attainment. Additionally, boards of education continuously want some positive indication of the return on their substantial financial investment.

This study utilized surveys of three important stakeholder groups (parents, students, and teachers) related to a one-to-one laptop project in a moderately-sized rural Midwestern school district. Perceptions about how often laptops were used in the classroom setting and across content areas (Language Arts, Social Studies, Mathematics, and Science) were explored. Finally, the same respondents were asked to identify their perceptions about how laptop computers had a positive or negative impact on quarterly grade averages within these same content areas. Results were extrapolated and associated with the Rogers' Innovation Continuum (Innovator, Early Adopter, Early Majority, Late Majority).

Data indicated significant mean differences in perceptions among the three groups in terms of use. Teachers believed students were using laptops more often than students or parents reported their use. Nearly all groups reported Mathematics as the area with

lowest amount of use and Science as the area with the highest. Almost all three groups believed laptops had little to no effect on quarterly grade averages. Mathematics teachers, however, believed laptops had a decidedly negative effect.

The data seemed to indicate a need for additional teacher training on best practices for implementing laptops within the content areas, as well as specific attention paid to mathematics instructors. Further, the school district was mapped to an Early Adopter on the Rogers' scale. This indicates a need for further implementation and refinement if it is to be an accepted part of the educational culture.

CHAPTER I: INTRODUCTION

The United States of America is following global trends of entering an Internet age. In 2004, the US Department of Commerce released a report entitled *A Nation Online: Entering the Broadband Age*. Broad-based goals, such as developing accessible and affordable access for all Americans by 2007, were developed as a result of this report. President George W. Bush surmised that, "the spread of broadband will not only help industry, it will help the quality of life for our citizens" (Cooper & Gallagher, 2004).

Although access to the Internet continues to grow, there is still evidence of the socioeconomic digital divide. One quarter of America's poorest households is online as compared with 80% of those households earning $75,000 or more. Racial inequalities are rampant as well, with 40% of African Americans reporting access as compared to 60% Caucasian (Cooper, 2002).

School districts across the country are finding ways to put mobile computing devices into the hands of students on a continuous basis. Not only do they seek to improve engagement, attendance, and attitude with technology (Bethel, Bernard, Abrami, & Wade, 2007) but they believe it also affords the student's family home access to a powerful learning tool (Murphy, King, & Brown, 2007). If the impetus continues to reasonably outfit every American with broadband Internet capability, laptop families will have a distinct potential economic advantage over those without this same opportunity (Silvernail & Lane, 2004).

Significance of the Study

This study is significant because it asks the same questions about educational laptop use across multiple stakeholder groups. Little to no research exists that compares

the perceptions of the same variable (i.e. hours of use in the classroom setting and effect on quarterly grade averages) from perspectives of student, teacher, and parent. The results will be a key consideration as school district leadership and policymakers consider either the adoption or continuance of a one-to-one laptop program.

In addition, the study will highlight the importance of the relationship between laptop usage and socioeconomic status. By potentially contrasting the differences in perception from those who receive free or reduced lunch versus those who do not, educational and economic strategists will become aware what the uses and benefits of laptop technology could be for those families. Those communities considering one-to-one implementation for purposes of narrowing the digital divide will have data from which to draw upon as possible predictors of how successful a proposition that could be.

Finally, powerful professional development plans will be developed from the outcomes of this study. Traditionally, professional development is thought of only for the purposes of retooling and retraining teachers. However, this study will show the need for addressing training needs of students and parents as well. Meeting the reported needs of all groups provides a roadmap for success of a one-to-one project.

Problem Statement

There are a vast number of variables to measure when considering whether a program achieves success. Boards of education must hear from all constituencies in order to make informed decisions based on sound data streams. There are studies that report laptops could be one variable that increases student achievement (Gulek & Demirtas, 2005; Russell, Bebell, & Higgins, 2004). There is also research on instructional obstacles that must be overcome for a one-to-one (every student with a

laptop) environment to be successful (Greenhow, Robella, & Hughes, 2009; Hew & Brush, 2007).

This study sought to gauge the perceptions across key stakeholder groups concerning the value, effectiveness, and use of the one-to-one laptop in a classroom environment. Parents were asked to recount observed uses of the laptop in the home, degree and level of use by their child(ren) and overall attitude of the program as an available resource offered by the school district. Students were asked to what degree the laptop was used in challenging their thinking, their frequency of use and for what purposes, and their level of use for communication and collaboration. Finally, teachers were asked to assess their instruction as a result of the laptop resource available in the classroom, including their ability to incorporate it to engage higher-level thinking.

Subjects for this study are from a rural Midwestern school district where a one-to-one initiative has been in existence since 2004. The laptop program included all of the district's traditional high school students in two campuses (approximately 3100 students). The schools' average free and/or reduced lunch population is 42%. Key points surrounding the program include the following:

- 24/7 access to a laptop during school months (August – May).
- Wireless Internet access throughout the entire school district
- Capability of wireless access at home (if the family already has an Internet Service Provider)
- One full-time Technology Integration Specialist at each school site who provides just-in-time assistance for teachers and students

- Two full-time computer technicians at each school site who ensure repairs are done in a timely manner
- An extensive professional development plan, affording the faculty's access to both real-time and virtual training experiences
- After-school phone call support to aid families with technical help issues at home

The results of this study will inform several areas of research. First, some of the same questions were asked of all three stakeholder groups. Comparisons can be made, for instance, between parents and teachers concerning level and effectiveness of use. Therefore, technology strategists can develop or continue an approach to engage each group appropriately in a one-to-one project. On the instructional side, school districts may learn best practices for integrating meaningful, high-level, and technology-rich projects into the curriculum. Boards of education may also glean important information about constituents' perceptions regarding the effectiveness of the resource and be able to account for that variable in a return-on-investment schema.

Purpose of the Study

This study investigated the perceptions of high school students, parents, and teachers concerning the overall success, level of implementation, and degree and frequency of use with distributed one-to-one laptops. The independent variable was the amount of time students spent in particular content area classes (Language Arts, Social Studies, Science, and Mathematics). The dependent variables were (a) student, teacher, and parent perceptions of how much time was spent using laptops in class and (b) student, teacher and parent perceptions about how laptops affected quarterly grade averages.

Theoretical basis for the Study

Rogers (2003) classifies the process of innovation based on the intensity and involvement of the stakeholder. Using a transformative continuum, Rogers labels groups as "innovators, early adopters, early majority, and finally late majority" (p. 37) . When the last two stages are prevalent, society has undergone a transformative culture change. Take, for instance, the introduction of the microwave to the modern home. After it was patented for use, it was simply a desired novelty in the home (innovator stage). Trendsetters began to purchase and use them (early adopters). As the phenomenon flourished, more and more families purchased them (early majority). Soon after, the microwave became a household fixture (late majority).

Considering the potential transformative nature of one-to-one laptops, Rogers (2003) suggests true and lasting change does not occur until at least the early majority perpetuates the movement. Lei, Conway, and Zhao (2007) believe the laptop movement is in the early adopters stage, but with dropping prices and better technology, early majority is quick to follow.

Within the context of this study, a comparison will be made across stakeholder groups to discover the perceptions of amount of use within content area courses and in the home. To inform further program planning, the responses given by each group were mapped to the Rogers' (2003) innovation continuum scale.

Weston and Bain (2009) synthesized innovation research as it relates to one-to-one computing devices and highlighted key researchers around this theme. Bransford, Brown and Cocking (2000) and Jonassen (2008) suggest an addition to Rogers' theory in order to maximize the innovation's effectiveness. For the laptops to become authentic

learning tools used for rich and engaging assignments, cognitive tools are introduced and monitored. Further, they maintain when technology "enables, empowers, and accelerates" (Rogers, 2003, p. 37) the core culture true innovation can occur. These cognitive tools are essential in building and monitoring change:

- Students, teachers, and parents have an explicit set of simple rules that defines what the community believes about teaching and learning.
- The school community deliberately embeds the big ideas and aspirations into day-to-day actions and processes of the school.
- All stakeholders are involved in creating, adapting, and sustaining the embedded school design.
- Feedback is generated from the embedded design and occurs in real time.
- A shared conceptual framework for practice is developed as a result of the above criteria.
- Guided by the framework, all stakeholders demand systemic use of technology rather than sporadic and occasional surface use (Bransford et al., 2000; Jonassen, 2008).

Rationale for the Study

Ubiquitous laptop programs are sprouting up across the country. Few studies, however, provide insight into what perceptual uses and benefits, if any, exists across multiple stakeholder groups. Additionally, boards of education must make difficult financial decisions for the benefit of their students. Therefore, the study will inform practitioners, policymakers, and the community-at-large about the perceived benefits of a laptop program. Results should indicate professional development goals for schools as

well as recommendations for a more successful infusion of the laptop program across the grade 9-12 curriculum. Chief Technology Officers will understand, from a macro level, the ramifications of implementing a large-scale technology initiative if they so chose. Community members will glean how students, parents, and teachers feel about the merging of 21st-century skills and a laptop program in a high school environment. Finally, the No Child Left Behind Act of 2002 seeks to minimize the achievement gap between high and low performing children (No Child Left Behind Act, 2002). Data will indicate possible interventions to help close the digital gap that exists between economically advantaged and disadvantaged students.

A plethora of qualitative studies exists on individual groups with respect to laptop programs. This study seeks to measure quantitatively the same dimensions of the program among all affected stakeholders. Results should add to the literature base for those in all stages of implementation, from the initial thoughts to the post-program evaluation.

Research Questions and Hypotheses

The study will focus on aspects of a high school one-to-one laptop program. Results will indicate the perceptions of stakeholder groups as they relate to allowing students (grades 9-12) to have full-time access to a laptop computer. By surveying parents, students, and teachers the following research questions will be explored:

Research Question 1: What are the perceptions of parents, students, and teachers about the number of hours per week students use laptops for school assignments across content areas (language arts, social studies, science, and math)?

Hypothesis 1: There will be no significant differences among student, teacher,

and parent perceptions on the number of hours students spend per week in completing assignments with laptops across content areas (language arts, social studies, science, and math).

Research Question 2: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages across content areas (language arts, social studies, science, and mathematics)?

Hypothesis 2: There will be no significant differences among student, teacher,and parent perceptions concerning the laptops' effects on quarterly grade averages across content areas (language arts, social studies, science, and mathematics).

CHAPTER II: REVIEW OF LITERATURE

Introduction

Understanding the context of one-to-one computing requires framing the strategy around theory, philosophy, and practice. Therefore, this literature review begins with how one-to-one laptops coincide within the landscape of 21st-century skill development. A brief history of how schools began considering laptops for every student is explained, with consideration given to both resource availability and physical classroom structures.

Next, a considerable amount of deference is given to the overall philosophy of integrating technology into teaching practice. Pedagogical influences and implications are explored and put in a time continuum whereby the reader will gain a historical perspective on the evolution of technology integration as an innovative instructional practice to the inclusion of a technology immersion model prevalent in some of today's classrooms.

A large portion of the chapter includes landmark literature synthesizing the findings of several key studies that highlight results of one-to-one computing projects within multiple contexts. Each stakeholder group (teachers, parents, and students) is profiled separately. To round out the literature review, a breakthrough study examining multiple stakeholder groups is presented. Murphy et al.'s (2007) publication is the basis for the researcher's study.

21st-Century Skills

The debate: new ideas or old re-framing?

Acting as the latest educational buzz phrase, "21st-century skill development" takes on a multitude of interpretations (Silva, 2009). Depending on which ideological

stance taken, debaters say it is anything from developing more independent thinkers and problem solvers to simply applying the age-old principles that Socrates preached (e.g., analytical and critical thinking). The difference in interpretation lies in what the student can do with the knowledge rather than what knowledge he/she possesses (Silva, 2009).

There is no doubt that the standards movement is upon K-12 education in the United States. With the No Child Left Behind movement and individual state mandates, students are formally tested in multiple grades over multiple subjects. The governors of at least 10 states have committed to creating new assessments that would originate from new teaching and learning standards (Gewertz, 2008).

Individual skills associated with 21st-century learning include such things as workforce aptitudes, interpersonal skills, and noncognitive attributes. The definition is further shaped by the available technology that cannot be ignored. A term now in its infancy, "technacy," involves information science skills, digital media fluency, and a deep technological system knowledge (Silva, 2009).

Futurists tie the application of the 21st century skills to the well-being of the overall economy. Murnane and Levy (2004) contend that work requiring routine skills (the education of old) is now all done by a computer. Today's workforce must be able to analyze complex situations and use multiple sources and viewpoints.

According to the International Society for Technology in Education and the National Research Council, teaching these skills is not optional. Complex thinking and analytical skills must comprise teaching and learning at every level (Bransford et al., 2000). In 2008, the United States Department of Education reported on a National

Mathematics Advisory Panel (2008) whose findings indicated there was no set age or developmental level at which children are able to gain complex thinking.

Technology Accessibility Over Time

Ubiquitous computing.

Weiser (1991) defined the term "ubiquitous computing" as the personal computing era. The vision at that time was looking for future technology that would be available at all times and anticipating the user's needs. Educators adapted that version to specifically focus on K-12 environments where teachers and students have uninterrupted access at both home and school.

Two major eras inform the evolution of the one-to-one movement. The first of these is the pre-Internet era (before 1995) and the current era (1995-present). Before the Internet, computers were large, bulky, slow, and expensive. Very few classroom units existed, and they relied on resident software. After the exponential explosion of the World Wide Web, inexpensive technology and portability abounded. According to Dede (2000), a paradigm shift happened in the way students and teachers thought about learning with technology.

One-to-one precursors and trendsetters.

The Apple Classroom of Tomorrow project was the United States' first attempt to make computers readily available to teachers and students. Powered by the Mac operating system, technology came to be viewed as a tool for learning (Keefe & Zucker, 2003).

In 1996, the personal digital assistant (PDA) became more prevalent to busy executives. The Palm operating system allowed multi-function capability in a windows-

like environment. Rudimentary handwriting recognition programs allowed for geographic versatility. Educational research consortia began to study this mode of learning in earnest. Today, many PDA devices are being used in classrooms (Keefe & Zucker, 2003).

Texas Instruments developed and successfully marketed the handheld graphing technology. Students across the world began to apply math and science principles on the large graph display. A myriad of programs added functionality and the form factor was interesting to futuristic engineers (Keefe & Zucker, 2003).

Along with infrastructure, schools began to formally plan for technology infiltration and inclusion. The early 1990s saw the emergence of the school computer lab where students could access necessary applications for completing projects. Thus, financial resources began flowing to schools for such investments (Lei et al., 2007). The development of technology-specific plans for schools, districts, states, and nations provided framework for legislators to funnel large amounts of start-up monies for infrastructure development. Due to these efforts, the person to computer ratio in the United States dropped from 125 people per computer in 1984 to 3.8 people per computer in 2004 (Madden, 2009).

Technology availability today.

The amount and availability of laptops and intuitive handheld devices has exploded since 2002. Thanks to a free market economy and the World Wide Web, a useful computing device can be purchased for a few hundred dollars (Livingston, 2006). In a matter of twenty years, the laptop computer has gone from eight pounds to today's version of as small as one pound. The socioeconomic and digital playing fields are being

leveled with the more affordable cost of the resource. According to Livingston (2006), it is critical we respond to the needs of our students in a ubiquitous way: "the magic numbers are 24/7 and 365" (p. 7). Lei et al. (2007) propose that many of the technologies taken for granted today were once rare innovations. As the first automobiles were put on roads, no one could have predicted that nearly every adult would own at least one. In similar fashion, computers have seamlessly found their way into the global society. The key to this transfer of innovation to appliance is found in the utility and cost of the product. Technologies such as space shuttles and commercial jets are owned by large corporations and require resources to maintain that are far beyond the capabilities of any one individual. However, technologies such as the pencil, cell phones, and now personal computers are becoming non-negotiable in terms of individual ownership. These innovations are evolving into appliances. Along with increased presence and prevalence, laptop computers have become smarter, more efficient, and multi-functional. Users rely on them for anything from writing reports to networking with a virtual friend to looking up a household recipe (Lei et al., 2007). Fueling this impetus for laptop ownership, the explosion of the Internet and its capabilities make the case for asynchronous informal and formal learning. In 2004, there were more than 800 million Internet users around the world. Just two years later, the number ballooned to 1.1 billion, and in 2009, the estimated number of world Internet users jumped to 1.7 billion. The Pew Research Group reports a 362% increase in usage from 2000-2009 (Madden, 2009).

Philosophical and Logistical Planning

Preparing the community.

Livingston (2006) synthesized history, context, and best practices in her book entitled *1-to-1 Learning* and offers a conceptual framework and planning templates. The Educators, Planning, and Commitment (EPC) must all work in tandem to produce a one-to-one exemplary site. Eight major pillars undergird a successful laptop implementation, according to Livingston (2006). Those are Vision, Leadership, Clarity, Communication, Implementation, Purpose, Assessment, and Support. Hierarchically, strong leadership structures must develop a clear and succinct mission that is carried out by all members of the organization. Research indicates one-to-one programs help students not only improve information-processing skills (Lei et al., 2007), but also prepare students for the high-tech global economy (Murnane & Levy, 2004). Additionally, it can help students become more self-sufficient and independent learners thereby making them adept at discerning the useful information from the bunk (Livingston, 2006). Finally, one-to-one programs can help students be more organized (Bransford et al., 2000). If they use it as their primary tool and electronic notebook, the laptop can store and disseminate information and resources on their behalf.

For teachers, one-to-one programs can supply teachers with confidence to plan, teach, and communicate more effectively (Lei et al., 2007). Livingston (2006) further asserts that richer, more engaging lessons can be taught with the laptop as the researcher and deliverer of information. Finally, the laptop can be the great communicator with student, parents, and other colleagues. For entire school buildings, a one-to-one program can improve student and school attendance, and even has potential to improve academic

performance in nearly all curricular areas. Additionally, the use of the laptop dramatically increases communication between home and school (Livingston, 2006).

An engaging classroom and workspace.

The Partnership for 21st Century Skills published a white paper in 2009 that addresses the optimal learning environment to engage students (Fadel, 2009). There is some agreement that attributes such as teamwork, collaboration, and problem solving must be explicitly taught and nurtured in classrooms (Chism & Bickford, 2002). Schools should create an environment in which students have ability to create, teachers have a venue for professional collaboration, and real-world discussion can meaningfully occur (Fadel, 2009). In addition, classrooms should be equipped with means to contact learning partners across the globe. Technology plays an obvious role in connecting resources to researchers and facilitating inquiry-based projects. The media center, then, must take on a more critical role of enabling its patrons to get to higher levels of thinking (analyzing, synthesizing, and evaluating resources). Further, they must provide a venue for large group presentations, social learning, and collaboration space (Fadel, 2009).

Time is a critical factor in determining the ideal learning environment. Carnegie units have been the standard in American high schools. These discrete and timed learning experiences rely on "seat time" for students. The George Lucas Educational Foundation, however, argues that educators do not give enough credence to the amount of time students are learning outside the classroom, particularly with available technologies (Ferrandino , 2007).

Physical constructs of a school building are important considerations to make when planning to infuse these skills into curriculum. In a multi-author collaboration,

editors Bellanca and Brand (2010) report "the need to transform our schools has never been more urgent" (p. 4). The factory approach to schooling, according to the partnership, has lasted many decades but is in need of great change. Technology needs to be present and available as a student resource: "In some schools, there may even be a laptop for every student" (p. 11).

Lei et al. (2007) found evidence of the merits of one-to-one computing in terms of mobility and flexibility by offering the resource inside the school culture and environment. Students are able to engage in a more personal way with an ultimate impact on student learning.

Teacher and Student Perceptions of Laptops

The extensive literature on teacher perceptions of technology and one-to-one laptops shows multiple perspectives on use, effectiveness, and student achievement implications. Overall, research indicates teachers see value in laptop learning but require ongoing professional development and curricular reframing. A convincing amount of literature exists that demonstrates students' engagement levels are higher with the laptop availability. Uses for students comprise both the organizational and instructional realms.

Technology integration and teaching philosophy.

According to Dexter, Anderson, and Becker (2000), teacher perceptions of the computer's role in the classroom have much to do with the degree and complexity of technology integration. Their research intended to uncover both teaching philosophy and perception of technology use. The information was collected as a preliminary study for a national survey concerning pedagogical beliefs and practices. Based on the recommendation of building leaders, forty-seven teachers across the United States were

chosen to respond to a questionnaire. In addition, these teachers were interviewed and observed in their classrooms. The sites were evenly divided among California, Minnesota, and New York. Teachers had varied ranges of experience, and both traditional and progressive schools were among the sample. Data analysis procedures resulted in teachers being placed in one of three categories: nonconstructivist, weak constructivist, or substantially constructivist. Of the 47 surveyed, 32 were in the constructivist grouping. These teachers used technology for their own productivity and consistently used innovative teaching practices to integrate technology successfully in the classroom. However, teachers did conclude that the computer did not automatically dictate innovative practices (Decker et al., 2000).

The opportunity to reflect to peers, administrators, and researchers acted as a catalyst for instructional change, according to teacher surveys. When given the chance to interact on practice, teachers frequently became constructivist-minded, and, therefore, changed practice. Technology, then, is a tool to help change the culture. When utilized in tandem with reflection, it becomes a powerful resource to help teachers overcome their perceived lack of innovation. Finally, if teachers themselves are seen as the agent of change and trusted to be so, educators must feel confident in their decision-making ability as to whether or not computers are appropriate at the given pedagogical time (Decker et al., 2000).

Little research exists on factors related to technology integration informing teacher morale, perceived student learning, and higher order thinking skills. Baylor and Ritchie (2002) qualitatively studied these variables in 94 classrooms across four geographically diverse states. The independent variables in the experiment included

planning, leadership, curriculum alignment, professional development, technology use, teacher openness to change, and teacher non-school computer use. Dependent variables included technology competency, technology integration, teacher morale, impact on student content acquisition, and higher order thinking skills acquisition.

Participating schools were chosen for the study that met four key requirements: the schools had made significant efforts over at least two years to integrate technology throughout the entire building, the key administrator had plans to stay in place during and past the study period, selected building teachers were willing to help collect data, and a school technology use plan was prevalent. Within school buildings, teachers were chosen for the study who were the primary instructional deliverers, who had plans to stay during and after the research study, and who were regularly integrating technology into instruction (Baylor & Ritchie, 2002). A mixed methods study ensued that consisted of interviews and surveys of teachers and school administrators. A total dataset of 13,912 key data points was used to show predictive tendencies within the variables.

Baylor and Ritchie (2002) found that three variables are important to consider in terms of student content acquisition. Strength of technology leadership on the school level, teacher openness to change, and teacher non-school computer use all seemed to predict the degree students master content. The degree to which higher-order thinking took place in classrooms was predicted by teacher openness to change, the amount of individual technology use in creative situations, and the level of integration attempted within the classroom.

Two factors predicted teacher morale: professional development and the level of integration attempted in a classroom. As was expected, teacher technology competency

was predicted by the teacher's openness to change. Finally, technology integration was predicted also by the willingness of the teacher to change as well as the percentage of collaborative technology opportunities available (Baylor & Ritchie, 2002).

The most prevalent factor that seems to have an impact on the degree and success of integration was the teacher's willingness to change. Unfortunately, according to Baylor & Ritchie (2002), it is also the most difficult to influence. A technology culture is built when strong leadership occurs and a lifelong learning attitude is developed among the stakeholders.

Instructional barriers.

According to Lowther, Inan, Strahl, and Ross (2008), grass-roots-level support is paramount to successful integration of technology. In an expansive experiment involving 26 schools in Tennessee, 12,420 students and 972 teachers used technology coaches to break down the instructional barriers to success over a three-year time period. These coaches were funded by the No Child Left Behind mandate and by the Enhancing Education Through Technology Initiative. Their goal included helping teachers and students understand that technology is a tool for learning and the use of the resource could have significant positive effect on both critical thinking skills and attainment of 21st-century skills.

Through student and teacher surveys, classroom observations, and disaggregation of state-mandated test data, the control group (no technology coaches) and experimental group (technology coaches) were compared. Six major instructional technology barriers served as measuring criteria: availability and access to computers, availability of

curriculum materials, teachers' beliefs, teachers' technological and content knowledge, and technical/administrative/peer support (Lowther et al., 2008).

Students in the technology-coached classrooms involved themselves in more student-centered learning activities, independent research, and collaborative learning than those in the non-coached schools. Achievement levels on state testing were raised slightly in only two content areas. Lowther et al. (2008) asserted a three year time period is too short a span in which to expect significant standardized test changes and conjectured that perhaps a longer timeframe may show results that are more positive.

Teachers in the experimental group showed more positive attitudes and perceptions concerning technology integration than that of the control group teachers. With coaches present as an available resource, confidence levels to complete computer tasks were significantly higher in the program schools. The classroom observations found, however, that teachers still needed professional development to use the tool for higher-level learning and critical thinking. An interesting finding of Lowther et al. (2008) was that technology-coached classrooms were more frequently focused on academics with a higher level of student attention and interest displayed.

Conducting a meta-analysis of 43 key studies that identified 123 barriers to successful technology integration, Hew and Brush (2007) found categorical commonalities across the spectrum. Barriers were identified in one of five areas: (a) resources, (b) institution, (c) subject culture, (d) attitudes and beliefs, (e) knowledge and skills, and (f) assessment.

The bulk of these barriers were resource-related. Subjects reported a lack of computers, hardware, software, and related items (Karagiorgi, 2005). Additionally, the

technology must be in the proper location for it to be usable and accessible by both teachers and students (Fabry & Higgs, 1997). Similarly, lack of time was also a large obstacle. Having time to find resources on the web, to scan photos, and to integrate into lesson plans was often reported problematic by teachers (Karagiorgi, 2005).

Instructors further acknowledged a skill deficiency (Snoeyink & Ertmer, 2001-02) in understanding computer and network logistical operations. Until they could do rudimentary tasks such as logging onto the network, saving a file, etc., teachers would not teach any technology-related activities in the classroom.

At the heart of change, school leadership structure and personnel can hinder technology integration progress (Fox & Henri, 2005). Classroom practices can be halted or restricted to the school administration's lack of understanding or philosophy behind technology integration. A study of teachers in Hong Kong found that since principals did not understand the relevance behind the infusion of technology to promote more learner-centered activities, classroom practices became restricted (Fox & Henri, 2005).

Teacher attitudes and beliefs also played a major role in the amount of technology infusion in the classroom. Ertmer (2005) asserts that the decision to utilize the innovation basically lies in the fundamental beliefs teachers hold concerning technology and student achievement. If teachers did not see the relevance in the resource, they willingly chose not to implement its use.

High-stakes assessment concerns were also prevalent in the minds of educators. Fox and Henri (2005) found this during a study of Hong Kong elementary and secondary classrooms. In the teacher's mind, pressures of mandated testing did not leave time to utilize the available technology. Shifts in technology uses as they relate to assessment

moved from using the computers for teaching and learning to using computers as data warehouses (Fitzgerald & Branch, 2006). Such emphasis on assessments and test scores, according to Schneiderman (2004), compromises the use of the computer as a teaching and learning tool. The shift in purposes caused school districts to look to one-to-one computing to have a direct (positive) link to student achievement data. Rather, Schneiderman (2004) contends this is counterproductive to the overall goal of preparing students for the 21st century.

Finally, the culture of the organization influences the classroom teacher on how much and to what degree integration takes place. Teachers are unwilling to adopt a new technology when it is perceived to be incongruent with the total school philosophy (Hennessy, Ruthven, & Brindley, 2005).

A 2008 study uncovered teacher perceptions of barriers associated with technology use in the classroom, their confidence levels, types and levels of training received, and conjectures on the future of technology in the next ten years. Al-Bataineh, Anderson, Toledo, and Wellinski (2008) posed a 10-question survey to teachers in grades six through 12 in Midwestern school district. Forty-nine teachers voluntarily responded to the survey and identified several obstacles to full technology integration. With standards and accountability come teacher stresses and pressures added to an already full set of day-to-day responsibilities. Teachers reported not having enough time to implement technology, full classrooms, and pressure to raise test scores.

Another issue for the traditional classroom is technology access. Without a one-to-one scenario, schools are limited to computer lab availability. Educators relayed frustrations with availability of labs when the curricular content could have been

supplemented by technology (Al-Bataineh et al., 2008). Also, teachers reported feeling uncomfortable with the ever-changing scope of the technology landscape. Providing adequate professional development and workshop time on new technology integration skills is difficult to prioritize. Teachers reported highest usage rates were on productivity and management (email, word processing, and electronic grade book). Al-Bataineh et al. (2008) found the least frequent way to use technology (2.7%) was as an instructional device. Recommendations from respondents indicated making technology more available to students in an effort to increase engagement levels and appropriate integration into instruction. Teachers longed for more job-embedded training on using the tools for effective teaching and learning. Sharing digital content asynchronously and in a collaborative environment seems to indicate the future of how technology and education should be related (Al-Bataineh et al., 2008).

Teaching and learning with one-to-one laptops.

In the fall of 2004, all freshmen at the United States Military Academy at West Point were issued laptop computers in a required psychology course. Efaw, Hampton, Martinez, and Smith (2004) followed the progress of this rollout and examined teaching techniques, lessons learned, and student performance. In the quasi-experimental study, the control group was not allowed to bring the laptop into the classroom space. In the treatment group, however, classroom laptop use was mandated. Six instructors comprised the control group while four made up the treatment group. The course material, syllabus, learning objectives, and exams were identical for all freshmen.

Significant challenges existed with the laptop classroom. The wireless infrastructure was not quite ready for implementation. Also, some classroom

management issues were noted. Students were surfing the web or instant messaging during classroom lectures. However, authenticity of engagement produced situationally relevant outcomes. For example, as a lecture was going on, a student was able to surf to a tolerance website to find that hate groups existed in her own hometown. Accessing the information that quickly would not have been possible in a non-laptop classroom (Efaw et al., 2004).

The use of simulations and online discussions were also prevalent for the experimental group and allowed for more and higher critical thinking on the students' part as they were called to apply and synthesize learned information (Efaw et al., 2004). Means (1993) found that simulations provided a concrete means of understanding and created a context for upper-level learning. Additionally, motivation for completing the task was found to have been higher when simulations were employed.

At the end of the study the average score on the student's final exam in the laptop classroom (M=86.8) was significantly higher (p<.05) than that of the non-laptop counterparts (M=83.5). According to survey data, students reported their own critical thinking demands were higher with the availability of the laptop. Open-ended comments pointed mainly to the ease of organization and management with the computers. Additionally, many reported on the appreciation for the use of the companion CD-ROM that came as a supplement to the textbook. The applied exercises solidified theoretical content for the students (Efaw et al., 2004).

Key research with teachers includes measuring the concern level as the initial implementation of laptops begins. Donovan, Hartley, and Strudler (2007) conducted an examination of 17 middle school teacher concerns during the initial stages of laptop

deployment. For the purposes of differentiation for teacher training based on concern level, researchers hoped to uncover recommendations for better alignment of training needs and implementation logistics.

Utilizing the Concerns-Based Adoption Model (CBAM) as a theoretical framework, researchers examined change from the perspective of those experiencing it (Heck, Stiegelbauers, Hall, & Loucks, 1981). CBAM focused also on the context in which the educational change was proposed. The questionnaire was administered to all core teachers of the program and follow-up interviews provided qualitative data (Donovan et al., 2007). Teachers were from an urban middle school in the southwestern United States that had received laptops as a result of a Gaining Early Awareness and Readiness for Undergraduate Programs grant. The school population was considered at-risk primarily due to the 84% free and reduced lunch eligibility as well as the 55% rate of English as a Second Language population.

Results indicated teacher concern was on a personal level. Common responses included statements like, "I'm worried about teaching with the laptops because I don't really know what to do," or "I'm concerned with being able to cover all course requirements while being bogged down with the laptops." Additionally, teacher concerns focused on being able to manage and multi-task. There was less concern about how to best utilize the technology to enhance the educational experience (Donovan et al., 2007).

Donovan et al. (2007) exposed the hesitancies teachers have when experiencing change. It was difficult for them to blend traditional pedagogical preparation with 21st-century innovation. This is all the more reason to ensure that proper amounts of professional development and planning go into such an initiative. According to

recommendations of the research, training must be differentiated based on the concern level and type of each teacher. Further, it must be immediately relevant and meaningful to their existing curriculum. Finally, it is critical to involve teacher input into the process of planning and implementation. Through collaborative discussion, Donovan et al. (2007) contend the entire change process will be much smoother and goal-oriented.

In a study of 10 K-12 schools in two states (Maine and California), Warschauer (2007) wanted to find what patterns of information use and research were being used in laptop classrooms and how what was observed might differ from their prior non-laptop class. For this study, Warschauer used the American Library Association (2000) definition of information literacy: the ability to access needed information effectively and efficiently; evaluate information and its sources critically; incorporate selected information into one's knowledge base; use information effectively to accomplish a specific purpose; and understand the economic, legal, and social issues surrounding the use of information.

From 2003 to 2005 heterogeneous school types (two elementary, four middle, three high, and one combined elementary-junior high) participated in surveys, interviews, observations, and submitted artifacts. A total of 650 hours of classroom observations were conducted across both states. Warschauer (2007) used, a variety of methods for evaluating the collected. He found that the laptop schools obviously had much more occasion to access just-in-time information, with the ability to augment their knowledge at the touch of a button. They became adept at managing it and including it in written work. Furthermore, teachers in laptop schools displayed significant pedagogical changes: 1) more just-in-time learning; 2) more autonomous, individualized learning; 3) a greater

ease of conducting research; 4) more empirical investigation; and 5) more opportunities for in-depth learning. In short, teachers were able to take advantage of many more "teachable moments." Accessing the information prompted most students to ask more questions. This opened the instructional door for the teacher, thereby creating richer and more meaningful discussions (Warschauer, 2007).

The variance in methods of working with this new information was a concern in this study. Whereas all students had exponentially increased access to information, not all received the needed scaffolding and instruction to develop properly the critical 21st-century skills (Warschauer, 2007). Students in socioeconomically advantaged schools exhibited higher-order thinking much more than low-income areas. The instructional program, therefore, must be intentional about how and what ingredients are used to solidify the information literacy skills fully into the 21st-century youth (Warschauer, 2007).

The Denver School of Science and Technology (DSST) bucks the trend of public school graduates with 100% moving on to a two or four-year postsecondary institution (Zucker & Hug, 2008). Each student receives an HP laptop computer as a tool for navigating through the high school. In their study of DSST, Zucker and Hug (2008) posited these questions: 1) In what ways has the DSST incorporated computers and other digital tools into its academic program, especially physics, 2) When, where, in which subjects, and for what purposes do teachers and students use the laptops and other digital tools, especially in physics, and 3) What are the opinions of teachers, students, and administrators about the 1:1 laptop program? The study consisted of both qualitative and

quantitative methods in which student, teacher, and administrator surveys were administered. Focus groups and classroom observations were also included.

DSST teachers and students used the laptops everyday for many purposes. This was in sharp contrast to students' previous year without the technology, where the economically diverse group of students, on some occasions, had never touched a computer. Teachers utilized in-class projectors to show their image to the classroom and shared centralized file access. Most textbooks were in digital form, and learning management systems like Moodle were prevalent (Zucker & Hug, 2008).

More than 90% of students reported that laptops had a positive impact on how much they learn from school, and provided a major advantage over their non-magnet-school counterparts. A wide majority (94%) believed that laptops had a "very" or "somewhat" positive impact on how much they learn at school. According to teachers, 75% believed that technology was either "essential" or "extremely essential" to their own teaching practice. Also, 89% believed the laptop program is important for a DSST student to succeed. Likewise, 80% said laptops have helped them become more reflective on their own teaching practice. Yet, Zucker and Hug (2008) acknowledged their need to hone their craft continuously, especially with the ubiquitous resource available to them. Finally, they proposed implications for policymakers who claim that technology is "oversold and underused" (Cuban, Kirkpatrick, & Peck, 2001).

Teacher instructional strategies were the thrust of the Owen, Farsaii, Knezek, and Christensen (2006) study. A full-scale implementation of 9600 laptops in a diverse urban high school setting provided the context for the external evaluation of the program with respect to teaching practices. Students were given the laptops and maintained ownership

throughout the school year. The study was conducted after five years of implementation in order to gauge potential changes in teacher practice and perception. In a combination of administered surveys (teachers and students) coupled with focus groups and interviews, researchers triangulated the data to uncover patterns and trends around the laptop initiative. Data showed some significant classroom changes in the instructional setting. Before the laptop program, teachers reported utilizing group work 48% of the class time, while after implementation, 58% of time was devoted to cooperative learning. The most frequent strategy teachers reported was their use of facilitated instruction rather than didactic, traditional methods (Owen et al., 2005).

Teachers reported that students became more independent learners and were able to sort and collect information much more easily with the laptops readily available. The use of the Internet as a research tool was a frequent response on both the student and teacher surveys. In order to stay current, instructors further reported learning from the students (Owen et al., 2005).

Classroom management concerns were frequently highlighted in the survey results. Giving up the instructional control to students was difficult for the majority of the teaching staff. This concern prompts training possibilities in terms of monitoring students and also offering challenging and engaging ways for learners to become involved in the lesson. Content-specific resources were also of concern to faculties. Giving time to work collaboratively to find these resources is critical to success (Owen et al., 2005).

Teacher perceptions of a laptop program are critical in successful implementation. Owen et al. (2005) contributes to the body of research that emphasizes the external buy-

in teachers must have in order to make lasting instructional change in classrooms. As reported in this study, students begin to think more creatively and critically when they have more control over the learning that is facilitated by the instructor.

The Maine Learning Technology Initiative (MLTI) involved distributing laptop computers to all seventh and eighth graders (N=34,000) and their teachers (N=3000) in the hopes of preparing its students to "navigate and prosper in the world" (Silvernail & Lane, 2002, p. 14). In 2002, Governor Angus King used one-time state surplus money to fund the project. At the behest of the Maine legislature, an evaluation of phase one of the project was performed by the Maine Education Policy Research Institute.

Through a mixed method approach incorporating student (N=26,000) and teacher (N=1700) survey instruments, site visits (N=39), observation (N=24), and document analysis (N=486), Silvernail and Lane (2004) answered the following research questions: 1) How were laptops being used, 2) What are the impacts of the laptops on teachers and students, and 3) What obstacles, if any, have schools, teachers, and students encountered in implementing the laptop program?

Findings of teacher surveys indicated a growing percentage of teachers using laptops to develop instructional materials, conducting online research, and communicating with colleagues from fall 2002 to fall 2003. Some anecdotal data suggested that teachers experienced difficulty using laptops to manage student assessment. Teachers struggled on how to incorporate electronic management strategies with providing timely feedback to students (Silvernail & Lane, 2004).

Teachers who attended four or more professional development sessions on effectively integrating technology into curriculum were more likely to incorporate

consistently the use of laptops for high-level learning. Over 80% of teachers "somewhat" or "strongly" agreed that having the laptop had allowed them to access more up-to-date curricular information.

Highest student usage rates by content area included Language Arts (93%), Science (91%), and Social Studies (88%). Students reported that the primarily used laptops for finding information (90%), organizing information (63%), and taking notes (57%). As mirrored by teachers, only 36% recounted using laptops to take quizzes or turn in work. Additionally, students who had the option of taking the laptops home reported higher usage than those only having computers available during school hours (Silvernail & Lane, 2004). Furthermore, 78% of students preferred to use the laptop to do work, 70% thought laptops made school more interesting, 71% thought laptops helped them improve the quality of their work, 65% report laptops helped them understand, and 73% thought laptops allowed them to get work done more quickly (Silvernail & Lane, 2004).

The overwhelming majority of teachers (75%) believed students were more actively involved in their own learning when they used laptops. At least half believed that students were more engaged when laptops were in use and the quality of the work increased with the use of the laptop (Silvernail & Lane, 2004).

A growing number of researchers have become interested in how teachers use computers in constructing and delivering curriculum. Garthwait and Weller (2005) performed a qualitative study on two seventh grade teachers involved in the Maine Laptop Technology Initiative. While attempting to answer the basic aforementioned question, the researchers discovered many more implications that affected the overall

degree to which implementation took place for these two particular teachers. Outcomes of the study were intended to inform current practitioners, advise policymakers, and act as a model for pre-service teachers. The theoretical framework driving this research was grounded in diffusion of innovation theory purported by Rogers (2003). According to Rogers, before implementation can take place, teachers must first hear about the innovation, form an attitude, and make a decision to reject or adopt.

Through a series of teacher interviews, artifacts, and classroom observations Garthwait and Weller (2005) found that teachers' level of adoption seemed to be directly proportional to their core beliefs about how students learn. "Rick" and "Susan" both saw the potential value of the laptop project. However, technical issues plagued both Rick and Susan. Network connectivity, Internet availability, printing management, and needed supplies did not seem readily available in the first year of the Maine Learning Technology Initiative (Garthwait & Weller, 2005). Due to Susan's frustration with technical glitches, her implementation level did not match that of Rick. Susan also was not willing to compromise her role as the sole proprietor of knowledge in the classroom. Rick, however, modeled a shared learning environment and allowed students to work collaboratively toward a common goal. Rick found students much more engaged and creative when the resource was available. He believed laptops were the socioeconomic equalizer with all students having the same access to the laptop. Susan struggled throughout the school year to find appropriate activities. Therefore, Susan's classroom use time varied greatly compared to that of Rick (Garthwait & Weller, 2005).

In summary, Susan believed the purpose of the laptop project was to help students work better and more efficiently but had nothing to do with changing the face of

education. Rick, on the other hand, reported a paradigm shift in his classroom culture. Students were more responsible for their own learning and became independent learners in a facilitated classroom (Garthwait & Weller, 2005).

One-to-one laptops and student achievement.

Connecting laptop usage to improved student achievement is a difficult case to make and not one that many researchers have been able to substantiate. Rockman (2000) was a key investigator in Microsoft's Anytime Anywhere Learning Project and was the first to uncover meaningful results. In his investigation of over 20 schools who piloted the use of portable computers, Rockman (2000) found students to be highly engaged and focused while using problem solving and critical thinking strategies in-group settings. Additionally, Rockman (2000) observed more individualized and differentiated learning when skill mastery was in question.

Gulek and Demirtas' (2005) substantial study, however, broke new ground on more directly linking laptops to increased academic performance asking and answering the following research questions: 1) Does the laptop program have an impact on students' grade point average (GPA), 2) Does the laptop program have an impact on students' end-of-course grades, 3) Does the laptop program have an impact on students' essay writing skills, and 4) does the laptop program have an impact on students' standardized test scores?

Focusing on a middle school in California, Gulek & Demirtas (2005) used standardized sets of data (GPA, end-of-course grade, state-mandated testing indices, norm-referenced tests, and district-wide writing assessments) to measure possible effects of the laptop on student achievement. Students in the laptop program (experimental

group) received the same curriculum as those without the laptop (control group). The differences in the two groups were the way instruction was delivered and the tools used to get work completed.

All students in the school were eligible to participate in the program. There was a fee for those that did elect to have a laptop; however, arrangements were made for those students who could not afford the device. Students in the experimental group (N=259) used the laptops on a daily basis performing such tasks as essay writing, online grading, note-taking, information gathering, developing presentations, designing websites, and completing content-specific webquests (Gulek & Demirtas, 2005).

The sixth grade cumulative grade point averages (on a 4.0 scale) of laptop (M=3.50) and non-laptop students (M=3.13) were significantly different (p<.05). Both the 7th and 8th grade also had higher GPAs in the laptop immersion program. In addition, end-of-course grades were significantly higher. Fifty percent of sixth grade Language Arts students received A's in the experimental group and 38% received A's in the control. Mathematics showed the same discrepancy at 40% to 33% respectively. On the sixth grade STAR norm-referenced test, 88% of the laptop students scored in at least the 50th percentile while 78% scored similarly in the non-laptop group (Gulek & Demirtas, 2005).

To add validity and reliability to study results, Gulek & Demirtas (2005) then performed a cross-sectional analysis of the students' academic performance after the laptop to the same performances before receiving them. Laptop students showed significantly (p<.05) higher achievement in the Language Arts (F=9.84) and Mathematics (F=13.89) norm-referenced test when comparing pre and post laptop years.

Gulek and Demirtas' (2005) contribution to the body of research is important because multiple indicators of learning were explored instead of just one factor. Also, the cross-sectional cohort analysis allowed for more credible results. They indeed found that students with laptops are more motivated, complete higher quality work, and can produce better academic results than those without laptops.

Lowther, Ross, and Morrison (2006) embarked on research that sought to show how laptop classrooms had an effect on learning, specifically looking at whether or not students could solve problems more effectively with the one-to-one availability. Fifth and sixth grade teachers (N=26) were trained in the iNtegrating Technology for inQuiry (NTeQ) model (Morrison & Lowther, 2002). The crux of the professional development was to introduce problem-solving and collaborative methods to address real-world problems.

Data were collected in a series of systematic classroom observations in which instructional methods and technology usage were monitored. Teacher, student, and parent surveys were administered and focus groups were used for interview purposes. Control groups were utilized where non-laptop classrooms had five or less desktop computers.

Results indicated significant (p<.05) differences in instruction in the laptop classroom versus the control group: students displayed extensively more knowledge of computers, applications, and productivity. A district-wide, percentage-assessed writing test was employed for all subjects, and the laptop classrooms (M=.78) outperformed the non-laptop classrooms (M=.61) that points to increased student achievement for those with the 24/7 availability. Interview data showed parents reporting an increased interest

in school due to engaging and meaningful classroom activities. Challenges were reported from the various stakeholder groups in relation to transporting laptops from home to school, training needs for teachers, and technical issues required to keep laptops running (Lowther et al., 2006).

Although Lowther et al. (2006) introduced research that attempted to link laptop access to student achievement and the writing assessment results were encouraging, they acknowledged limitations and the need for further research. Opportunities for further research included identifying each student and tracking their past academic and testing progress to that of a current valid measure. This study acknowledged this would have been more helpful and added validity. Also, only teachers that were trained in the NTeQ model were a part of the study. Having had the extensive training, it would be interesting to see what, if any, difference would occur in a non-NTeQ classroom. Regardless of these limitations, Lowther et al. pioneered the notion that laptops might have a positive effect on student achievement. While difficult to point to one variable, the study is important to the ongoing work of researchers that desperately want to make that connection.

Dunleavy and Heinecke (2007) investigated at-risk middle school students (N=54) and their achievement on state-mandated mathematics and science tests after having had one-to-one laptop access from Monday-Friday of each week. The school is located in a mid-Atlantic state and is extremely diverse, with 81% of the population reported as African American. Because of successive inability to meet accreditation requirements, the school had been placed into an academic sanctions category. Initial goals of the laptop program did not include major changes in teaching and learning.

Rather, at the outset, it was seen as a way to increase student efficiency and thereby increasing state standardized test scores (Dunleavy & Heinecke, 2007).

The methodology of the study involved a pretest-posttest control group design. The students were randomly assigned to either a one-to-one classroom or a traditional non-laptop classroom. The treatment (laptop computers) was measured over two years and the pre-existing standardized scores in mathematics and science were utilized. ANCOVA was used to report possible significant differences in test scores between the experimental and control groups.

Three major findings were reported by Dunleavy and Heinecke (2007). First, there was a significantly negative difference on science achievement scores from pretest to posttest with respect to laptop classrooms. Secondly, laptop males were found to have outperformed laptop female students in science scores. Finally, there were no significant differences reported in mathematics achievement between the two groups. Limitations of the study included not being able to control for teacher effect on student achievement. This factor is always a concern for researchers. The variable of a human interaction between teacher and student was very difficult to control. Additionally, the sample size in this study was small when considering gender as a factor (N=20). Despite these limitations, this study makes important strides in looking at individual content area achievement with respect to laptop access. While schools are making the technology available school-wide, it is important to consider that integration may be more meaningful in some content areas over others. Also, it is critical to consider that resources available to integrate are more available with some particular content areas than others, therefore lending to easier and more seamless use of laptops in focused content

environments. Finally, these data call policymakers and technology planners to look at gender as a possible factor in laptops and student achievement (Dunleavy & Heinecke, 2007).

The prevalence of one-to-one computing in school districts and institutes of higher learning prompted Russell et al. (2004) to compare two groups of students. One group received their laptops on school-owned carts. They would only use them for necessary classroom activities. Conversely, another student group received laptops to take home and use whenever and as often as they needed. The study looked at differences in both instructional practice and learning activities within each group's classroom environment. Sample size consisted of 209 students in nine classrooms. Four classrooms had 1:1 laptops while five had laptops on carts over two months more than 50 classroom observations were conducted and data measuring student engagement, frequency of use, type of collaborative setting, and the teacher's role were recorded. Also, students were asked to draw a picture of themselves writing in school, in order for researchers to get further insight into how technology might have played a role for them (Russell et al., 2004).

Data analysis showed a higher frequency of technology use by students in the one-to-one classroom. Differences in the sporadic cart availability versus the always-available laptop classroom were astounding. Students in the cart classroom responded a typical use of "15 to 60 minutes a day." However, one-to-one classrooms reported "1-2 hours per day" or even "2+ hours per day." Teachers reported more technology use by students in the laptop classroom. Moreover, the richness of the interaction was much deeper. Instead of productivity and printing, students were using computers for Internet

research and problem solving (Russell et al., 2004). Additionally, there was significant difference also noted in the level of student engagement. Based on structured observations, the level of engagement for one-to-one classrooms (M=3.8) compared to cart classroom (M=3.3) was statistically significant at the .05 level.

This study was the first of its kind to compare the two kinds of laptop delivery models as they relate to instructional practice and student engagement. It paved the way for many other studies that analyze effects of multiple methods for full-scale technology integration (Russell et al., 2004).

Student reactions of one-to-one learning.

Little documentation exists about international laptop projects. However, the Landes initiative in the northwest portion of France supplied 817 students with laptops (Jaillet, 2004), with goals of improving student achievement and student-centered learning. Geographically, Landes was in a rural area with limited wireless access. Therefore, the computer was seen as a learning tool for the entire family.

Jaillet (2004) conducted large-scale surveys to both students and parents to inform Landes' future work with laptops. An overwhelming majority of students responded to the question "I am convinced I could learn how to use a computer effectively." Students were eager to embrace the new tools. The most prevalent use was email followed by Internet research. Over half the students visited websites that were unrelated to their school lessons. Jaillet (2004) concluded that, for the most part, students were using the devices more for personal use than an educational one.

Data returned at the end of the school year indicated an increased use in search engines, communication, and personal web pages. Conclusions drawn by Jaillet (2004)

indicate that perhaps the laptop provides too great a temptation for "escape" from the lesson at hand. Acknowledging that implementation and goal realization takes time, phase two promised to address more teacher pedagogy and training.

Student attitudes and perceptions were also the focus of Mouza's (2006) study. In an urban elementary setting, three classrooms were outfitted with laptop computers for the purposes of increasing meaningful educational experiences. Both quantitatively and qualitatively, Mouza (2006) focused on perceived importance of the technology, computer enjoyment, frequency of student-teacher and student-student interactions, and motivation toward school and learning. Data collected included classroom observations, teacher interviews, student surveys, and student focus groups. Additionally, the Young's Children Computer Inventory questionnaire was administered to all students. One hundred students responded to the survey, that contained items related to computer importance, use, and enjoyment.

Each of the laptop classrooms had a mirror control group that did not have access to laptops, and had only two desktop computers for the entire class to use. Both experimental and control classrooms were similar in demographics and teacher preparation. As expected, the teachers in the laptop classroom significantly changed pedagogical practices based on the technology available to students (Mouza, 2006).

Findings revealed varied teacher practice in the laptop classroom. After overcoming procedural and logistical challenges, students began to use them for content research projects. Programs such as Inspiration were used to help students think creatively and organize their thoughts. Data analysis became commonplace with spreadsheet applications (Mouza, 2006). Results from the MANOVA analysis did not

find significant differences in student attitude about learning, whether they had a laptop or not. Separate ANOVAs indicated, however, third graders were significantly more likely to have creative tendencies than fourth graders. Results from focus groups indicate students were more excited about learning in a laptop classroom and opportunities for richer and more meaningful engagement were possible. Learning in multiple and varied ways helped students get to some higher level and creative thinking experiences. Students felt empowered and more in charge of their own learning in the laptop classroom, as compared to that of the control group (Mouza, 2006).

Mouza's (2006) study adds to the body of research related solely to student perceptions. Rarely do studies include focus group and extensive interviewing along with quantitative survey data. This approach helped expound on student responses and clarified the thoughts of an elementary-aged student. Additionally, controlling for demographics and teacher preparation is difficult to do in an urban school setting. Mouza (2006), however, was able to do so and find some interesting and significant data.

Students, parents, and teachers combined.

Murphy et al. (2007) investigated a high school laptop initiative that provided ninth-grade students and teachers with one-to-one access. The goals of the project focused on technology integration, professional development for teachers, and appropriate training for students. The study sought to gauge the impact on student, teacher, and parent attitudes with respect to the new technology being offered. Researchers selected three suburban schools and offered a combination of hands-on training for students and teachers as well as ongoing support through a software program called ActNow! Additionally, graduate assistants were placed at each of the three

schools to provide job-embedded and live support for the school buildings and sample populations (Murphy et al., 2007).

In an effort to appropriately gauge technology integration and its proprietary effect, Murphy et al. (2007) used an instrument that employed a Likert scale and polled stakeholders on knowledge, attitudes, and behaviors in relation to the technology. Three versions of this instrument were created with slightly different wording for each of the student, teacher, and parent groups. For example, a student questionnaire item may read, "I like to complete computer-based homework assignments" while a parallel teacher item would read, "I like to assign computer-based homework assignments."

Participants of the study included 247 students randomly selected from the three schools, 168 parents of these students, and 24 teachers involved with the laptop initiative. Subjects were tracked from December 1999 through June 2000. Pre- and post-surveys were administered as well as some qualitative interviews from each of the three groups. Four dependent variables were measured for all three subject types: perceived software task competence, attitudes toward use of technology, perceived use of the Internet to complete tasks, perceived general technology task competence. A fifth dependent variable delved into changes in reported teacher self-efficacy with respect to teaching in the new technology environment. Independent variables included gender and type of school (Murphy et al., 2007).

Findings indicate no significant differences in parent survey results between pre- and post- results. Also, gender was not found to have made any marked difference for students, parents, nor teachers across any of the factors. Students did show statistically different results in one school on attitudes toward use of technology and their perceived

ability to use Internet/email. For teachers, differences in pre and post surveys pointed to software use, Internet/email use, and general technology use (Murphy et al., 2007).

Murphy et al.'s (2007) study was groundbreaking in that it attempted to draw out similarities and differences across the three stakeholder groups by asking the same types of questions. The study pointed out the importance of having a comprehensive strategic plan before implementing such a monumental change in a school district (Lebaron & Collier, 2001; Moore & Kearsley, 1996; Tiene & Ingram, 2001). Additionally, the frequency and number of support systems were critical to level of success. Recommendations for further research invite longer-term studies. The gap between pre- and post- surveys was only four months. More comprehensive data could be gathered during a longer-term study (Murphy et al., 2007).

Conclusion

This chapter contextualized the practice of implementing one-to-one programs in schools. Many variables and facets are reviewed to inform policy, logistical, and instructional planners as they consider such a move. Three important stakeholder groups (teachers, students, and parents) have the ability to affect lasting change within the educational landscape. Capturing the perceptions of each of these groups individually and comparing them collectively will likely inform school districts considering such a move and add to the body of research concerning one-to-one programs in general.

The next chapter will highlight the methodology employed to gauge the perceptions of parents, students, and teachers as they relate to a school district's one-to-one laptop immersion program. Particular attention will be placed on validating Murphy

et al.'s (2007) work while also placing the program along the Rogers' (2003) innovation continuum.

CHAPTER III: METHODOLOGY

Introduction

In order to compare stakeholder responses against similar types of questions, I surveyed parents, students, and teachers (See Appendices E-G) regarding their perceptions of a one-to-one laptop program. Specifically, the survey included questions concerning amount of time spent with laptops in specific content area assignments as well as what affect, if any, laptops may have had on quarterly grade averages. The research questions are as follows:

Research Question 1: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (Language Arts, Social Studies, Science, and Mathematics)?

Research Question 2: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages?

This chapter outlines the research methodology of the study. First, an explanation of the participants and how they were selected are presented. Next, the research design is explained with sufficient depth to understand the survey instrument as well as how pilot study, validity, and reliability data were gathered. Key research theories are revisited as a means to provide a strong rationale for the survey design. Finally, specific data analysis measures are highlighted in order to address each research question.

Participants

Because the study dealt with human subjects (students, teachers, and parents), all appropriate materials were submitted to the University's Human Subjects Review Board. Acceptance was formally granted (See Appendix A) with no known risks to participants.

Attempts to compare perceptions of three stakeholder groups associated with the one-to-one project lead to consideration of who and what type of demographics made up the potential samples. The high school communities being studied come from a rural Midwestern river city of approximately 60,000. Average annual income for the city approached $35,000 (Brake, 2010). The school district being studied was a medium-sized institution with just over 10,800 students from preschool through 12th grade.

The sample included students from two large comprehensive high schools (grades 9-12) within this school district. According to demographic data provided by the state education agency (Kentucky Department of Education, 2009), School A housed 1400 students while School B housed 1700. It was the intent of the researcher to include all students in the data analysis. Demographics of the entire group indicated a fairly homogeneous population, with 92.4% white students and 40.4% qualifying for the National School Lunch Program's free or reduced status (Table 1). The attendance (M=95.2) and graduation rates (M=96.0) are extremely high in the district. Both high schools are typically in the top of any standardized assessment measures of the state.

Table 1

Demographics of the student sample (by percentages)

	Male	Female	White	Other	Paid Lunch	Attendance Rate	Graduation Rate	Free/Reduced Lunch
School A	39.8	60.2	89.7	10.3	56.5	95.3	94.7	37.3
School B	46.8	53.2	95.1	4.9	62.5	95.0	97.2	25.7
Combined	43.7	56.3	92.4	7.6	60	95.2	96.0	30.5

High school teachers were also a focus of this study. The comprehensive high school faculty consisted of approximately 200 instructors representing a wide range of content areas. Table 2 indicates varied teaching experience and ages across the instructional spectrum at each school (Kentucky Department of Education, 2009).

Table 2

Demographics of the teacher sample

	Male (in percent)	Female (in percent)	Avg Range of Teaching Experience (in years)
School A	35.3	64.7	10-15
School B	34.4	65.6	10-15
Combined	34.5	65.6	10-15

Parents of the high school students were also included as a stakeholder group from which to analyze perceptions. Out of a possible 2700 parents, the desired sample size of this group was 900. Table 3 indicates demographic data concerning the parent group, according to the results of the survey.

Table 3

Demographics of the parent group

	Male (in percent)	Female (in percent)	Average Level of Education
School A	46.4	53.6	Associates' Degree
School B	46.2	53.8	Bachelors' Degree
Combined	46.5	53.5	Bachelors' Degree

In order to reject the null hypotheses, the researcher must be assured of strong results that clearly and consistently show marked differences in perceptions among and within the three stakeholder groups. It is with this desire that a power analysis was completed. At an alpha level of $p<.05$ and statistical power of at least .7, desired sample size for three groups is $N=744$. This study far exceeded this estimate for students and parents. (Student $N=2700$, Parent $N=900$). For teachers, however, there were a maximum of 200 from which to choose. The sample size of 180, or 90%, still reflects strong results.

Incomplete surveys were used if sufficient data existed to address the particular hypothesis in question. Questionable or missing data in crucial parts of the survey were not considered in the final data analysis.

Measures

A 17-question survey was designed by the researcher to specifically address all research questions. Within the context of this study, a comparison was made across stakeholder groups to discover the commitment level and impetus for change. Teachers (See Appendix E), Parents (See Appendix F), and students (See Appendix G) were asked parallel questions to determine where they fell on the Rogers' innovation continuum scale (1995). Rogers (2003) classifies the process of innovation based on the intensity and

involvement of the stakeholder. Using a transformative continuum, Rogers labels groups as "innovators, early adopters, early majority, and finally late majority" (p. 37). When the last two stages are prevalent, society has undergone a transformative culture change. By understanding each one's particular innovation dynamic, appropriate actions could be enacted (per group) to accomplish stated one-to-one laptop goals.

Weston and Bain (2009) synthesized innovation research as it relates to one-to-one computing devices. Bransford et al. (2000) and Jonassen (2008) suggest an addition to Rogers' theory in order to maximize the innovation's effectiveness. For the laptops to become authentic learning tools used for rich and engaging assignments, cognitive tools are introduced and monitored. Bransford et al. (2000) and Jonassen (2008) maintain that when technology "enables, empowers, and accelerates" the core culture true innovation can occur.

Pilot Study and Results

In an effort to examine the content validity of the instrument, six expert judges conducted a review of the instrument items. The judges were selected for their expertise in the area of technology and education. Two of the judges were university professors in educational technology, three judges were chief information officers in K-12 school districts, and the sixth judge was a high school English teacher as well as a graduate student in educational technology.

Judges were asked to categorize each item by the dimension, determined a-priori, it most appropriately represented. These dimensions were created based upon the educational technology objectives derived from Rogers (2003), Lei et al. (2008), and Weston and Bain (2009). The judges were provided a copy of the survey questions.

The results of each judge's rankings were combined and examined for rate of agreement. Percentages of agreement were determined and items with variation in categorization were analyzed.

Next, the survey was pre-piloted to a group of 19 high school journalism students. The researcher personally visited the classroom, explained the context of the study, and the importance of gathering meaningful data. These students took twenty minutes to complete the survey, and an item-by-item discussion ensued. Questions that seemed unclear or awkward to students were improved and/or struck from the pre-pilot survey. Students for the pilot survey (N=144) came from a rural Midwestern high school with 1400 students. Participants were mixed grade levels, ranging from grades 9 through 12. Additionally, as Table 4 illustrates, students were mixed gender and come from varied socioeconomic backgrounds; about half the pilot survey participants were members of the free/reduced lunch group while the other half were paid lunch students.

Table 4

Gender and Socioeconomic Status of Pilot Survey Participants

	Male	Percent	Female	Percent
Free/Reduced Lunch	33	49	34	44
Paid Lunch	31	46	40	52
No Lunch	3	5	3	4
Total	67		77	

All students in this high school were issued a laptop computer at the beginning of the school year and are able to keep it in their possession until the end of the same school year. The laptops were wirelessly connected to the Internet while at school and if the student had an Internet Service Provider at home, it could be connected there as well.

Participants were chosen based on a stratified random sampling of each grade level (Table 5). One classroom of each particular grade was chosen at random and if the teacher agreed to administer the pilot survey, the class commenced in completing the questions. The experimentally accessible population included all students in the high school (N=1400). The random sampling occurred from this pool of classrooms.

Table 5

Gender and Grade Level of Pilot Survey Participants

	Male	Female
9th Grade	11	10
10th Grade	36	52
11th Grade	12	13
12th Grade	8	2
Total	67	77

According to the aforementioned sampling method, participants were chosen for the pilot survey based on teacher approval, availability, and willingness for their students to complete it. Because all students had a laptop with seamless availability to the Internet, the survey was constructed and administered using a survey administration electronic resource. The website link for the survey was placed on the host school's main website. Students were instructed to go to the school's website and click on the link to take the survey. Teachers gave students a minimum of twenty minutes to complete all the items. The entire population (N=144) had a three-day window in which to complete the survey. The link was removed from the school's website directly after those three school days.

Data were extracted from the electronic survey tool and imported into the SPSS software program. The final analysis of pilot data included the examination of Cronbach's (1951) alpha internal consistency reliability estimates calculated, as well as

the alpha scale change if the item were removed, for each of the two factors. All had alpha reliabilities above .80 (α=.805), the cut-off point recommended for overall internal-consistency reliability (Gable & Wolf, 1993). Table 9 shows the inter-item correlation analysis among the 8 items. As expected, the correlations are low indicating the varied amount of use among content areas and environments.

Table 6

Inter-Item Correlation Analysis between Time Spent with Laptops (by Content Area) at School vs. at Home

	English	Math	Science	Social Studies	English Home	Math Home	Science Home	Social Studies Home
English	---							
Math	.310	---						
Science	.212	.369	---					
Social Studies	.236	.358	.425	---				
English-Home	.481	.196	.069	.224	---			
Math -Home	.354	.288	.126	.218	.541	---		
Science-Home	.218	.318	.436	.368	.456	.597	---	
Social Studies - Home	.367	.292	.170	.461	.521	.629	.635	---

Research Design

The purpose of this study was to determine the perceptions of three key client groups associated with one-to-one laptop computers in a Midwestern school district. Specifically, information was sought to explain how much and in what content areas students are using laptops to complete assignments. Additionally, exploring the perceived effect the presence of laptops on final student grades was also important.

The study utilized a survey design whereby the three stakeholder groups were asked similar questions in order to compare means (e.g. “Please rate the degree to having school-issued laptops may have affected the last nine weeks’ grade….”). In order to

garner measurable and consistent results a Likert scale was used. Values were assigned in each category and relative comparisons made across stakeholder groups.

The hypotheses stated:

- Hypothesis 1: There will be no significant differences among student, teacher, and parent perceptions on the number of hours spent per week in completing assignments with laptops across content areas (Language Arts, Social Studies, Science, and Mathematics).
- Hypothesis 2: There will be no significant differences among student, teacher, and parent perceptions concerning the laptops' effects on quarterly grade averages.

Table 7

Hypotheses with Dependent and Independent Variables

	Independent Variable	Dependent Variable
Hypothesis 1	Number of hours spent per week in Language Arts, Social Studies, English, and Mathematics Classrooms	Perceptions of students, teachers, and parents related to amount of student in-class laptop use.
Hypothesis 2	Number of hours spent per week in Language Arts, Social Studies, English, and Mathematics Classrooms	Perceptions of students, teachers, and parents related to laptop effect on quarterly grade averages

Procedures

Soon after official approval and notification from the Human Subjects Review Board, data collection began. Parent surveys were the most difficult to collect and the first stakeholder group to receive information. In the fall of 2010, all parents were mailed a copy of the survey and the Opt-out form (See Appendix D). They were asked to return the survey to the school in a provided return envelope. Expected return rate from the

parents was about 30%, or 900 surveys. Both high schools also maintain an electronic address book with several hundred parent email addresses. A link to the electronic version of the survey was also emailed to them. Parents could then fill out the survey online and submit answers or take the survey on paper and mail in the results.

Accompanied in the parent mailing was also a consent letter for their child(ren) (See Appendix D). After reading about the nature and purpose of the project, an explanation of procedures, discomfort and risks, benefits, confidentiality, and refusal/withdrawal, parents could make an informed decision about their children's participation in the laptop survey. A copy of the student survey was also included in the parent mailing. Any opt-out letters had five business days to be returned.

All students in this school district were issued an email address. The researcher coordinated with the principals of each school to send an email to the students explaining the nature and procedures of the project. The electronic link to the survey was included in the email. Principals coordinated within the school day to dedicate sufficient time to complete the survey. Students could either click inside their email or access the particular school's main website, which also housed a hyperlink to the survey site. Because all students were issued a laptop and the schools have wireless access, students could complete the survey right from the laptop computer. Expected return rate from students was 90% (N=2700).

Teachers were sent the electronic link to their survey by email. Principals coordinated with the researcher to find the best time to ask teachers to complete it. They too have an informed consent procedure (See Appendix E) and participation was voluntary. All teachers had a laptop computer issued to them and just like students;

access to the electronic survey should have been the easiest alternative to completion. Expected return rate from teachers was 90% (N=180).

All surveys were anonymous with no identifying information tied to either paper or electronic copies. Access to data was restricted to the researcher throughout the collection and analyzing period. Strict password protection was placed on the electronic database and paper copies were locked in a secure area.

Data Analysis

There were two research questions and hypotheses in this study:

- Research Question 1: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (Language arts, Social Studies, Science, and Mathematics)?
- Hypothesis 1: There will be no significant differences among student, teacher, and parent perceptions on the number of hours spent per week in completing assignments with laptops across content areas (language arts, social studies, science, and math).
- Research Question 2: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages?
- Hypothesis 2: There will be no significant differences among student, teacher, and parent perceptions concerning the laptops' effects on quarterly grade averages.

For all questions, comparisons of means using an analysis of variance (ANOVA) garnered the most accurate results ($p<.05$). The researcher was interested in finding significant mean differences in the stakeholder groups. First, the ANOVA was run to determine any significant mean differences among students, teachers, and parents as they relate to time spent with laptops completing assignments across content areas. A second set of ANOVAs were run to address the question of the same three groups as they perceive effects on quarterly grades. Assumptions of the groups being tested include that each are independent and the population variances are homogeneous. Follow-up testing included Tukey's HSD comparison in order to distinguish differences between and among stakeholder groups.

Chapter 3 has reported the methodology associated with the study, including research design, survey instrumentation, procedures, and data analyses. Because this study reflected the user of an original survey, details were also provided on validity and reliability testing as well as piloting the instrument. Chapter 4 indicates the data results from the specific methodologies mentioned in this chapter.

CHAPTER IV: RESULTS

Introduction

This study addressed the perceptions of three key stakeholder groups. Within each group, quantifiable feedback was given to inform the general school community on two issues. In terms of integrating laptops into the curricula of the core areas (language arts, mathematics, science, and social studies), the study showed perceived time students spend per week completing those activities. With respect to how laptops might impact an overall grade average within core areas, stakeholder groups responded with their perception of whether or not the laptops might have had any mitigating or contributory effect.

The study is significant because while research has been conducted on many factors related to one-to-one laptop initiatives, few have sought to find out how core content courses and amount of time may or may not have an impact on grade averages. Studies completed have focused on barriers to technology integration (Hew & Brush, 2007; Karagiorgi, 2005; Fabry & Higgs, 1997) and teacher effectiveness and training (Donovan et al., 2007; Waschauer, 2007) however few have explicitly asked how much time the laptop is being used within core content classes and if this laptop availability may have had any significant effect on overall quarter grade averages. Also, few have asked parallel questions to the three most heavily impacted stakeholders: teachers, students, and teachers. Murphy et al. (2007) did ask the three groups similar questions about laptop initiatives. However, their study focused more on perceived components of a successful implementation.

Research question 1 was designed to find out how often students were using laptops to complete assignments in the core content courses:

> Research Question 1: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (language arts, social studies, science, and math)?

There are a variety of assignments being given in the high school core content classrooms, some of which utilize laptop computers, and some which involve traditional methods of completion. The perception of teachers in any given content area may be different than that of students, while perception of parents could differ from students. Nuances in these differences will be analyzed.

Research question 2 focused on overall perceived effect of laptop computers on grade averages within the core content courses:

> Research Question 2: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages across content areas (Language Arts, Social Studies, Science, and Mathematics)?

Descriptive statistics

Table 8

Sample Size (N) by Stakeholder Group

	Male	Female	No Response	Total
Student	420 (38%)	541 (49%)	139 (13%)	1100
Parent	152 (45%)	175 (52%)	12 (3%)	339
Teacher	40 (33%)	76 (63%)	4 (4%)	120

Table 8 shows the sample sizes of each stakeholder group with gender breakdowns and percentages. Total available student population in the two

comprehensive high schools (School A and School B) was 2643. Sample size (N=1100), therefore, represents 43% of total available for students (see Table 9). Parent representation (see Table 10), however, accounts for only 14% of the 2398 available families. Teacher representation (see Table 11) was the highest of the three groups. Of the 180 available high school teachers, 120 (67%) responded. If participants chose not to answer the item (see Table 8), the non-response was not factored into the final analysis.

Table 9

Demographics of the student sample (by percentages)

	Male	Female	White	Other	Free/Reduced Lunch	Attendance Rate	Graduation Rate
School A	39.8	60.2	89.7	10.3	37.3	95.3	94.7
School B	46.8	53.2	95.1	4.9	25.7	95.0	97.2
Combined	43.7	56.3	92.4	7.6	30.5	95.2	96.0

*Data reported by 2010 School Report Card (Kentucky Department of Education, 2010)

Table 10

Demographics of the Parent Sample

	Male (in percent)	Female (in percent)	Average Level of Education
School A	46.4	53.6	Associates' Degree
School B	46.2	53.8	Bachelors' Degree
Combined	46.5	53.5	Bachelors' Degree

*Data reported by Researcher's Survey Respondents

Table 11

Demographics of the Teacher Sample

	Male (in percent)	Female (in percent)	Avg Range of Teaching Experience (in years)
School A	35.3	64.7	10-15
School B	34.4	65.6	10-15
Combined	34.5	65.6	10-15

*Data reported by Researcher's Survey Respondents

Findings Related to Research Question 1

Research Question 1 asks: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (Language arts, Social studies, Science, and Mathematics)? Because there are more than two groups in which to compare means, the Analysis of Variance (ANOVA) is the most appropriate statistical measure to employ (Fisher, 1925). Respondents were all scored on a Likert scale with 1 signifying No Use, 2 signifying 0-2 hours (average) per week, 3 signifying 2-4 hours (average) per week, 4 signifying 4-6 (average) per week and 5 signifying 6 or more hours (average) per week.

Table 12

Survey Means by Stakeholder Group and Content Area (Time Spent)

Content Area	Parent Mean (SD)	Student Mean (SD)	Teacher Mean (SD)
Language Arts/English	2.24 (0.92)	2.35 (1.00)	3.28 (1.02)
Social Studies	2.19 (0.94)	2.25 (1.02)	2.93 (0.83)
Mathematics	1.99 (0.91)	1.74 (0.81)	2.42 (0.78)
Science	2.19 (0.95)	2.41 (1.09)	3.40 (1.12)

Note: Choice (1)= Not Used; Choice (2) = 0-2 Hours; Choice (3) = 2-4 Hours; Choice (4) = 4-6 Hours; Choice (5) = 6 or more Hours

Table 13

ANOVA Source Table for Significant F Findings for Language Arts/English (Time Spent)

Amount of Time	Sum of Squares	*df*	F	Sig.
Between Groups	19.06	2	9.88	.00
Within Groups	1288.69	1336		
Total	1307.75	1338		

Table 14

Tukey HSD Comparisons for Language Arts/English (Time Spent)

Stakeholder	Stakeholder	Mean Difference	Std. Error	Sig.
Teachers	Parents	1.04	.24	.00
	Students	.93	.24	.00

Note: Choice (1)= Not Used; Choice (2) = 0-2 Hours; Choice (3) = 2-4 Hours; Choice (4) = 4-6 Hours; Choice (5) = 6 or more Hours

ANOVA testing revealed significant differences between groups [F(2, 1336)=9.88, p=.000] in Language Arts/English (See Table 13). Tukey post hoc analysis (See Table 14) revealed significant differences between Teachers (M=3.28, SD=1.02) and Students (M=2.35, SD=1.00). There were also significant differences between Teachers (M=3.28, SD=1.02) and Parents (M=2.24, SD=.92).

Table 15

ANOVA Source Table for Significant F Findings for Social Studies (Time Spent)

Amount of Time	Sum of Squares	*df*	F	Sig.
Between Groups	7.48	2	3.73	.02
Within Groups	1264.50	1261		
Total	1271.97	1263		

Table 16

Tukey HSD Comparisons for Social Studies (Time Spent)

Stakeholder	Stakeholder	Mean Difference	Std. Error	Sig.
Teachers	Parents	.74	.27	.02
	Students	.68	.27	.03

Note: Choice (1)= Not Used; Choice (2) = 0-2 Hours; Choice (3) = 2-4 Hours; Choice (4) = 4-6 Hours; Choice (5) = 6 or more Hours

ANOVA testing revealed significant differences between groups [F(2, 1261)=3.71, p=.02] in Social Studies (See Table 15). Tukey post hoc analysis (See Table

16) revealed significant differences between Teachers (M=2.93, SD=.83) and Students (M=2.25 SD=1.02). There were also significant differences between Teachers (M=2.93, SD=.83) and Parents (M=2.19, SD=.94).

Table 17

ANOVA Source Table for Significant F Findings for Mathematics (Time Spent)

Amount of Time	Sum of Squares	*df*	F	Sig.
Between Groups	23.68	2	16.94	.00
Within Groups	932.32	1334		
Total	956.00	1336		

Table 18

Tukey HSD Comparisons for Mathematics (Time Spent)

Stakeholder	Stakeholder	Mean Difference	Std. Error	Sig.
Teachers	Parents	.43	.18	.00
	Students	.67	.17	.00
Parents	Students	.25	.05	.04

Note: Choice (1)= Not Used; Choice (2) = 0-2 Hours; Choice (3) = 2-4 Hours; Choice (4) = 4-6 Hours; Choice (5) = 6 or more Hours

ANOVA testing revealed significant differences between groups [F(2, 1334)=16.94, p=.00] in Mathematics (See Table 17). Tukey post hoc analysis (See Table 18) revealed significant differences between Teachers (M=2.42, SD=.78) and Students (M=1.74, SD=.82). There were also significant differences between Teachers (M=2.42, SD=.78) and Parents (M=1.99, SD=.91). Finally, there were also differences between Parents (M=1.99, SD=.91) and Students (M=1.74, SD=.82).

Findings Related to Research Question 2

Research question 2 asks: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages

across content areas (Language Arts, Social Studies, Science, and Mathematics)? Once again, ANOVA analyses were conducted with Tukey's post hoc comparisons to point out differences within specific groups. Respondents were asked to identify the perceived effect based on the following Likert scale: Negatively affect quarter grade average (1), Somewhat negatively affect quarter grade average (2), No effect (3), Somewhat positively affect quarter grade average (4), and Positively affect quarter grade average (5).

Table 19

Survey Means by Stakeholder Groups (Quarter Grade Averages)

Content Area	Parent Mean (SD)	Student Mean (SD)	Teacher Mean (SD)
Language Arts/English	3.53 (1.06)	3.48 (1.07)	3.64 (1.17)
Social Studies	3.51 (1.09)	3.41 (1.09)	3.20 (1.32)
Mathematics	3.35 (1.00)	3.23 (0.95)	2.50 (0.95)
Science	3.46 (1.02)	3.42 (1.06)	3.38 (1.15)

Note: Choice (1) = Negatively Affected Grade Average; Choice (2) = Somewhat Negatively Affected Grade Average; Choice (3) = No Effect on Grade Averages; Choice (4) = Somewhat Positively Affected Grade Averages; Choice (5)=Positively Affected Grade Averages

Table 20

ANOVA Source Table for Significant F Findings for Mathematics (Quarter Grade Averages)

Amount of Time	Sum of Squares	*df*	F	Sig.
Between Groups	18.32	2	9.81	.00
Within Groups	1191.51	1276		
Total	1209.83	1278		

Table 21

Tukey HSD Comparisons for Mathematics (Quarter Grade Averages)

Stakeholder	Stakeholder	Mean Difference	Std. Error	Sig.
Teachers	Students	-.73	.19	.00
	Parents	-.85	.20	.00

Note: Choice (1) = Negatively Affected Grade Average; Choice (2) = Somewhat Negatively Affected Grade Average; Choice (3) = No Effect on Grade Averages; Choice (4) = Somewhat Positively Affected Grade Averages; Choice (5)=Positively Affected Grade Averages

ANOVA testing revealed significant differences between groups [F(2, 1276)=9.81, p=.00] in Mathematics (See Table 20). Tukey post hoc analysis (See Table 21) revealed significant differences between Teachers (M=2.50, SD=.95) and Students (M=3.22, SD=.95). There were also significant differences between the Teachers (M=2.50, SD=.95) and Parents (M=3.35, SD=1.00).

Conclusion

This chapter presented quantitative findings based on the two research questions concerning amount of time spent with laptops in core content curriculum as well as perceived effect on quarterly grade averages. Descriptive statistics were presented for a comprehensive look at all three stakeholder groups (parents, students, and teachers). A series of ANOVA tests and Tukey's HSD post-hoc analyses were presented to show specific differences between groups. The findings can be used to inform policy makers and program providers, as well as inform professional practice. Chapter 5 will discuss findings, draw conclusions, and make recommendations for further study.

CHAPTER V: DISCUSSION

This study dealt with perceptions of three key stakeholder groups as they related to a one-to-one laptop program in a suburban K-12 school district. Many educational entities around the world are attempting to be innovative and engaging to students of the 21st century. With the revolution and evolution of technology and personal learning devices, it is incumbent on both policymakers and classroom educators to evaluate the utility, practicality, and effect of this medium in the learning space.

Due to the emergence and availability of laptop learning devices, school districts around the world are beginning to investigate ubiquitous solutions (Livingston, 2006). Boards of education are charged with utilizing taxpayer dollars in a responsible manner. When faced with difficult financial decisions, these governing bodies require information concerning how much and to what extent laptops are being used. Oftentimes boards of education are also interested in their own constituencies' views on such projects.

Additionally, educators are tasked with, among other things, imparting 21st-century skills within and across the curricula. While debates occur about the definition and implementation of such skills, oftentimes the integration of technology is common (Silva, 2009).

Discussion of Findings

Discussion of findings for research question 1.

Research Question 1: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (Language arts, Social Studies, Science, and Mathematics)?

The teaching faculty's responses to the survey were significantly different than that of the parents and students. In all content areas (Language Arts/English M=3.28 hours; Social Studies M=2.93 hours; Mathematics M=2.42 hours) except science (M=3.40 hours), teachers believed students spent much more time per week using laptops in class to complete assignments than parents (Language Arts/English M=2.24 hours; Social Studies M=2.19 hours; Mathematics M=1.99 hours; Science M=2.19 hours) and students (Language Arts/English M=2.35 hours; Social Studies M=2.25 hours; Mathematics M=1.74 hours; Science M=2.41 hours).

The theoretical basis for this study includes a connection to the Rogers' (2003) innovation continuum, whereby he charts any novel innovation to a scale of earliest adopters to the latest majority. Rogers (2003) classifies the process of innovation based on the intensity and involvement of the stakeholder. Using a transformative continuum, Rogers labels groups as innovators, early adopters, early majority, and finally late majority. When the last two stages are prevalent, the entity has undergone a transformative culture change. Considering the potential game-changing nature of one-to-one laptops, Rogers (2003) suggests true and lasting change does not occur until at least the early majority perpetuates the movement.

The school district in this study might fall in the early adopters stage of the innovation continuum when considering the amount of time spent using laptops in classrooms. If the results had indicated more frequent use across the board, for instance, they would be mapped to a late majority status, and an assumption that the culture is engaged in frequent and regular use. The survey results, however, indicated an in-class average of 2 hours per week within each content area. Overall, the available classroom

time in a typical week for this school district is 7.5 hours in any one content area. In terms of Rogers' (2003) scale, this would likely translate to an early adopter. More work is needed with all stakeholder groups to progress on Rogers' (2003) continuum, for he contends that if an innovation is truly transformative in nature, the early majority stage must be achieved first (Rogers, 2003).

This school district, then, is consistent with the laptop movement across the world, as Lei et al. (2007) diagnose the innovation in the early adopters stage. Likely, the school community had hoped for a higher rating on the continuum. At the time of the study, the district had been engaged in a one-to-one laptop project for seven years. During year one of implementation, the laptops were certainly identified with Rogers' (2003) innovative stage. However, by year seven, a hopeful progression might have occurred whereby the culture had been transformed. By amount of reported use within content areas, this has not yet occurred in this school district.

All groups, however, did indicate some use of the laptop within each content area. When considering an average perceived use across parent, student, and teacher groups, science reported the most frequent use of 2.67 hours. Language Arts/English closely followed with 2.62 hours. Social Studies reported an average of 2.46 hours while Mathematics resulted in the least amount of perceived use with an average of 2.05 hours per week.

Dexter et al. (2000) caution the correspondence of amount of time using a computer and innovative practices. Although science was collectively perceived to have utilized laptops for the longest amount of time (M=2.67 hours) versus all other content areas (Language/Arts English M=2.62; Social Studies M=2.46 and Mathematics

M=2.05), it is not safe to conclude that science teachers are the most innovative. Specific uses of the laptops while in the content area would inform this question and add complexity to Rogers' (2003) theory. In fact, Baylor and Ritchie (2002) point to amount of time computers are used in creative situations as only one factor in terms of successful content mastery. In this study, time was analyzed but specific use and classroom setting was not. Other factors identified, such as strength of technology leadership on the school level, teacher openness to change, and teacher non-school computer use are all factors in overall success.

Philosophical investment of the stakeholders in the mission and vision of the individual schools may have influenced these results. If stakeholders see, understand, and apply this connection to the mission of the laptop initiative, perhaps more evidence will be seen of the next innovation stage. Setting clear goals and expectations of use, either in a collaborative situation or a top-down model, would provide boundaries by which teachers could self-reflect and self-evaluate. There may also be cause to analyze the overall physical environment, including infrastructure needs placed on an ever-changing technological landscape. If gaining access to needed resources was an issue for teachers and students, perhaps frustration was the cause for less-than-expected use. Teacher and student training is another variable to consider. Investigating the quantity and quality of professional development as it relates to teaching and learning with the laptop resource might inform the district. Perhaps more intensive and intentioned training would allow for the early adopter to move to the early majority.

The data seem to indicate a need for teachers to become aware of the types of activities students do on the laptops related to content assignments and how much time it

takes for students to complete them. Because students report spending nearly half as much time with them as teachers believe, perhaps some additional professional development is needed. Students are spending less time completing the actual given assignment with the laptop, or perhaps becoming more efficient and proficient with the technology than teachers believe. If teachers better understood how they were used, especially away from the classroom, they may be better informed and more equipped for stronger and more efficient implementation (Livingston, 2006).

The findings also highlight the digital gap that exists between teachers and students. While students seem to have little problem mastering a specific application or incorporating multiple programs within a completed assignment, the teacher sometimes struggles with estimating exactly how much time is needed and should be allowed for technology use. Within any given student work session, multiple tasks are likely being performed. From word processing to Internet research to social networking and collaboration, students are utilizing all electronic resources available to complete work. And, they are doing this as second nature. What teachers seem to believe, however, is that one particular electronic task takes longer than a combined multi-tasking effort that students normally produce.

Targeting particular content area teachers may also be a method for improving innovation within the school. Employing staff that primarily deals with best practice integrative technology techniques would be an effective resource. If concentrated efforts were placed on the mathematics faculty with frequent modeling and resource-sharing, perhaps significant gains could be made in the amount of time spent using laptops in the mathematics classrooms. Conversely, if science teachers (who reported the most

frequent use) would be willing to partner with mathematics faculty to collaborate on technology projects, it is likely usage would be higher as well as leadership capacity established.

Discussion of findings for research question 2.

Research Question 2: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages across content areas (Language Arts, Social Studies, Science, and Mathematics)?

Quantitative findings indeed indicated some significant differences in the perceptions across the three stakeholder groups in terms of overall use in content areas and the effect the laptop availability had on overall quarterly grade averages.

All content areas (except mathematics) and all three stakeholder groups (parents, students, and teachers) had across-the-board agreement on the perceived effect of the laptops on the summative grade. For the Language Arts/English, Social Studies, and Science areas a combined mean of 3.44 (on a 5-point Likert scale) indicates all stakeholder groups believe laptops have a neutral effect on grade averages.

In terms of the perception of laptops having an effect on overall grade achievement a significance was noted among all three groups in only one of the content areas: mathematics. Teachers reported a 2.50 on a 5-point Likert scale when asked what kind of effect laptops had on overall quarterly grades. Students (M=3.22) and parents (M=3.35), however, reported a significantly ($p<.05$) different result. Mathematics teachers perceive laptop use as having a negative impact on their students' quarterly grades.

Depending on the stakeholder group involved, this study could lend affirmation to Gulek and Demirtas' (2005) assertion that mathematics averages can be positively affected by the integration of laptop computers. Their study of an upper middle grades classroom found several factors has a positive impact on student grade point average. Understanding the role of the laptop inside the mathematics classroom would be critical as more investigation is completed. It appears that mathematics teachers are not using it as a critical part of lesson delivery as they report it having a slightly negative impact on grading. It would follow that mathematics teachers, then, believe the laptops are detracting from the potential achievement level of the students.

Due to the progressive nature of the mathematics curricula, teachers likely feel the pressure to ensure content mastery throughout the spiraling content. Consequently, they may not be as opportunistic about utilizing the laptop resource within their natural content delivery for fear of running out of coverage time.

The response could also indicate an issue with classroom management of the laptops inside the mathematics classroom. If there is an especially difficult concept that does not require the use of technology to master, the mathematics teacher may be more likely to refuse students to even bring them into the classroom environment.

Finally, each teacher's view about the philosophy of grade achievement would have an impact as well. More traditionalist-teachers may have a preconceived notion that the presence of the laptop will distract students. Progressive teachers, however, would be likely to embrace the resource and utilize it in the classroom.

The across-the-board agreement of all three stakeholder groups in all content areas (except mathematics) can be viewed as appropriate responses in this Early Adopter

stage. Students, parents, and teachers may be seeing the laptops as a seamless resource to be used when appropriate. It could be likened to any other resource students take advantage of in order to be successful (notebook, textbook, pen, pencil, etc).

In a 2008 study, six instructional technology barriers were identified as hindering successful integration of technology (Lowther et al., 2008). Two of the barriers measured were specifically highlighted in this study. First, the amount of time available to students to use technology was addressed. In all content areas and in all groups, respondents reported on availability (Science M=2.67; Language/Arts English M=2.62; Social Studies M=2.46 and Mathematics M=2.05). While each group perceived time was spent using laptops, roughly one-third of the available class time (per week) is reported as using laptops. Second, the laptop's effect on achievement level was found to be inconclusive in Lowther's (2008) study. In terms of perceived affect, this study showed a neutral to slightly positive affect. Students, parents, and teachers' combined averages indicated no effect to slightly positive effect on the Likert scale in each of the content areas (Language Arts/English M=3.55; Science M=3.42; Social Studies M=3.37; Mathematics M=3.03).

It is interesting to note the disagreement in the results from this study versus that of Zucker and Hug's (2008) findings. A wide majority (94%) of their respondents believed that laptops had a "very" or "somewhat" positive impact on how much they were learning. In the researcher's study, results concerning perceptions on grade averages indicated no effect, from the perspectives of the students (M= 3.39) and parents (M=3.18), when asked if the laptops had a positive or negative impact on quarterly grade averages. More observation and questions should be asked to find the true reason for the disparity in this study and Zucker and Hug (2008). Variables such as stakeholder

demographics, teacher pedagogy, quantity and quality of professional development could have accounted for the differences. Caution should be placed on comparing student responses about how much they learn and perceptions on grade averages. Some respondents may believe these two survey items asked very different questions, while some may have believed they were similar in nature.

In terms of the Innovation Continuum (the theoretical basis for this study), the overall means of the three stakeholder groups would again be mapped to an early adopter stage. The school district believes that in order for the culture to be transformed, a 'no effect' or 'positive effect' should be mapped to an early majority stage. Evidence of moving up the Innovation Scale will be acceptance of the laptops as part of the culture of these high schools. It may require some modeling and/or awareness of other school districts and their best practices about how incorporation of laptops might lead to positive grade results. What type of instruction happens with the laptops in the classroom (the introduction of a multitude of additional variables) may be what governs achievement. Quality of assignments should be studied as well as levels of higher-level thinking associated with the assignments. Amount of teacher interaction with students and laptops would also be critical to observe. Finally, studying these factors with a control group might make the results even more reliable and valid in order to generalize to other populations.

Once again, mathematics teachers seem to struggle with having the laptops available and in use within the classroom. The consistency of results from question 1 and question 2 follow in that if the teachers believe there is a negative effect on grade averages, they logically would choose not to use them as much in the classroom

experience. Many variables could obviously have an impact on the perceptions of mathematics teachers. This bears further consideration and study, but there are a few common concerns offered by other studies. In speculating the cause, mathematics teachers could be feeling pressure to cover particular standards and believe they do not have time for the introduction of technology (Baylor & Ritchie, 2002). Also, some may feel the laptops to be an overall distraction and simply choose not to use them (Lowther et al., 2008). Finally, if the instructor is traditional in nature, there may not be enough commitment to use the laptops as a classroom resource (Dexter et al., 2000). Subsequent questions within this survey get at some of these motivations and are definitely a source for future research and reporting.

Each stakeholder survey (See appendices E-G) included more demographic questions such as socioeconomic status (student), gender, years of experience (teachers), and highest education level of the household (parents). The results have the potential to be richened and more specific when those variables are introduced. As boards of education consider more information or have questions concerning what specific populations' perceptions are, these constructs would be available. However, the researcher in this study sought general perceptions concerning time with laptops, and those general comparisons across groups.

Results of the study could have significant implications on day-to-day instruction within the core content areas. Any disparities among the groups would indicate a potential opportunity for additional training, more information, or greater awareness. With the school district having been involved for seven years it is possible a rejuvenation of the program might be in order. Education sessions for parents may better inform them

of their role in the educational process of using the laptop to benefit their child. Teacher workshop sessions could be planned for collaboration and time to apply new knowledge. Finally, utilizing appropriate social networking practices might be immediately useful for students.

Part of the rationale of this study sought to inform policy makers and planners about the perceptions of the laptops as they were used in core content courses. The next logical step for these decision makers, then, would be to enact some of the recommended changes the data suggests. For instance, comprehensive mission and vision self-auditing may be in order so that all stakeholders get an unequivocally clear message about the intent of the laptop computers. Secondly, reasonable expectations of use may need to be communicated with school-level personnel followed by some accountability measure to ensure regular infusion of technology into the curriculum. Finally, professional development is critical to connecting the teaching and the learning. Job-embedded learning may be a powerful method whereby teachers learn particular skills, integrative techniques, and best-practice pedagogical practices and immediately apply them in the classroom.

Discussion of overall findings and demographics.

This research study sought general perceptions of teachers, students and parents concerning in-class time utilizing laptops and possible effects on grade averages. These research questions were the initial topics of study because they were the most critical and timely for this school district. Other items were included on the survey administered in this study (See appendices E-G). This researcher plans to continue this study to further analyze these results.

Each stakeholder survey included more demographic questions such as socioeconomic status (student), gender, years of experience (teachers), and highest education level of the household (parents). Other instructional factors include thinking level of instructional activities, amount of laptop use at home, cell phone use in school, and more. The results of this study have the potential to be richened and more specific when those variables are introduced. As the governing bodies and policymakers begin to ask questions about digital gaps, experience level of teachers, grade level differences of students, or economic diversity of the respondents, this research can uncover trends and patterns for this school district. The translation of these potential findings into actionable policies might have significant impact on program planning and improvement. However, these questions go beyond the scope of this research study.

Conclusions

Conclusions related to research question 1.

Research Question 1 states: What are the perceptions of parents, students, and teachers about number of hours per week students using laptops for school assignments across content areas (Language Arts, Social Studies, Science, and Mathematics)?

Hypothesis for Research Question 1 states: There will be no significant differences among student, teacher, and parent perceptions on the number of hours student spend per week in completing assignments with laptops across content areas (Language Arts, Social Studies, Science, and Mathematics).

The null hypothesis is rejected for Research Question 1. In the areas of language arts, social studies, and mathematics findings did indicate a significant difference in what the students and parents perceived in terms of time completing assignments in class versus what the teachers reported. In the content areas of language arts, social studies, and mathematics, teachers believe that students spend more time using laptops in class than the students and parents perceive they do. However, parents, students, and teachers agree concerning the amount of time students spend using laptops to complete science assignments in class.

When referring to in-class time with the laptop, the teachers perceive spending more time using laptops than that of students. This allows for some rich discussion on potential reasons. Themes such as mission and vision planning, teacher professional development, student 21st-century skill attainment, and focused discussions would offer the school district some avenues for both explaining and working through the differences.

The findings indicate the school district may not be as advanced as it may have hoped to be, when extrapolated to Rogers' (2003) innovation continuum. With an average of just over 2 hours per week per content area, it appears the one-to-one laptop initiative is in the early adopter stage and has not yet reached a transformative culture-changing status.

In terms of goal-setting, this information could be useful to policymakers and visionary planners. If a school week consists of 7.5 hours of in-classroom content-area instruction and students spend an average of 2 classroom hours per week using the laptops, the leadership may need to decide if that is too much or too little time.

Drilling down into particular content areas may also advise curriculum planners, technology integration specialists, and administrators. All three groups, for instance, reported the lowest usage in mathematics classrooms. Perhaps some additional investigation should be done within this strand to analyze teaching practice and technology use.

Conclusions related to research question 2.

Research Question 2 states: What are the perceptions of parents, students, and teachers concerning the positive or negative effect of laptops on quarterly grade averages across content areas (Language Arts, Social Studies, Science, and Mathematics)?

Hypothesis for Research Question 2 states: There will be no significant differences among student, teacher, and parent perceptions concerning the laptops' effects on quarterly grade averages across content areas (Language Arts, Social Studies, Science, and Mathematics).

The null hypothesis is rejected as significant perception differences were noted for mathematics teachers as compared to students and parents. In fact, mathematics teachers believe grades were slightly negatively impacted by laptops while students and parents reported no effect of laptops on quarterly grades.

Probing this disparity would likely result in quantifiable differences in pedagogical approaches from mathematics teachers versus other content areas. Also, results could likely point to a unique professional development need for mathematics faculty such as discussion of the role of laptops in the mathematics classroom and authentic, higher-level thinking applications of mathematics using technology.

No significant differences were found among the stakeholder groups for language arts, social studies, and science content areas related to the perceived effect of laptops on quarterly grade averages.

For the most part, all groups believed laptops had little to no effect on report card grades. Overall intent and philosophical mission of the laptop initiative, resource usage levels, and varied perceptions can explain this, in general, about the connotations of grades. Some school districts believe one-to-one laptop projects should be implemented expressly to increase student achievement. This is very difficult to prove given the multitude of variables in educating a child. The district in this research study had a goal of increasing student engagement as well as offering another resource for students to use when appropriate. Therefore, the interpretation of a 'no effect' on grades could indicate to the school district that students and teachers use laptops as it naturally fits into and complements instruction and productivity.

Limitations

Several limiting factors may have affected the outcome of this study. Sample sizes of parents and students were not ideal. While every effort was made to obtain surveys back from parents, it only resulted in nearly 30% of the total population.

The data in this study is not generalizable to the entire population. Two rural schools in the Midwest were analyzed. Therefore, the conclusions drawn from data must be either localized to the individual school district in question or compared to other similar-sized rural Midwestern school districts.

The teacher sample size is a limiting factor with the research questions asked. The teacher was asked to comment on how often the laptops are used and what effect, if

any, laptops may have had on grade averages. While the students and parents could have an educated estimate on these questions across all content areas, the teacher would only be able to comment on that which he/she deals with on a daily basis. For instance, a mathematics teacher could only comment on how often the laptops are used in mathematics. Being able to comment on use within other subject areas would not be readily known. Therefore, the sample sizes were considerably smaller given this limitation.

Unfortunately, the school district has little diversity in its makeup. In terms of race, an overwhelming majority (89%) is white (See Table 1). Additionally, the socioeconomic makeup includes just 37% free and/or reduced lunch students. Finally, the extremely high graduation rate (94%) implies a small number of at-risk students. Therefore, the homogeneity of the sample is a limiting factor. This would definitely limit the ability to share and extrapolate results except to a similar-size and similar student body makeup.

Recommendations for Future Research

The research questions from this study focused strictly on amount of laptop use in specific content areas, as well as the perceived effect on grade averages. It was important to the school district in question to find out just how much the laptop was put to use considering the financial investment being made to the project. The next logical step in the research process would be to consider specific uses and purposes within this reported use. The goal of classroom instruction should be to deliver engaging content while utilizing higher-level questioning and activities (Maxwell, Atwell, & Smith, 2005).

Natural extensions of this study might include activities students complete with the laptops as opposed to total time using laptops. (e.g. blogging, emailing, video production, etc). These results could be correlated with specific content areas to inform the school district to what extent, for example, science classrooms utilize interactive websites within instruction. Additionally, because all three groups were asked the same question, similarities and/or differences in perception could be uncovered to better inform the future effectiveness of the program.

The last part of each stakeholder survey contains demographic questions (See Appendices E-G). Parents were asked gender, school affiliation, child grade level, socioeconomic status, and highest education level. Students were asked gender, school affiliation, grade level, and socioeconomic status. Teachers were asked school affiliation, gender, and years teaching experience. More focused and potentially useful data could be compiled so that the school district could understand more about what groups believe and if groups are alike or similar.

A plethora of potential variables could be studied, based on the existing survey data. Because gender and school affiliation were asked of all three groups, some interesting correlations could be drawn while introducing other variables such as amount of perceived 21st-century skill preparation, types of activities involved in class, use of laptop outside the home, etc. If students or parents self-reported socioeconomic status, these questions could be analyzed to see if income level made any significant difference in achievement and/or activities.

If the school district was interested in obtaining qualitative data, open-ended questions could be asked of individual stakeholders. These collective responses could

then be categorized and sorted using a content analysis to find any commonalities or trends. For instance, if groups were asked how they perceived the laptop project progressing or had any feedback on what improvements should be made, this information could inform next steps for the program.

Getting at the issue of 21st-century skill development and laptop computer integration would be an interesting extension of the current research. Schools around the world continue to discuss whether students are prepared enough to be critical thinkers, problem solvers and appropriate collaborators. Thinking of these variables in terms of laptop availability within a school setting would extend two bodies of knowledge, as it would merge the technology skill development (Mouza, 2006) as well as the 21st-century classroom teaching and learning component (Silva, 2009). Coupling these responses with other variables such as technology for communication, technology for artistic expression, technology for analyzing and problem solving, technology for evaluating resources, and technology for collaboration would yield results worth examining for the purposes of curriculum development.

Trends in one-to-one computing and generalizable data are difficult to identify. The best example of this, however, would be the Maine Learning Technology Initiative (Silvernail & Lane, 2004). Across the state, the same survey was used for all students. It would be interesting to use a common survey across multiple states and/or regions, and/or countries. Within the study's school district state, there are at least seven other districts engaged in a one-to-one laptop initiative. If those groups were asked to administer this study's survey, perhaps some conclusions could be drawn to make the data more generalized and transferable, thereby informing the entire body of research around this

teaching and learning innovation. To make the data even more powerful, these seven school districts could be matched with seven similarly-sized school districts with laptop programs with an intent to uncover similarities and/or differences across states. Also, if seven other demographically-similar districts could be found that did NOT use one-to-one laptop computers, a full experimental study could be completed with a control (no laptops) and treatment (one-to-one laptop) group. If common standards could be established across these states (Common Core State Standards) perhaps conclusions could be drawn in terms of student achievement differences. This is the one variable that has been both elusive and most sought-out for researchers (Donovan et al., 2007; Dunleavy & Heinecke, 2007; Garthwait & Weller, 2005; Gulek & Demirtas, 2005; Keefe & Zucker, 2003; Livingston, 2006). If this distinction can be definitively made, school districts across the world would likely be making one-to-one laptops (or other personal learning devices) more a priority for inclusion.

REFERENCES

Al-Bataineh, A., Anderson, S., Toledo, C., & Wellinski, S. (2008). A Study of Technology Integration in the Classroom. *International Journal of Instructional Media, 35*, 381-387.

American Library Association. (2000). Information literacy competency standards for higher education. Retrieved August 16, 2009, from http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm

Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education, 39*, 395-414.

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

Bethel, E., Bernard, R., Abrami, P., & Wade, C. (2007). The Effects of Ubiquitous Computing on Student Learning: A Systematic Review.

Brake, N. (2010). 2010 Wage and Benefit Survey. Retrieved April 30, 2010, from http://edc.owensboro.com/_documents/2010_Wage_&_Benefit_Survey.pdf

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How people learn*. Washington, D.C.: National Academy Press.

Chism, N., & Bickford, D. (2002). The importance of physical space in creating supportive learning environments. *New Directions for Teaching and Learning, 92*, 112-131.

Cooper, K. B., & Gallagher, M. D. (2004). *A nation online: Entering the broadband age*. from http://www.ntia.doc.gov/reports/anol/NationOnlineBroadband04.pdf.

Cooper, M. N. (2002). *Does the digital divide still exist? Bush administration shrugs, but evidence says "yes"*. Washington, DC: Consumer Federation of America.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.

Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.

Dede, C. (2000). *The role of emerging technologies for knowledge mobilization, dissemination and use in education*. Fairfax, VA: Commissioned by the Office of Educational Research and Improvement, U.S. Department of Education.

Dexter, S., Anderson, R., Becker, H. (2000). Teachers' views of computers as catalysts for changes in their teaching practice. *Journal of Research on Computing in Education, 31*(3), 221-239.

Donovan, L., Hartley, K., & Strudler, N. (2007). Teacher concerns during initial implementation of a one-to-one laptop initiative at the middle school level. *Journal of Research on Technology in Education, 39*, 263-286.

Dunleavy, M., & Heinecke, W. (2007). The impact of 1:1 laptop use on middle school math and science standardized test scores. *Computers in the schools 24*(3/4), 7-20.

Efaw, J., Hampton, S., Martinez, S., & Smith, S. (2004). Miracle or menace: Teaching and learning with laptop computers in the classroom. *Educause Quarterly, 27*(3), 10-18.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25-39.

Fabry, D., & Higgs, J. (1997). Barriers to the effective use of technology in education: Current status. *Journal of Educational Computing Research, 17*(4), 385-395.

Fadel, C. (2009). 21st century learning environments. 1-29. Retrieved from http://www.21stcenturyskills.org/index.php?optio*N*=com_content&task=view&id=600&Itemid=185

Ferrandino, V. (2007). The time, learning, and afterschool task force. Retrieved from http://www.edutopia.org/files/existing/pdfs/ANewDayforLearning.pdf

Fisher, R. A. (1925). *Statistical Methods for Research Workers*, Ann Arbor: University of Michigan Publishing.

Fitzgerald, M. A., & Branch, R. M. (Eds.) *Educational media and technology yearbook 2006.* Westport, CT: Libraries Unlimited.

Fox, R., & Henri, J. (2005). Understanding teacher mindsets: IT and change in Hong Kong schools. *Educational Technology & Society, 8*(2), 161-169.

Gable, R. K., & Wolf, M. B. (1993). Instrument Development in the Affective Domain (2nd ed.) Boston, MA: Kluwer Academic Publishers.

Garthwait, A., & Weller, H. G. (2005). A year in the life: Two seventh grade teachers implement one-to-one computing. *Journal of Research on Technology in Education, 37*(4), 361-377.

Gewertz, C. (2008, October 13). States press ahead on 21st century skills. *Education Week.*

Greenhow, C., Robella, B., & Hughes, J. A. (2009). Learning Teaching and Scholarship in a Digital Age. *Educational Researcher* (May 2009), 246-259.

Gulek, J. C., & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *The Journal of Technology, Learning, and Assessment, 3*(2), 1-39.

Heck, S., Stiegelbauers, S., Hall, G., & Loucks, S. (1981). *Measuring innovation configurations: Procedures and application*. Austin: Southwest Educational Development Laboratory.

Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. *Journal of Curriculum Studies, 37*(2), 155-192.

Hew, K., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Educational Technology Research & Development, 55*, 223-252.

Jaillet, A. (2004). What is happening with portable computers in schools? *Journal of Science Education and Technology, 13*(1), 115-128.

Jonassen, D. (2008). *Meaningful learning with technology*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Karagiorgi, Y. (2005). Throwing light into the black box of implementation: ICT in Cyprus elementary schools. *Educational Media International, 42*(1), 19-32.

Keefe, D., & Zucker, A. (2003). *Ubiquitous Computing Projects: A Brief History*. Retrieved from http://ubiqcomputing.org/

Kentucky Department of Education (2009). *School report cards* [Data file]. Retrieved from http://applications.education.ky.gov/schoolreportcardarchive/

Lebaron, J. F., & Collier, C. (2001). *Technology in its place: Successful technology infusion in schools*. San Francisco: Jossey-Bass.

Lei, J., Conway, P. F., & Zhao, Y. (2007). *The digital pencil: One-to-one computing for children*. Mahwah, NJ: Lawrence Erlbaum.

Livingston, P. (2006). *1-to-1 learning*. Washington, DC.

Lowther, D., Ross, S., & Morrison, G. (2006). When each one has one: The influence on teaching strategies and student achievement using laptops in the classroom. *Educational Technology Research and Development, 51*(3), 23-44.

Lowther, D. L., Inan, F. A., Strahl, J. D., & Ross, S. M. (2008). Does technology integration work when key barriers are removed? *Educational Media International, 45*, 195-213.

Madden, M. (2009). Internet penetration report. Retrieved October 20, 2009, from http://www.internetworldstats.com/stats.htm#

Maxwell, M., Atwell, N., & Smith, R. (2009). Authentic Assessment in a Virtual World. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2009* (pp. 130-131). Chesapeake, VA: AACE.

Means, B. (1993). Using technology to support education reform. Washington, DC: Office of Educational Research and Improvement.

Moore, M. B., & Kearsley, G. (1996). *Distance education: A systems view*. San Francisco: Wadsworth.

Morrison, G. R., & Lowther, D. L. (2002). *Integrating computer technology in the classroom (2nd ed.)*. Upper Saddle River: Merrill Prentice Hall.

Mouza, C. (2006). Learning with laptops: the impact of one-to-one computer on student attitudes and classroom perceptions. *International Conference on Learning Sciences*, 488-494.

Murnane, R., & Levy, F. (2004). *The new division of labor: How computers are creating the next job*. Princeton, NJ: Princeton University Press.

Murphy, D. M., King, F. B., & Brown, S. W. (2007). Laptop initiative impact: Assessed using student, parent, and teacher data. *Computers in the Schools, 24*, 57-73.

National Mathematics Advisory Panel. (2008). Foundations for success: The final report of the national mathematics advisory panel. Washington, D.C.: Department of Education.

Owen, A., Farsaii, S., Knezek, G., & Christensen, R. (2006). Teaching in the one-to-one classroom: It's not about laptops, it's about empowerment! *Learning and Leading with Technology, 33*, 12-16.

No Child Left Behind Act, 2 U.S.C. §117b *et seq.* (2002)

Rockman, S. (2000). *A more complex picture: Laptop use and impact in the context of changing home and school access - the third in a series of research studies on Microsoft's Anytime Anywhere Learning program*. San Francisco, CA: Microsoft

Rogers, E. M. (2003). *Diffusion of innovations*. New York: The Free Press.

Russell, M., Bebell, D., & Higgins, J. (2004). Laptop learning: A comparison of teaching and learning in upper elementary classrooms equipped with shared carts of

laptops and permanent 1:1 laptops. *Educational Computing Research, 30*(4), 313-330.

Schneiderman, M. (2004). What does SBR mean for educational technology? *THE Journal.* 31(11), 30-36.

Silva, E. (2009). Measuring skills for 21st-century learning. *Phi Delta Kappan*, 630-634.

Silvernail, D. L., & Lane, D. M. (2004). The impact of Maine's one-to-one laptop program on middle school teachers and students (Maine Education Policy Research Institute Publication). Gorham: University of Southern Maine Printing Office.

Snoeyink, R., & Ertmer, P.A. (2001-02). Thrust into technology: How veteran teachers respond. *Journal of Educational Technology Systems, 30*(1), 85-111.

Tiene, D., & Ingram, A. (2001). *Exploring current issues in education technology*. Boston: McGraw-Hill.

Warschauer, M. (2007). Information literacy in the laptop classroom. *Teachers College Record, 109*(11), 2511-2540.

Weiser, M. (1991). The computer for the 21st century. *Scientific American*, 94-100.

Weston, M. E., & Bain, A. (2009). The end of techno-critique: The naked truth about 1:1 laptop initiatives and educational change. The Journal of Technology, Learning, and Assessment, 9(6), 5-25.

Zucker, A. A., & Hug, S. T. (2008). Teaching and learning physics in a 1:1 laptop school. *Journal of Science Education and Technology, 17*, 586-594.

Appendix A: Institutional Review Board Approval

WKU

A LEADING AMERICAN UNIVERSITY WITH INTERNATIONAL REACH

HUMAN SUBJECTS REVIEW BOARD

In future correspondence, please refer to HS11-011, September 29, 2010

Matthew Constant
c/o Dr. Marge Maxwell
School of Teacher Education
WKU

Matthew Constant:

Your research project, *Perceptions of Students, Teachers, and Parents on a One-to-one Laptop Project*, was reviewed by the HSRB and it has been determined that risks to subjects are: (1) minimized and reasonable; and that (2) research procedures are consistent with a sound research design and do not expose the subjects to unnecessary risk. Reviewers determined that: (1) benefits to subjects are considered along with the importance of the topic and that outcomes are reasonable; (2) selection of subjects is equitable; and (3) the purposes of the research and the research setting is amenable to subjects' welfare and producing desired outcomes; that indications of coercion or prejudice are absent, and that participation is clearly voluntary.

1. In addition, the IRB found that you need to orient participants as follows: (1) signed informed consent is not required; (2) Provision is made for collecting, using and storing data in a manner that protects the safety and privacy of the subjects and the confidentiality of the data. (3) Appropriate safeguards are included to protect the rights and welfare of the subjects.

   This project is therefore approved at the Expedited Review Level until May 15, 2011.

2. Please note that the institution is not responsible for any actions regarding this protocol before approval. If you expand the project at a later date to use other instruments please re-apply. Copies of your request for human subjects review, your application, and this approval, are maintained in the Office of Sponsored Programs at the above address. Please report any changes to this approved protocol to this office. A Continuing Review protocol will be sent to you in the future to determine the status of the project. Also, please use the stamped approval forms to assure participants of compliance with The Office of Human Research Protections regulations.

Sincerely,

Paul J. Mooney, M.S.T.M.
Compliance Coordinator
Office of Sponsored Programs
Western Kentucky University

cc: HS file number Constant HS11-011

HUMAN SUBJECTS REVIEW BOARD WKU APPROVED

HSRB APPLICATION # 11-011
APPROVED 5/29/10 to 5/15/11
EXEMPT EXPEDITED (FULL BOARD)
DATE APPROVED 5/29/10

Appendix B: Teacher Informed Consent

TEACHER INFORMED CONSENT DOCUMENT

Project Title: Perceptions of Students, Teachers, and Parents on a One-to-one Laptop Project
Investigator: Matthew Constant, Director of Instructional Technology, (270) 852-7000 ext. 282
Email: matthew.constant@daviess.kyschools.us

Teachers:
You are being asked to participate in a project conducted through Western Kentucky University and in cooperation with the Daviess County Public Schools (DCPS).

1. **Nature and Purpose of the Project:**
DCPS is in the midst of seven years of implementing laptop computers for every high school student. A growing amount of research has been done to investigate the perceived benefits and challenges of such a program, however very few investigate perceptions across three stakeholder groups. This study seeks to survey the perceptions of students, teachers, and parents concerning the laptop program within the DCPS.

2. **Explanation of Procedures:**
During a faculty meeting, teachers will receive a verbal explanation of the survey, its rationale, and procedures surrounding completion. Teachers will receive a personal email with the electronic link to the survey. Teachers not wishing to opt out may click on the link and respond to the items. Teacher survey window opens on November 15th and closes on December 3rd, 2010.

3. **Discomfort and Risks:**
There are no know risks.

4. **Benefits:**
The researcher will compile all data and report significant findings across the three groups (teachers, parents, and students) based on frequency and type of laptop use. These data will assist in determining program effectiveness, thus encouraging modifications in the program. Feedback from the three groups shared with the Daviess County Board of Education as summary analysis of the eLearning program.

5. **Confidentiality:**
Survey results will be stored on a computer in the primary investigator's office and available on the secure-sign-on Surveymonkey site. This site will be kept accessible by DCPS. In addition, results will be coded so that survey data remains confidential. No surveys will have names attached nor any means to track them electronically. Additionally, raw data will be stored in the faculty sponsor's office (Dr. Marge Maxwell) for a period of three years after completion of the study.

6. **Refusal/Withdrawal:**
Refusal to participate in this study will have no effect on employment status. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT
THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Paul Mooney, Compliance Coordinator TELEPHONE: (270) 745-4652

Appendix C: Student Informed Consent

STUDENT INFORMED CONSENT DOCUMENT

Project Title: Perceptions of Students, Teachers, and Parents on a One-to-one Laptop Project
Investigator: Matthew Constant, Director of Instructional Technology, (270) 852-7000 ext. 282
Email: matthew.constant@daviess.kyschools.us

Students:
You are being asked to participate in a project conducted through Western Kentucky University and in cooperation with the Daviess County Public Schools (DCPS).

1. **Nature and Purpose of the Project:**
DCPS is in its seventh year of providing laptops to all its high school students. The researcher would like to find out how particular groups feel about laptops. The survey you are being asked to take will help DCPS find out about the status of the program and how it should be shaped in the future. Your parents/guardians and teachers will be asked similar questions.

2. **Explanation of Procedures:**
During the week of October 18-22, homeroom teachers will explain the purpose of the survey. Each student will receive an opt out letter in the mail. Those wishing to opt out must return the form by October 29th, 2010. Students not opting out will receive an email in their DCPS-issued inbox which will have the survey link provided. Students may click and respond to the items.

3. **Discomfort and Risks:**
There are no known risks.

4. **Benefits:**
Results from the three groups (parents, students, and teachers) will be analyzed and reported back to the school and to the Board of Education. Decisions about how the program should be operated in the future will be made based on survey input.

5. **Confidentiality:**
All survey results will remain confidential. No survey will have names attached nor any means to track them electronically.

6. **Refusal/Withdrawal:**
Refusal to participate in this study will have no negative effects to the student. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT
THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Paul Mooney, Compliance Coordinator TELEPHONE: (270) 745-4652

Appendix D: Parent Informed Consent

INFORMED CONSENT DOCUMENT FOR PARENTS

Project Title: Perceptions of Students, Teachers, and Parents on a One-to-one Laptop Project
Investigator: Matthew Constant, Director of Instructional Technology, (270) 852-7000 ext. 282
Email: matthew.constant@daviess.kyschools.us

Dear Parent/Guardian,
Both you and your high school son(s)/daughter(s) are being asked to participate in a project conducted through Western Kentucky University and in cooperation with the Daviess County Public Schools (DCPS).

1. **Nature and Purpose of the Project:**
DCPS is in the midst of seven years of implementing laptop computers for every high school student. A growing amount of research has been done to investigate the perceived benefits and challenges of such a program, however very few investigate perceptions across three stakeholder groups. This study seeks to survey the perceptions of students, teachers, and parents concerning the laptop program within the DCPS.

2. **Explanation of Procedures:**
For your son/daughter:
Your son/daughter will be asked to complete the survey (via email correspondence) sometime in the window of November 15-26, 2010. Prior to this, homeroom teachers will explain the purpose of the survey to the students. Opt out letters for students are included in this mailing. If you wish for your son/daughter to opt out, please complete the form and send it back to the school by October 29th, 2010. Students will use their provided laptop to take the survey, and it will be done within a homeroom group setting.

For yourself:
Enclosed in this mailing is both a paper copy of the survey and an electronic link as well. If you wish to complete it using the paper method, please do so and return it back to the school in the provided envelope by December 3rd, 2010. Those wishing to take the electronic survey, please visit the survey site: https://www.surveymonkey.com/s/dcpsparents

3. **Discomfort and Risks:**
There are no known risks.

4. **Benefits:**
The researcher will compile all data and report significant findings across the three groups (teachers, parents, and students) based on frequency and type of laptop use. These data will assist in determining program effectiveness, thus encouraging modifications in the program. Feedback from the three groups shared with the Daviess County Board of Education as summary analysis of the eLearning program.

HSRB APPLICATION # 11-011
APPROVED 9/29/10 to 5/15/11
EXEMPT EXPEDITED (FULL BOARD)
DATE APPROVED 9/29/10

5. **Confidentiality:**
Survey results will be stored on a computer in the primary investigator's office and available on the secure-sign-on Surveymonkey site. This site will be kept accessible by DCPS. In addition, results will be coded so that survey data remains confidential. No surveys will have names attached nor any means to track them electronically. Additionally, raw data will be stored in the faculty sponsor's office (Dr. Marge Maxwell) for a period of three years after completion of the study.

6. **Refusal/Withdrawal for yourself:**
Refusal to participate in this study will have no effect on any future services you may be entitled to from DCPS. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

7. **Refusal/Withdrawal for your son/daughter:**

Refusal to participate in this study will have no effects on the student. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

If you do not wish for your child to participate, please sign below and return to your child's CAP (AHS) or Advocate (DCHS) teacher by October 29th, 2010..

I DO NOT wish for my child, _____, to participate in the one-to-one perceptions of laptops survey.

_____ _____
Student Name CAP/Advocate Teacher

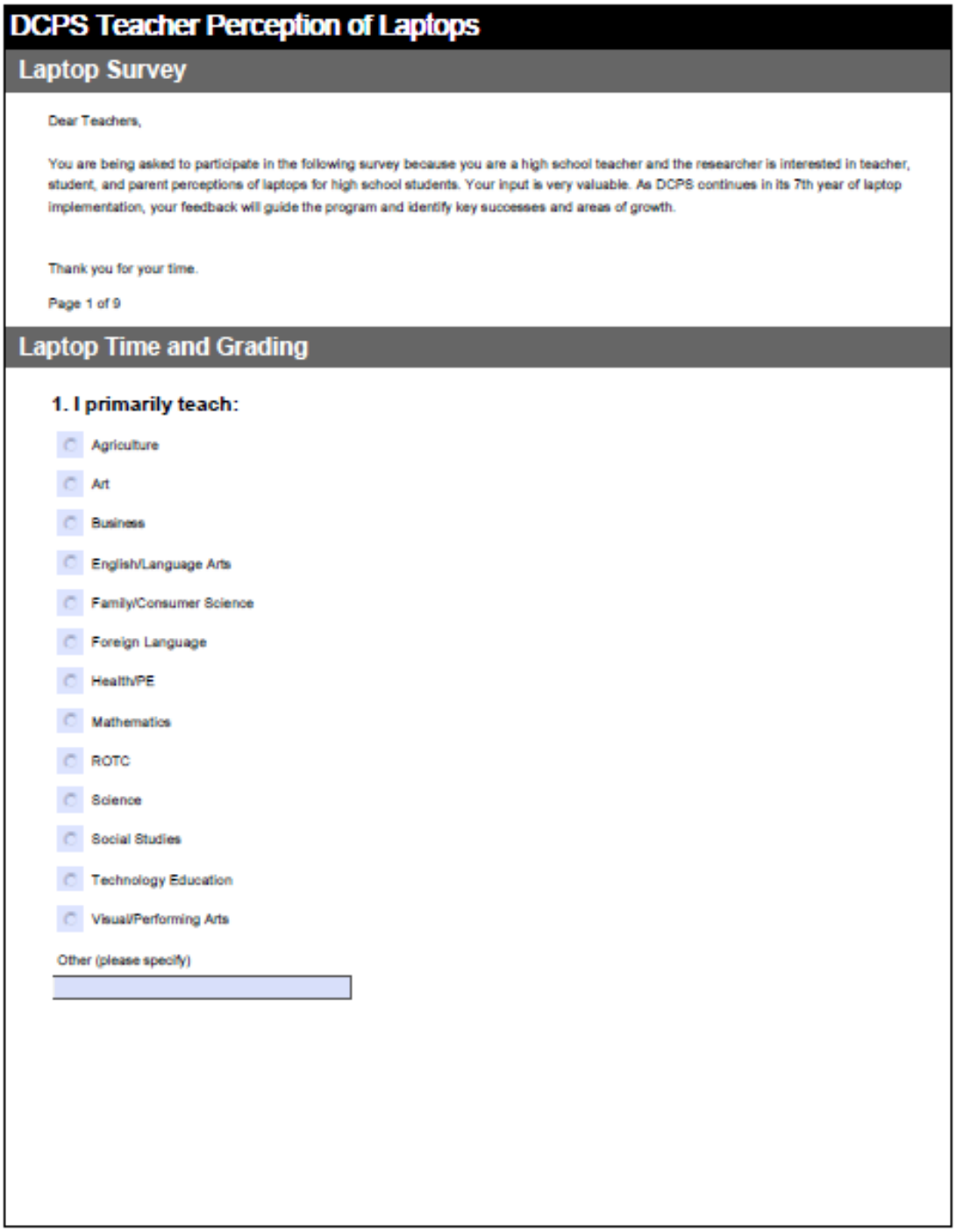
_____ _____
Parent/Guardian Signature Date

Note: For students whose parents have opted them out of the survey, they will not receive the email with the survey link and not be prompted to complete the survey.

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT
THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Paul Mooney, Compliance Coordinator TELEPHONE: (270) 745-4652

HSRB APPLICATION # 11-011
APPROVED 9/29/10 to 5/15/11
EXEMPT EXPEDITED (FULL BOARD)
DATE APPROVED 9/29/10

Appendix E: Teacher Survey



DCPS Teacher Perception of Laptops

Laptop Survey

Dear Teachers,

You are being asked to participate in the following survey because you are a high school teacher and the researcher is interested in teacher, student, and parent perceptions of laptops for high school students. Your input is very valuable. As DCPS continues in its 7th year of laptop implementation, your feedback will guide the program and identify key successes and areas of growth.

Thank you for your time.

Page 1 of 9

Laptop Time and Grading

1. I primarily teach:

- Agriculture
- Art
- Business
- English/Language Arts
- Family/Consumer Science
- Foreign Language
- Health/PE
- Mathematics
- ROTC
- Science
- Social Studies
- Technology Education
- Visual/Performing Arts

Other (please specify)

DCPS Teacher Perception of Laptops

* **2. On average, how many hours per week (during school hours) do you involve student use of the school-issued laptop computers?**

- 0-2 hours per week
- 2-4 hours per week
- 4-6 hours per week
- 6+ hours per week

3. On average, how many hours might students spend using laptops at home to complete assignments from your class?

- 0-2 hours per week
- 2-4 hours per week
- 4-6 hours per week
- 6+ hours per week

* **4. Please rate the degree to which you believe school-issued laptops may have affected your students' last nine weeks' grades in your content area.**

- Negatively Affected Grade Average
- Somewhat Negatively Affected Grade Average
- No Effect
- Somewhat Positively Affected Grade Average
- Positively Affected Grade Average

Please add any comments here

Page 2 of 9

DCPS Teacher Perception of Laptops

5. How often do you incorporate the following activities in your classroom:

	Never	Rarely	Sometimes	Often	Always
Lecture					
Discussion					
Memorization exercises					
Drill and practice assignments					
In-Class Research (using laptops)					
In-Class Reading (using laptops)					
In-Class Writing (using laptops)					
Projects involving problem solving (using laptops)					
Projects involving analysis of data (using laptops)					
Ability to create an original product (using laptops)					

6. How often do your students use the school-issued laptops for the following activities:

	Never	Rarely	Sometimes	Often	Always
Note-taking					
File Storage					
Homework Completion					
In-Class Assignment Completion					
Finding Information					

Other (please specify)

Page 3 of 9

DCPS Teacher Perception of Laptops

*** 7. On average, how many hours per week do YOU spend with school-issued laptops doing the following activities?**

	Never	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours
Email					
Social Networking (Facebook, MySpace)					
Instant Messaging					
Chat Rooms					
Blogging					
Mobile Blogging (Twitter, etc)					
Listening to Music					
Gaming/Online Gaming					
Voice Chat (Skype, etc)					
Making and Sharing Movies					
Making and Sharing Photographs					
Creating Digital Music					
Podcasting/Vodcasting					
Internet Surfing					

Page 4 of 9

DCPS Teacher Perception of Laptops

10. How prepared are your students in the following areas:

	No Opinion	Not Prepared	Poorly Prepared	Adequately Prepared	Well-Prepared
Using technology for communication					
Using technology for expressing themselves artistically					
Using technology for working with others (collaboration)					
Using technology for research					
Using technology for analyzing and problem solving					
Using technology for evaluating online resources					
Using technology skills in general					

Internet Connection

*** 11. What type of an Internet connection do you have at home?**

- I do not have any connection at home
- Dial-up (Internet connected through standard telephone line)
- Cable Modem (Internet connected through cable provider)
- DSL (High-speed Internet usually provided by a telephone company)
- Satellite Dish
- Other

Cell Phone

*** 12. Do you have a cell phone you exclusively use?**

- I have a cell phone with no Internet connection
- I have a cell phone with Internet connection
- I don't have a cell phone

DCPS Teacher Perception of Laptops

13. Choose the best answer from the below choices about cell phone use in the classroom.

- Cell phones have no place in the instructional setting.
- I can see potential uses of cell phones in the classroom.
- I would use cell phones more if I had training on their instructional uses.

Other (please specify)

Page 7 of 9

Demographics

* **14. Gender**

- Male
- Female

15. I teach at _____.

- Apollo High School
- Daviess County High School

16. I have _____ years of teaching experience

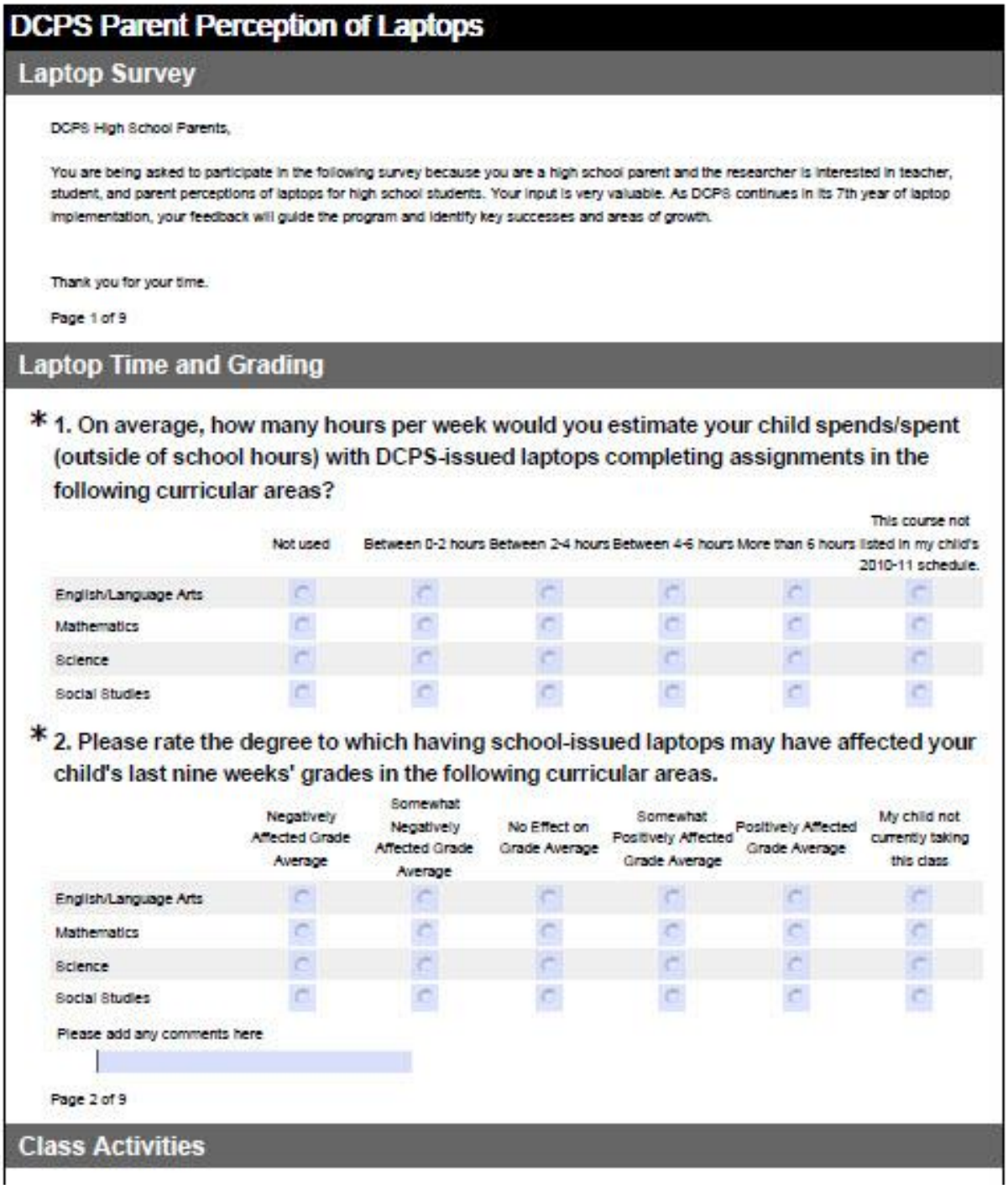
- 0-5
- 5-10
- 10-15
- 15-20
- 20+

Page 8 of 9

Feedback

17. The Daviess County Public Schools will be entering its sixth year of full-scale laptop implementation in the 2010-11 school year. Please use this opportunity to offer any opinion and/or advice as we move the project forward. Your comments will be anonymous and much appreciated.

Appendix F: Parent Survey



DCPS Parent Perception of Laptops

Laptop Survey

DCPS High School Parents,

You are being asked to participate in the following survey because you are a high school parent and the researcher is interested in teacher, student, and parent perceptions of laptops for high school students. Your input is very valuable. As DCPS continues in its 7th year of laptop implementation, your feedback will guide the program and identify key successes and areas of growth.

Thank you for your time.

Page 1 of 9

Laptop Time and Grading

* 1. On average, how many hours per week would you estimate your child spends/spent (outside of school hours) with DCPS-issued laptops completing assignments in the following curricular areas?

	Not used	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours	This course not listed in my child's 2010-11 schedule.
English/Language Arts						
Mathematics						
Science						
Social Studies						

* 2. Please rate the degree to which having school-issued laptops may have affected your child's last nine weeks' grades in the following curricular areas.

	Negatively Affected Grade Average	Somewhat Negatively Affected Grade Average	No Effect on Grade Average	Somewhat Positively Affected Grade Average	Positively Affected Grade Average	My child not currently taking this class
English/Language Arts						
Mathematics						
Science						
Social Studies						

Please add any comments here

Page 2 of 9

Class Activities

DCPS Parent Perception of Laptops

3. My child uses his/her school-issued laptop for (check all that apply):

	Never	Rarely	Sometimes	Often	Always
Note-taking					
File Storage					
Homework Completion					
In-Class Assignment Completion					
Finding Information					
Personal Entertainment					

Other (please specify)

Page 3 of 9

Personal Entertainment and Productivity

* 4. On average, how many hours per week (outside of school hours) would you estimate your child spends with school-issued laptops doing the following activities?

	Never	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours	Not Sure
Email						
Social Networking (Facebook, MySpace)						
Instant Messaging						
Chat Rooms						
Blogging						
Mobile Blogging (Twitter, etc)						
Listening to Music						
Gaming/Online Gaming						
Voice Chat (Skype, etc)						
Making and Sharing Movies						
Making and Sharing Photographs						
Creating Digital Music						
Podcasting/Vodcasting						
Internet Surfing						

Page 4 of 9

What do you think?

DCPS Parent Perception of Laptops

5. Choose your opinion on the following statements:

	No Opinion	Strongly Disagree	Disagree	Agree	Strongly Agree
My child is learning basic technology skills from this school.					
My child is using the school-issued laptop to organize himself/herself.					
It is important for teachers to use technology to address different learning styles and needs.					
The teachers seem to be regularly using technology to engage my child in learning.					
There is an adequate amount of technology in the high school classrooms.					
My child is comfortable using technology in his/her personal life.					
My child uses technology to work with others.					
The teachers use technology enough.					
The teachers do not use technology enough.					

6. How prepared do you feel your child is in the following areas:

	No Opinion	Not Prepared	Poorly Prepared	Adequately Prepared	Well-Prepared
Using technology for communication					
Using technology for expressing him/herself artistically					
Using technology for working with others (collaboration)					
Using technology for research					
Using technology for analyzing and problem solving					
Using technology for evaluating online resources					
Using technology skills in general					

Internet Connection

DCPS Parent Perception of Laptops

* 7. What type of an Internet connection do you have at home?

- I do not have any connection at home
- Dial-up (Internet connected through standard telephone line)
- Cable Modem (Internet connected through cable provider)
- DSL (High-speed Internet usually provided by a telephone company)
- Satellite Dish
- Other

Cell Phone

* 8. Does your child have a cell phone he/she exclusively uses?

- My child has a cell phone with no Internet connection
- My child has a cell phone with Internet connection
- My child doesn't have a cell phone

Demographics

* 9. Gender

- Male
- Female

10. My child(ren) attend(s) _____.

- Apollo High School
- Daviess County High School

* 11. My child's current grade level:

- 9
- 10
- 11
- 12

DCPS Parent Perception of Laptops

12. My child(ren) participate(s) in:

- Free/Reduced Lunch Program (He/she receives a discount or receives free lunches)
- Paid Lunch Program (He/she pays full price for school lunches)
- Neither option (He/she does not eat school lunch)

13. What is the highest education level in the household?

- Less than High School
- High School
- Some Postsecondary Education/Training
- Associates' Degree
- Bachelors' Degree
- Masters' Degree
- Post-Masters' Education

Page 8 of 9

Feedback

14. The Daviess County Public Schools is in its seventh year of full-scale laptop implementation in the 2010-11 school year. Please use this opportunity to offer any opinion and/or advice as we move the project forward. Your comments will be anonymous and much appreciated.

Page 9 of 9

Appendix G: Student Survey

DCPS Student Perceptions of Laptops

Laptop Survey

DCPS High School Students,

You are being asked to participate in the following survey because you are a high school student and the researcher is interested in teacher, student, and parent perceptions of laptops for high school students. Your input is very valuable. As DCPS continues in its 7th year of laptop implementation, your feedback will guide the program and identify key successes and areas of growth.

Thank you for your time.

Page 1 of 9

Laptop Time and Grading

*** 1. On average, how many hours per week DURING SCHOOL do/did you spend with school-issued laptops completing assignments in the following curricular areas?**

	Not Used	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours	This course not listed in my 2010-11 schedule
English/Language Arts	○	○	○	○	○	○
Mathematics	○	○	○	○	○	○
Science	○	○	○	○	○	○
Social Studies	○	○	○	○	○	○

*** 2. On average, how many hours per week BEFORE/AFTER SCHOOL do/did you spend with school-issued laptops completing assignments in the following curricular areas?**

	Not used	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours	This course not listed in my 2010-11 schedule
English/Language Arts	○	○	○	○	○	○
Mathematics	○	○	○	○	○	○
Science	○	○	○	○	○	○
Social Studies	○	○	○	○	○	○

*** 3. Please rate the degree to which having school-issued laptops may have affected your last nine weeks' grades in the following curricular areas.**

	Negatively Affected Grade Average	Somewhat Negatively Affected Grade Average	No Effect on Grade Average	Somewhat Positively Affected Grade Average	Positively Affected Grade Average	Not currently taking this class
English/Language Arts	○	○	○	○	○	○
Mathematics	○	○	○	○	○	○
Science	○	○	○	○	○	○
Social Studies	○	○	○	○	○	○

Please add any comments here

DCPS Student Perceptions of Laptops

Class Activities

4. How often do you experience the following types of activities in the ENGLISH/LANGUAGE ARTS classroom (skip this question if you do not currently have an English/Language Arts course):

	Never	Rarely	Sometimes	Often	Always
Lecture	○	○	○	○	○
Discussion	○	○	○	○	○
Memorization exercises	○	○	○	○	○
Drill and practice assignments	○	○	○	○	○
In-Class Research (using laptops)	○	○	○	○	○
In-Class Reading (using laptops)	○	○	○	○	○
In-Class Writing (using laptops)	○	○	○	○	○
Projects involving problem solving (using laptops)	○	○	○	○	○
Projects involving analysis of data (using laptops)	○	○	○	○	○
Ability to create an original product (using laptops)	○	○	○	○	○

5. How often do you experience the following types of activities in the MATHEMATICS classroom (skip this question if you do not currently have a mathematics course):

	Never	Rarely	Sometimes	Often	Always
Lecture	○	○	○	○	○
Discussion	○	○	○	○	○
Memorization exercises	○	○	○	○	○
Drill and practice assignments	○	○	○	○	○
In-Class Research (using laptops)	○	○	○	○	○
In-Class Reading (using laptops)	○	○	○	○	○
In-Class Writing (using laptops)	○	○	○	○	○
Projects involving problem solving (using laptops)	○	○	○	○	○
Projects involving analysis of data (using laptops)	○	○	○	○	○
Ability to create an original product (using laptops)	○	○	○	○	○

DCPS Teacher Perception of Laptops

5. How often do you incorporate the following activities in your classroom:

	Never	Rarely	Sometimes	Often	Always
Lecture					
Discussion					
Memorization exercises					
Drill and practice assignments					
In-Class Research (using laptops)					
In-Class Reading (using laptops)					
In-Class Writing (using laptops)					
Projects involving problem solving (using laptops)					
Projects involving analysis of data (using laptops)					
Ability to create an original product (using laptops)					

6. How often do your students use the school-issued laptops for the following activities:

	Never	Rarely	Sometimes	Often	Always
Note-taking					
File Storage					
Homework Completion					
In-Class Assignment Completion					
Finding Information					

Other (please specify)

Page 3 of 9

DCPS Teacher Perception of Laptops

*** 7. On average, how many hours per week do YOU spend with school-issued laptops doing the following activities?**

	Never	Between 0-2 hours	Between 2-4 hours	Between 4-6 hours	More than 6 hours
Email					
Social Networking (Facebook, MySpace)					
Instant Messaging					
Chat Rooms					
Blogging					
Mobile Blogging (Twitter, etc)					
Listening to Music					
Gaming/Online Gaming					
Voice Chat (Skype, etc)					
Making and Sharing Movies					
Making and Sharing Photographs					
Creating Digital Music					
Podcasting/Vodcasting					
Internet Surfing					

Page 4 of 9

DCPS Teacher Perception of Laptops

8. Choose your opinion on the following statements:

	No Opinion	Strongly Disagree	Disagree	Agree	Strongly Agree
My students are learning basic technology skills.					
My students are using school-issued laptops to organize themselves.					
It is important for me to use technology to address different learning styles and needs.					
I regularly using technology to engage my students in learning.					
There is an adequate amount of technology in my classroom.					
I am comfortable using technology in my personal life.					
I use technology to work with others.					
I use technology enough.					
I do not use technology enough.					

9. How often do you employ the following teaching techniques in your classroom?

	Never	Sometimes	Often	Very Often	Always
Using technology for communication					
Using technology for expressing themselves artistically					
Using technology for working with others (collaboration)					
Using technology for research					
Using technology for analyzing and problem solving					
Using technology for evaluating online resources					
Using technology skills in general					

DCPS Student Perceptions of Laptops

10. Choose your opinion on the following statements:

	No Opinion	Strongly Disagree	Disagree	Agree	Strongly Agree
I am learning basic technology skills from this school.					
I use my laptop to organize myself.					
It is important for teachers to use technology to address different learning styles and needs.					
My teachers are regularly using technology to engage me in learning.					
There is an adequate amount of technology in all my classrooms.					
I am comfortable using technology in my personal life.					
I use technology to work with others.					
My teachers use technology enough for me.					
My teachers do not use technology enough for me.					

11. How prepared do you feel in the following areas:

	No Opinion	Not Prepared	Poorly Prepared	Adequately Prepared	Well-Prepared
Using technology for communication					
Using technology for expressing myself artistically					
Using technology for working with others (collaboration)					
Using technology for research					
Using technology for analyzing and problem solving					
Using technology for evaluating online resources					
Using technology skills in general					

Page 5 of 9

Internet Connection

DCPS Student Perceptions of Laptops

* 12. What type of an Internet connection do you have at home?

- I do not have any connection at home
- Dial-up (Internet connected through standard telephone line)
- Cable Modem (Internet connected through cable provider)
- DSL (High-speed Internet usually provided by a telephone company)
- Satellite Dish
- Other

Page 6 of 9

Cell Phone

* 13. Do you have a cell phone you exclusively use?

- I have a cell phone with no Internet connection
- I have a cell phone with Internet connection
- I don't have a cell phone

Page 7 of 9

Demographics

* 14. Gender

- Male
- Female

15. I am a student at _____.

- Apollo High School
- Daviess County High School

* 16. Current Grade Level

- 9
- 10
- 11
- 12

DCPS Student Perceptions of Laptops

17. I participate in:

- Free/Reduced Lunch Program (I receive a discount or receive free lunches)
- Paid Lunch Program (I pay full price for school lunches)
- Neither option (I do not eat school lunch)

Page 8 of 9

Feedback

18. The Daviess County Public Schools is in its seventh year of full-scale laptop implementation in the 2010-11 school year. Please use this opportunity to offer any opinion and/or advice as we move the project forward. Your comments will be anonymous and much appreciated.

Page 9 of 9

Appendix H: Curriculum Vitae (CV)

Constant, Matthew D.

A. Personal History

Position: Director of Instructional Technology, Daviess County Public Schools
Address: Daviess County Public Schools
1622 Southeastern Pkwy
Owensboro, KY 42304

Phone: Work: (270) 852-7000
Cell: (270) 313-5495

E-mail: matthew.constant@daviess.kyschools.us

B. Educational History

1. Bellarmine University: Louisville, KY (1990-1994)
   Major: Mathematics
   Minor: Vocal, Instrumental Music
   Degree: BA, Mathematics, May 1994
   Certification: Education, Grades 9-12
   Honors: Cum Laude Graduate
   Top Service Award
   Outstanding Sophomore, Senior
2. Murray State University: Murray, KY (1995-1997)
   Major: Vocational/Technical Education
   Degree: MS, Vocational/Technical Education, December 1997
   Honors: 4.0 GPA
3. Western Kentucky University: Bowling Green, KY (1997-2001)
   Major: Educational Administration
   Degree: Rank I, Educational Administration, August 2001
   Honors: 4.0 GPA
4. Murray State University: Murray, KY (2004-2005)
   Specialization: Superintendency Certification
   Honors: 4.0 GPA
5. Western Kentucky University: Bowling Green, KY (2008-Present)
   Ed.D. (P-12 Administration)

C. Professional Responsibilities

1. **Director of Instructional Technology,** Daviess County Public Schools (2008-Present)
   Duties: Supervise and Manage all Technology for 11,000 students and 1700 staff, Professional Development Technology Planner for all staff.

2. **Kentucky Society for Technology in Education (KySTE) Treasurer** (2009-Present)
   Duties: Executive planning, budget maintenance, expense recording, membership management, conference logistics

3. **Kentucky AD/Exchange Committee,** Office of Educational Technology (2009-Present)
   Duties: Evaluate vendors/specifications on statewide solution, represent 2nd region CIO's with issues and needs

4. **Cohort 1 Representative, Doctoral Program,** Western Kentucky University (2008-Present)
   Duties: Represent 24 members of the cohort on procedural and course matters to the Doctoral Advisory Board
5. **Principal**, Daviess County High School (2005-2008)

Duties: Instructional Leader, Responsible for overall operation of school building with 1740 students, 110 certified staff, and 40 support staff

6. **Kentucky Staff Development Council**, Secretary (2007-08)
   Duties: Take minutes, participate in Executive Council meetings, plan KSDC activities

7. **DCHS Youth Service Center,** Chairperson (2007-present)
   Duties: Conduct meetings, grant oversight, plan activities

8. **Certified Evaluation Committee Member** (2007)
   Duties: Provide input on changes to current evaluation system of certified staff; devise updated documents for district evaluation procedures

9. **Local Planning Committee**, Daviess County Public Schools (2005-08)
   Duties: One of 18 members within the district responsible for facility recommendations for a period of 4 years; became familiar with facility funding, demographics, districting, and construction details.

10. **St. Stephen Cathedral Parish Pastoral Council Co-Chair** (2006-2007)
    Duties: In conjunction with the pastor and other chair, we maintain priority planning, visioning, and planning for the entire operations and activities of the parish (1000 families).

11. **Assistant Principal,** Daviess County High School (2003-2005)
    *Duties: e*Learning Building Coordinator, Special Education ARC Chair, 504 Coordinator, CATS Coordinator, KTIP Principal member, Staff Evaluation (35 teachers), Facility Management, Support Staff Supervisor, Textbook Coordinator, Comprehensive School Improvement Plan Coordinator, Committee Chair, Renaissance Student Incentives Coordinator

12. **High School Staff Developer,** Daviess County Public Schools (2002-2003)
    Duties: Curriculum, Assessment, Instruction, Professional Development oversight and development for two high schools' approximately 200 staff members, and approximately 3000 students. http://www.dcps.org/curhs/default.htm

13. **Technology Education Teacher**, Apollo High School (1995-2002)
    Duties: Have taught or the following courses: Introduction to Computer Technology, Tech Lab, Drafting, Drafting II, Technology Work-Based Learning, Pre-Engineering, Graphic Arts

14. **Tech Prep Coordinator**, Apollo High School (1996-2003); Daviess County High School (2002-2003); (2004-present)
    Duties: Securing Grant Funds (approximately $150,000) from Perkins Federal Legislation via Kentucky Department of Education/Workplace Cabinet funds. All students interested in pursuing a 2-year postsecondary degree and/or certification targeted and tracked throughout the educational experience. Community contacts were made and kept to insure students were gaining a valuable educational experience, in conjunction with community needs and interests. Curriculum development, which emphasizes more progressive and experiential methods, have been studied and enacted at Apollo. Responsible for upkeep and leading of Tech Prep Steering Committee and held two large meetings per year.
    Supervisor: Julie Clark, Daviess County Public Schools

15. **High Schools That Work Coordinator**, Apollo High School (1997-Present); Daviess County High School (2002-Present)

Duties: Securing Grant Funds from the Southern Region Education Board. This Comprehensive School Improvement organization with 10 Key Practices must be managed in terms of the school community. Yearly progress reports are given. The High Schools That Work Assessment is given every two years. In 2000, Apollo received the Gold Performance Award, with one of the top 5 scores in the country on the HSTW Assessment. Also in 2000, Apollo was named a Pacesetter site, and schools across the country were given the chance to visit the school to study our successful methods. *Supervisor*: Julie Clark, Daviess County Public Schools

16. **Instruction and Professional Growth Committee Chair**, Daviess County High School (2002-Present)
    Duties: Monitoring, researching, coordinating, and reporting best instructional practices; Surveying, analyzing, planning and delivering quality professional development programs. *Supervisor*: Brad Stanley

17. **Site-Based Decision Making Council Teacher Member**, Apollo High School (1999-2002)
    Duties: Represent Staff Concerns for School Improvement. Meetings held monthly with administrators, parents, and staff members. Responsible for fiscally managing the school building, and curriculum policies.
    Supervisor: Dale Stewart, Principal

18. **National Honor Society Co-Sponsor**, Apollo High School (1996-2001)
    Duties: Manage 60+ members in Scholarship, Leadership, Character, and Service issues. Fiscal management of the organization. Supervisor for out-of-town conventions.
    Supervisor: Dale Stewart, Principal

19. **Technology Committee Member**, Apollo High School (1995-2003)
    Duties: Organize and help manage all technology in the building. Helped train both Apollo and Daviess County Middle School in the STI computer program.
    Supervisor: John Crady, School Technology Coordinator

20. **Resource Teacher, KTIP Program**, Apollo High School (1999-2000)
    Duties: Mentoring 1st-year teacher, both in and out of the classroom.
    Supervisor: Dale Stewart, Principal

21. **Consolidated Planning Committee Member (District and Local)** Apollo High School and DCPS (1997-Present)
    Duties: Monitoring and Formulating Action Components for the Consolidated Plan Process. Represent staff members' interests and needs in the plan. Compiled data items into overall needs for the school.
    Supervisor: Stan Scott, Asst. Principal, Apollo High School

22. **Safety Committee Member**, Apollo High School (1998-2000)
    Duties: Monitor, assess, and revise safety procedures and equipment both inside and outside the school building.
    Supervisor: Chuck Broughton, Assistant Principal, Apollo High School

23. **Family Resource Center Advisory Council Member (**2000-2003)
    Duties: Draft grant to obtain resource center. Survey Staff, Parents, and Students as to the needs of the center.
    Supervisor: Renee Ireland, Social Services, Daviess County Public Schools; Sue Bittel-Krampe, Apollo YSC Director

24. **Alliance Subcommittee for Recruitment and Articulation**, Daviess County Public Schools (2000-2001)

Duties: Organize and articulate transitions between high school and postsecondary education. Committee consists of surrounding counties, community colleges, and technical colleges.
Supervisor: Nick Brake, Chair, Regional Alliance for Education

25. **Extended School Services Employee**, Apollo High School (1995-Present)
Duties: Tutor students in both mathematics and technology issues. Issue make-up tests.
Supervisor: Mary Coomes, ESS Coordinator

26. **Community Education Instructor**, Community Education (1998-Present)
Duties: Teach courses for adults in the community (Microsoft Word, Excel, Access, Publisher).
Supervisor: Susan Law, Community Education Coordinator

D. Conferences and Papers

Society for Information and Technology and Teacher Education, July 2011
WKU Library Media Educators' Summer Conference, presenter
Innovations for Learning Conference, presenter
Kentucky Society for Technology in Education, presenter
Kentucky Staff Development Council, presenter
KASSP Conference, participant
KDE Master Scheduling Conference, participant
Daviess Instructional Technology Academy (DITA), presenter
National Education Computing Conference, participant
Association for Supervision and Curriculum Development National Conference, participant
Tech Prep/High Schools That Work Coordinator Meetings (2 per school year), participant
*e*School Conference on Seeking more Grant Monies for School Technology Integration of Academics and Vocational Education, participant
HSTW Conference Visit to Gloucester, VA, participant
HSTW Local Leaders' Retreat, presenter
HSTW Conference on Meeting the 9th Grade Challenge, participant
Kentucky Teaching and Learning Conference (KTLC), presenter
Association for Career and Technical Education (ACTE) Conference, participant
Principles of Technology Institute, participant
Consolidated Planning Institute, participant
SBDM training, participant
KTIP training, participant
Portfolio Scoring Training, participant

E. Honors and Awards

Summa Cum Laude Doctoral Graduate, Western Kentucky University, May 2011
State Farm Foundation Doctoral Dissertation Nominee---March 2010
Executive Leadership Program for Educators---Harvard University---July 2007
Graduate of Leadership Owensboro Class of 2007
DCHS---Top ACT Average of Public Regional High Schools
DCHS---Top Academic Index score in 3rd Region/ Top 10 in state of Kentucky
Smaller Learning Communities Grant Writing Team---Helped secure $300,000
Chair, Principal Selection Committee for AHS (Tom Purcell), 2002
Summa Cum Laude, Murray State University, 2005
Dean's List, Bellarmine University, 1990-94
Cum Laude Graduate, Bellarmine University, 1994
Summa Cum Laude Graduate, Murray State University, 1997
Summa Cum Laude Graduate, Western Kentucky University, 2000
Daviess County Public Schools Teacher of the Year Nominee, 1998

Tandy Math/Science/Technology Teaching Award, 1998
Apollo High School Educator of Excellence: 1998, 2000
Wal-Mart Regional Teacher of the Year, 2000
HSTW Pacesetter Site, 2001-2002
HSTW Gold Performance Site, 2001-2002