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Evaluating a 1:1 Computer Program in a Secondary School

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EVALUATING A 1:1 COMPUTER PROGRAM IN A SECONDARY SCHOOL

By

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Under the Supervision of Dr. Jill F. Russell, Ph.D.

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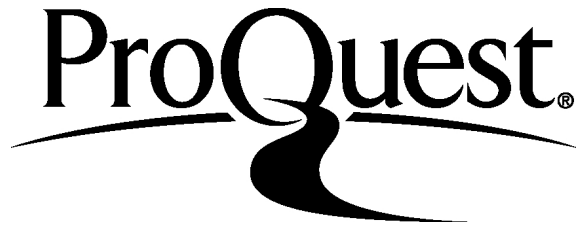Nealy F. Grandgenett, Ph.D.

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Andrew R. Walters, Ed.D.

University of Nebraska, 2015

Advisor: Dr. Jill F. Russell, Ph.D.

Abstract

The purpose of this study was to evaluate the success of the Lewis Central High School 1:1 Chromebook initiative. This evaluation replicated a study by Dr. Don Johnson evaluating a 1:1 Ipad initiative within the Fort Calhoun Community Schools. The resulting data is intended to provide the Lewis Central Community School District results and feedback to be used toward the implementation of future school-wide initiatives in a more effective and efficient manner. Using Developmental Evaluation model/design, the research findings will be reported to the school board, the Lewis Central High School Building Leadership Team, and to the local Phi Delta Kappa chapter in a poster session. Questionnaires were answered by students, parents, and staff related to this research to formulate all conclusions. Longitudinal student performance data was considered as a means to interpret the survey results as well as statements garnered through the open-ended question survey responses. The data collected for this research project indicates that the implementation of the 1:1 Chromebook initiative at Lewis Central High School had a positive impact upon exposure, use, and attitudes about technology among students, staff, and parents alike. While themes exist among all three groups concerning areas of improvement, such as internet connectivity in the school, blocking of websites, and the reliability of the technology, the overall perception about the 1:1 Chromebook initiative at Lewis Central High School was positive.

Acknowledgements

My father would always say "there is a right tool for every job." I've found the most successful tasks are indeed accomplished by those who have the very best and correct tools in their hands, as it increases interest, efficiency, engagement, and pride in one's work. Finding the right tool for students in any position in education is paramount as a goal. My life's work has, at times, centered on helping others to indeed find the right tool for the job.

While I am not a procrastinator at all in my life, I can say the writing process wore on my approach to accomplish this task. Staying motivated to write, finding the time to write, and following APA 6 format was indeed a daunting task. Through this process, I have learned more about myself, had fantastic support, and have gained an experience that has made me a far better human being than when I started. As it takes a village to raise any student in a community, it also has taken a village to create this product. I first want to thank my wife, Melanie. I must thank her for her understanding and patience throughout the process of both taking classes and writing the dissertation. My wife is my most honest critic, yet also my greatest fan. I love her and thank her for allowing me to follow my dreams, goals, and passions for this material. I am excited about the responsibilities, opportunities, privileges, and open doors that will come for the rest of our lives as a result of this dedication and hard work. Though my son Leo is young, I also appreciate his understanding when Dad needed to "do his computer work." I'm glad Dad's computer work is finally done so I'm able to find better balance in my life and enjoy watching my family grow up and flourish.

I want to thank my major professor and committee members for all their time and attention to my dissertation. I appreciate your feedback and efforts in making me a better researcher, a more concise writer/communicator, and a more patient human being through this endeavor. I'd like to express special gratitude to Dr. Jill Russell, Dr. Kay Keiser, Dr. Elliott Ostler, and Dr. Peter Smith for their dedication to my work with extra time, patience, and encouragement during the entire degree and dissertation process.

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Table of Contents

List of Tables

List of Tables Continued

List of Figures/Graphics

Chapter 1. Introduction

In the 19th and 20th centuries, electricity and the internal combustion engine drove the rise of manufacturing and America's shift away from an agrarian economy. In the 21st century, computers and related inventions are transforming the U.S. economic landscape—boosting productivity so companies can produce more with less and spurring an economic shift from manufacturing to services (Carnevale, Smith, and Strohl, 2008). In preparing students to enter this new and ever-changing workforce, "schools today are given the task of not only educating students with the three Rs of Reading, wRiting, and aRithmetic but also are expected to give students strong backgrounds in science, technology, global studies, and a diversity of so-called '21st century skills' such as critical thinking, collaboration, agility, initiative, oral and written communication, analyzing information, and imagination" (Wagner, 2008).

Computer technology and innovation are viewed as bedfellows in today's educational landscape as educators look to prepare students for careers that have not been invented. Part of the process of preparing students for this learning landscape involves providing tools for experimentation, problem solving, and creativity in the classroom. Since the early 1990s, school districts and the federal government have invested heavily in instructional technology (Miranda & Russell, 2011). There is promise of even more investment, according to Allen, Seaman, & Garrett, (2007) who go to on say, "Consumer preference for and openness to online and blended delivery far exceeds consumer experience of these delivery modes. This suggests that the market for online/blended delivery has a lot of room for growth."

Part of the challenge of preparing students for the future is revealed by the measuring tools which exist to determine "readiness" for post-high school work. "Only 24% of graduates met all four ACT College Readiness Benchmarks, meaning that 76% were not adequately prepared academically for first-year college courses in English Composition, College Algebra, Social Studies, and Biology" (ACT, Inc., 2010).

How do educators adequately prepare students for such a rapidly growing technological landscape? How do teachers keep students engaged academically, when their world outside of school consists of a "live" identity and also an online identity? What catalyst for change will be here for a lifetime and is ever-increasingly central to students' lives as communicators?

The answer lies in providing tools to harness information. The acquisition of information, along with the tools to apply the power of knowledge, could provide students with the means to not only thrive in, but help create, our future. "Almost one-quarter of school districts nationwide in nine states have invested millions of dollars in 'one-to-one' laptop programs, hoping the availability of a computer for every student could improve academics and other skills. They made those investments despite the fact that research on the impact of such technology on student achievement is largely mixed and preliminary" (Borja, 2006, p.10). Borja goes on to say: "Experts report that districts employing such initiatives must train teachers on how best to use the computers in their classrooms. Students must learn how to amplify the academic applications of the computing devices--not just use them to pass electronic notes to each other or to play video games."

For many schools, this means breaking from a model that presents technology in a "lab" setting to a model that provides them access to technology 24/7 through initiatives commonly known as 1:1 (i.e., one computing device per one student, usually in the form of a laptop computer). With a computer in hand, a person has access to answers to almost any question. The challenge lies in asking the right questions. Asking the right questions 20 years ago involved a book, card catalog, or other type of system rooted in documentation that was stored in hard copy in a building somewhere. Today's information is utilized within a digital format combined into one search engine. Traditional book/pen/paper classroom instruction may leave little room for creativity. Many educators believe creativity is one of many facets of a 1:1 program that can help better educate each student. What impact upon student achievement does a 1:1 program have? Studies vary on the achievement results dealing with 1:1 technology, yet research also shows that at present, nearly 60% of Iowa schools employ technological advances (Grundmeyer, 2012).

Why does this initiative continue to grow – and why are districts staying with 1:1 initiatives at the end of each machine's lifetime despite the extra cost and use of resources? Does the use of 1:1 technology in the classroom improve student GPA, activity participation, and student engagement in the classroom?

Further confounding the issue, Miranda and Russell (2011) report that despite widespread investment in information technology during the 1990s, greater access to technology may not have translated into increased computer use. To maximize educational technology's benefits for student learning, organizational leaders must

understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011).

Background and Context

Lewis Central High School serves approximately 975 students in grades 9-12. Kreft Primary, Titan Hill Intermediate School, and Lewis Central Middle School feed into Lewis Central High School, with a total district population of 3,150 students. Nearly 600 students from Council Bluffs and surrounding communities open enroll into the Lewis Central Community Schools which has a free and reduced lunch population of approximately 43%. Lewis Central High School is located at 3504 Harry Langdon Boulevard in Council Bluffs, Iowa, near Interstate 29 and U.S. Highway 92.

In 1997, the first computer network was put together at Lewis Central, beginning at the high school level. The middle school and high school had their own network servers connecting desktop and a few laptop computers within the buildings, but not to any other building or to the world, though student computers were in place in labs and classrooms. Devices in the hands of students began to become a priority due to the changing curriculum and graduation requirements during the late 1990's, with business education classes being a primary driver of technology integration. Black (2014) says, "Even before the push of technology education toward the middle school, several lab spaces were added across the district (in all buildings), all staff received laptops and the general emphasis of technology use was expanding tremendously, but mostly through the eyes of staff use."

"Technical Integration of English (TIE) classes took all of the typing labs utilizing typewriters and replaced them with computer labs" (Black, 2014). This system,

18 years ago, was the genesis of what would lead to the 1:1 Chromebook initiative in place today at Lewis Central High School. "Technology at this point was not about collaborating, creating, researching or networking, it was still about the function of typing, as the internet was not in place" (Black, 2014).

In 2000 and 2001, fiber-optic cable was laid to link Lewis Central High School, Lewis Central Middle School, and Titan Hill Intermediate School. Kreft Primary School was not included due to its being located ten miles from the other three schools. There was a movement toward course-based technology integration that was directed toward staff first and students second. The technology was not about connection to the real world, but more about increasing efficiency for staff and meeting the requirements of the TIE courses through a framework designed by the business education department at Lewis Central High School.

During 2002 to 2004, the district moved away from the TIE courses as a graduation requirement and put the curriculum into the middle school, as "most students were coming to the high school prepared to use technology because of exposure at home and exposure to typing opportunities earlier in their lives" (Black, 2014). This became a competency requirement in the middle school, whereby students demonstrating the skills to type would not need TIE instruction or keyboarding at the high school level. The Internet "explosion" also occurred during this time, with an increased need to have Internet access as a resource for staff at first, then students. Staff needed the resources to be able to network, use email, and communicate using technology to stay up-to-date with information and changes outside of school. The center of the experience was still about

staff providing access/experiences for students, though this process was driven primarily by the needs of staff.

The years 2005 to 2010 brought increased emphasis to adopt technology that was centered more on collaboration, research, and networking. A number of factors influenced district expansion toward the 1:1 Chromebook initiative, including infrastructure in the form of fiber-optic cable upgrades/expansion, physical desktop and laptop computer additions/upgrades, additional staffing for technology support, pressure from staff to increase technology use for efficiency in the classroom, and increased interest by students/families in having technology outside of school in the form of computers in their homes and cellular phones in students' pockets. As neighboring districts began to incorporate 1:1 technology into their curricula, Lewis Central began to take note of this change and questioned the purpose, need, and desire for such technology to meet the needs of an adaptive and well-rounded learner in the classroom and at home.

Through researching possible funding sources to create a technology infrastructure, the idea came to survey southwest Iowa schools about the need for such technology. In December of 2010, the Lewis Central Schools engaged with a consortium of Pottawattamie County Schools and Green Hills Area Education Agency (AEA) to conduct a 1:1 research and planning effort. The goal of this research and planning effort was to lay the groundwork to help transform district teaching and learning from staff-centered to student-centered through a 1:1 laptop program which included professional development infused with common curriculum expectations for schools across the state of Iowa, developed by the Iowa Department of Education, known as the Iowa Core 21st Century Skills Competencies. Tech audits, focus groups, and an online survey were used

to produce recommendations for each district with regard to readiness of the staff and community and the technical preparedness of each district for 1:1 implementation.

The survey was wide-ranging, including a variety of school districts and stakeholder groups. "A total of 1,726 respondents completed the survey. There were 365 respondents from A-H-S-T Community School District, 282 from Lewis Central School District, 247 from Riverside Community School District, 315 from Treynor Community School District, 191 from Tri-Center Community Schools, 266 from Underwood Community School District, and 60 from Walnut Community School District. Constituent breakdown was 1155 students, 354 parents, 186 teachers, and 31 administrators…" (Education Collaborators, 2010). This survey took into account opinions from all stakeholders in the survey process. The following 1:1 goals and action points were suggested as a result of the 2010 Education Collaborators survey:

1. Research and Planning Effort Survey Goal: Transform district learning and teaching from staff-centered to student-centered through the planning, implementation, and evaluation of a 1:1 laptop program which will include professional development infused with the Iowa Core 21st Century Skills Competencies.

2. Action Points:

- Students will create and manage their own learning through experiential and virtual projects using problem-based and multi-disciplinary activities.
- Students will have the ability to access online learning materials and information, anywhere and anytime there is an active internet connection.
- Students will utilize virtual environments to research, download coursework, communicate, submit assignments, and work collaboratively.

- Faculty will expand the learning opportunities for students beyond the classroom walls by integrating online content and learning resources.

- Communication among faculty and students will increase through email, live discussions, online communities, online assessment tools, and classroom management and learning software.

- Through increased virtual communication, parents/caregivers will communicate more efficiently with staff.

- Through increased virtual communication, parents/caregivers will monitor daily classroom work, homework, and student achievement more efficiently.

- Through the 1:1 program, students will become more actively engaged in authentic projects and problem-based learning.

- Through the 1:1 program, students will demonstrate their learning through a variety of media, including written essays and reports, videos, podcasts, blogs, wikis, screencasts, presentations, and online published work.

- Through the 1:1 program, faculty and student communications will become more efficient and productive.

- Through the 1:1 program, students will become active participants in collaborative group projects, finding deeper knowledge and understanding of topics and engaging in problem solving and higher order thinking (Education Collaborators, 2010).

The Discussion at Lewis Central

This survey data suggested that Lewis Central staff, parents, students, and other district constituents were ready for 1:1 technology. A part of the discussion concerning

the survey results centered on the offerings of neighboring schools. The Lewis Central

School district has an open enrollment percentage of approximately 20% (Black, 2014).

Nearby neighboring districts, including Council Bluffs Community Schools and

Underwood Community Schools, had adopted or were in the process of adopting 1:1

initiatives. Part of the enrollment choices for parents are made because of opportunities

provided to students. Because of the perceived readiness for 1:1 technology through the

consortium and the need to provide tools equal or superior to neighboring districts, plans

began to emerge for the groundwork for increased technology integration. Careful

budgeting and research led the school to implement increased networking capability

using Google products – through a three-year transition from purchase-based email and

data storage, to online email, sharing, and other resources through Google.

Provided are a number of insights from The Education Collaborators survey that

came to influence decisions and operations of a 1:1 program for Lewis Central. These

insights and recommendations were as follows:

1. Of the families who responded from Lewis Central, 36.3% indicated they did not
   have enough computers at home for all family members to get their work done.

2. Many (89.2%) of the families who responded from Lewis Central had high speed
   (cable/DSL) connections at home.

3. All four groups of respondents (administrators, staff, students, and parents)
   indicated they saw several important benefits of a 1:1 program.

Survey results indicated community members were positive about the Lewis

Central Schools, technology, and 21st Century Core competencies. Staff were committed

to developing technology-infused education for the advancement of their practice.

Specific paths for professional development and new learning activities were revealed, and benchmarks for future studies were provided. From the perspective of school district administrators, districts in the Pottawattamie County Consortium, including Lewis Central, had achieved a synergistic momentum to develop teaching and learning with technology, and the survey results provided data to build paths for progress.

As a follow-up to the survey findings, the Lewis Central district requested funding from the Iowa West Foundation to implement a 1:1 initiative. The proposal was denied. Regardless, the Lewis Central School Board of Education and district leadership chose to fund the program. A plan was devised to implement the 1:1 Chromebook initiative at Lewis Central through three stages:

- Stage 1 was an update to infrastructure through more wireless access points at Lewis Central, staff updates/training for the Chromebooks, and an increase in support staff to help with the management of the Chromebooks. This occurred during the spring and summer of 2013. Staff were given Chromebooks during the summer of 2013 to prepare for use during the beginning of the 2013/2014 school year (Black, 2014).

- Stage 2 was to deploy 600 Chromebooks at Lewis Central Middle School during trimester one of the 2013/2014 school year, where the machines would be physically kept at school when school was not in session. This would allow Lewis Central High School a gradual check-out process that would flow smoothly. It would also allow monitoring/adjustment of the network in the schools as network traffic would increase significantly through this process (Black, 2014).

- Stage 3 was the rollout of the Chromebooks at Lewis Central High School and grades four and five at Titan Hill Intermediate at the beginning of trimester two during the 2013/2014 school year. This included the teaching of laptop expectations to students and various homeroom lessons to emphasize proper use, storage, and care for the machines. Staff were provided professional development opportunities during the fall of 2013 to prepare for this initiative (Black, 2014).

Problem Statement

Some of the questions that arise concerning 1:1 technology are the following: What will be the results of the 1:1 Chromebook initiative after implementation? How does the implementation affect the success of the 1:1 Chromebook initiative? How have staff utilized the technology in different classes? What are the perceptions of students, parents, and staff concerning the 1:1 Chromebook initiative? How will the 1:1 Chromebook initiative change our learning patterns in our school? How will staff react to new technologies in the classroom with kids? To what extent can the shift be made to a student-centered classroom from a staff-centered classroom? Can the learning process involve more research, collaboration, discovery, group work, creativity, and fact checking rather than lecture, repetition, memorization, and "sit and get" activities in the classroom? How will this impact student attitudes about school and/or achievement? Will gaming and apps take over as a part of student free time in school? What are the negative consequences of this type of initiative? Are there long-term effects to staring at a screen for longer periods of time? How does the impact affect different types of learners (i.e. free/reduced vs. non-free/reduced lunch, SPED students, learners who already have technology at home vs. those who do not, males vs. females, parent/family

attitudes, and integration of technology)? All of these questions can be summed up in asking the following: To what degree of success has Lewis Central High School implemented the 1:1 Chromebook initiative?

The questions above, as well as other forms of comparison and research can be answered in a number of different ways. Michael Quinn Patton's Developmental Evaluation is a newer approach to evaluation which thoroughly examines the effectiveness of a program. "Developmental Evaluation supports learning to inform action that makes a difference. This often means changing systems, which involves getting beyond surface learning to deeper understandings of what's happening in a system" (Patton, 2010, p. 11). It is through this approach that Lewis Central administrators anticipate making informed decisions concerning the 1:1 Chromebook—by using stakeholder input to formulate a deeper understanding of current reality through qualitative, open-ended opportunities with reflection from stakeholders. Patton reinforces this idea of accountability for resources spent, stating "...Accountability-focused evaluators report independently to decision makers charged with making sure that resources are spent on what they're supposed to be spent on...with specific primary users for specific, intended uses" (p.13-14).

Purpose Statement

The purpose of this study is to evaluate the effectiveness and implementation of the Lewis Central High School 1:1 Chromebook initiative. This study replicated a similar undertaking by Dr. Don Johnson from Fort Calhoun Community Schools, which worked to identify and analyze the necessary data and use it to determine the success of the implementation process used to initiate a 1:1 Ipad program in a senior high school.

Use of this data will enable the district to more effectively infuse the use of the Ipad into the delivery of instruction, thereby improving student achievement and technology-skill readiness for post-graduation. The Lewis Central District chose to use the Google Chromebook as the technology of choice for secondary students, rather than the Ipad as used by Fort Calhoun. The study utilized Patton's Developmental Evaluation Model to assess the implementation of the processes used as the 1:1 Chromebook initiative was designed and implemented.

Conceptual Framework

This study centered on a model that examines the effectiveness of the 1:1 Chromebook initiative at Lewis Central High School using the Conceptual Framework adapted from Saven-Baden & Howell-Major, (2013). Smyth (2004) defines a conceptual framework as "a set of broad principles and ideas taken from relevant fields of inquiry and use to structure a given paper, presentation, or research process." This process provides a scaffolding framework that keeps the research on track as the results from additional work/research toward a given goal emerge. Figure 1 depicts the primary concepts related to this study:

Figure 1. Savin-Baden Action/Survey Research Mode

Adapted from Savin-Baden, 2010, p.133

Action/Survey Research

Developmental Evaluation Approach:

Seeking deeper understanding within a system

Learning to inform action

Information Needed

Student Perception of 1:1 Chromebook initiative

Parent Perceptions of 1:1 Chromebook initiative

Teacher Perceptions of 1:1 Chromebook initiative

Data Collection

Survey Monkey survey with Likert Scale items and open-ended comments

Performance Trend Data assembled through PowerSchool

Data Analysis

Descriptive Statistics and Chi square with cross tabs for Likert scale items

Qualitative treatment for open-ended comments

Presentation of student performance data

Data Interpretation:

Comparison of like-items by population /subject matter

Responses to research/evaluation questions

Comparison of performance data with survey findings

Recommendations for the 1:1 initiative

Recommendations for other/future technology initiatives, etc.

Overall Conclusions

Present findings to Lewis Central High School Building leadership, Lewis Central District Leadership/School Board and Phi Delta Kappa members

Action/Survey research was used through Patton's model of Developmental

Evaluation to elicit student, staff, and parent opinions in the spring of 2015 concerning

the effectiveness of the district's 1:1 Chromebook initiative. Through descriptive

statistics and chi square with cross tabs for Likert scale items, and qualitative treatment

for open-ended comments, the researcher sought to assess the effectiveness of the 1:1

initiative as it pertained to students, staff, and parents. Staff responses were also

compared by years of experience. All three surveys also included an option for

participants to provide anonymous, qualitative feedback about the effectiveness of the 1:1

Chromebook initiative. In addition, archival/longitudinal student performance data was

reviewed in relation to the survey data. These results will be reported to the Lewis

Central School Board, the Lewis Central High School Building Leadership Team, in a

Phi Delta Kappa poster board session, and are available for use/observation by other

researchers and school districts.

Research Questions

The research questions below were used to determine the overall effectiveness of

the Lewis Central High School's 1:1 Chromebook initiative:

Overarching Question #1: What are the staffs' perceptions regarding the

implementations of the 1:1 Chromebook initiative?

1.1   What is the percentage of staff who believe the 1:1 program is good for teachers?

1.2   Did the staff at Lewis Central believe they were provided enough professional

development to make the 1:1 initiative work?

1.3   How often do staff utilize Chromebooks in their daily lesson planning?

1.4   What percentage of staff believe the implementation process was done in a reasonable timeline?

1.5   Has there been adequate ongoing professional development to properly educate staff during the Chromebook implementation?

1.6   What percentage of staff believe that students are more engaged in their own learning progress because of the 1:1 Chromebook program?

1.7   What percentage of staff felt that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time?

1.8   What percentage of staff would recommend that other school districts utilize the 1:1 Chromebook program for student learning?

1.9   What suggestions would staff have for school districts considering implementing the Chromebook program?

1.10   Through question prompts, this question solicited qualitative, open-ended response from Lewis Central High School staff.

Overarching Question #2: Does the perception regarding the implementation of the Chromebook initiative differ based upon years of experience?

2.1   Does the perception of the staff who believe the 1:1 program is effective for student learning differ based upon years of experience?

2.2   Does the perception of whether the staff received adequate professional training for implementation of the 1:1 initiative differ based on years of experience?

2.3   Does the percentage of staff who utilize the Chromebook in their daily lesson planning differ based upon years of experience?

2.4   Does the percentage of staff who believe there was reasonable timeline for the implementation of the 1:1 program differ based upon years of experience?

2.5   Does the feeling that the staff received ongoing professional development to adequately prepare their students differ based upon years of experience?

2.6   Does the percentage of staff who believe students are more engaged in their own learning because of the Chromebook program differ based upon years of experience?

2.7   Does the percentage of staff who believe there are adequate rules and guidelines in place to keep students from misusing their Chromebooks during school time differ based upon years of experience?

2.8   Does the percentage of staff who would recommend that other schools utilize the 1:1 Chromebook program for student learning differ based upon years of experience?

Overarching Question #3: What are the students' perceptions regarding the implementation of the 1:1 Chromebook initiative?

3.1   What percentage of the students believe that their technology use skills improved with the implementation of the Chromebook program?

3.2   What percentage of time are students using the Chromebook in an academic versus non-academic way?

3.3   Do the students believe the teachers are incorporating the Chromebook into their instruction on a regular basis?

3.4   Do the students perceive specific classes/subject areas as more engaging because of the use of the Chromebook in the delivery of instruction?

3.5   Do the students feel they learn more with the Chromebooks?

3.6   What additional Chromebook training would be helpful to students now?

3.7　　If another technology were introduced to students at Lewis Central, what changes would they desire to the implementation process?

3.8　　Do the students believe they are better able to access information after the Chromebook implementation?

3.9　Do the students perceive a difference in 1:1 usage in different classes?

Overarching Question #4:　What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?

4.1　　How often do parents see their students using the Chromebook at their homes in an educational way?

4.2　　What percentage of time do parents see their student using the Chromebook in an academic versus non-academic way?

4.3　　Do parents believe the Chromebooks are helping their students learn?

4.4　　Do parents believe the Chromebooks are helping prepare their students for the future?

4.5　　Qualitative, open-ended response from parents.

4.6　　Do parents have enough information about how the 1:1 Chromebook initiative operates?

Overarching Question #5:　How did the 1:1 initiative relate to student performance at Lewis Central High School?

5.1　　How have the attendance percentages at Lewis Central High School changed since the Chromebook initiative?

5.2　　How have students' composite ACT scores changed since the Chromebook initiative?

5.3   How have 4-year cohort graduation rates changed since the implementation of the

1:1 initiative?

Input from educator teams from the Fort Calhoun Community Schools, Lewis

Central Community Schools, and the University of Nebraska at Omaha was considered in

the process of creating these questions. Educator teams worked through this process to

develop a system that is "adaptive...or innovative to new conditions in complex dynamic

systems" (Patton, 2010, p.194). We have "offered questions that connect with the ideas,

language, and framework of the innovators with whom [we're] working. Listening to

how they talk about what they're doing...and watching how they respond to optional

inquiry frameworks" (Patton, 2010, p.229). It is through the question and creativity

process that the survey questions and responses continued to improve and solidify,

providing a structure for continued innovation. Part of continual improvement in any

educational structure involves stable systems that are resilient through the change

process. "Resilience is the capacity to experience massive change and yet still maintain

the integrity of the original. Resilience isn't about balancing change and stability. It isn't

about reaching an equilibrium state. Rather, it is about how massive change and stability

paradoxically work together" (Westley, Zimmerman, & Patton, 2006, p.65).

The findings will be used to evaluate and provide recommendations to the Lewis

Central Community Schools for future school improvement initiatives. The procedure

illustrated in Figure 2 using Patton's Developmental Evaluation model could also serve

as a basis for other school districts to evaluate the effectiveness of technology integration

as part of their curriculum and learning processes.

Figure 2: LCHS 1:1 Chromebook Evaluation using Developmental Evaluation
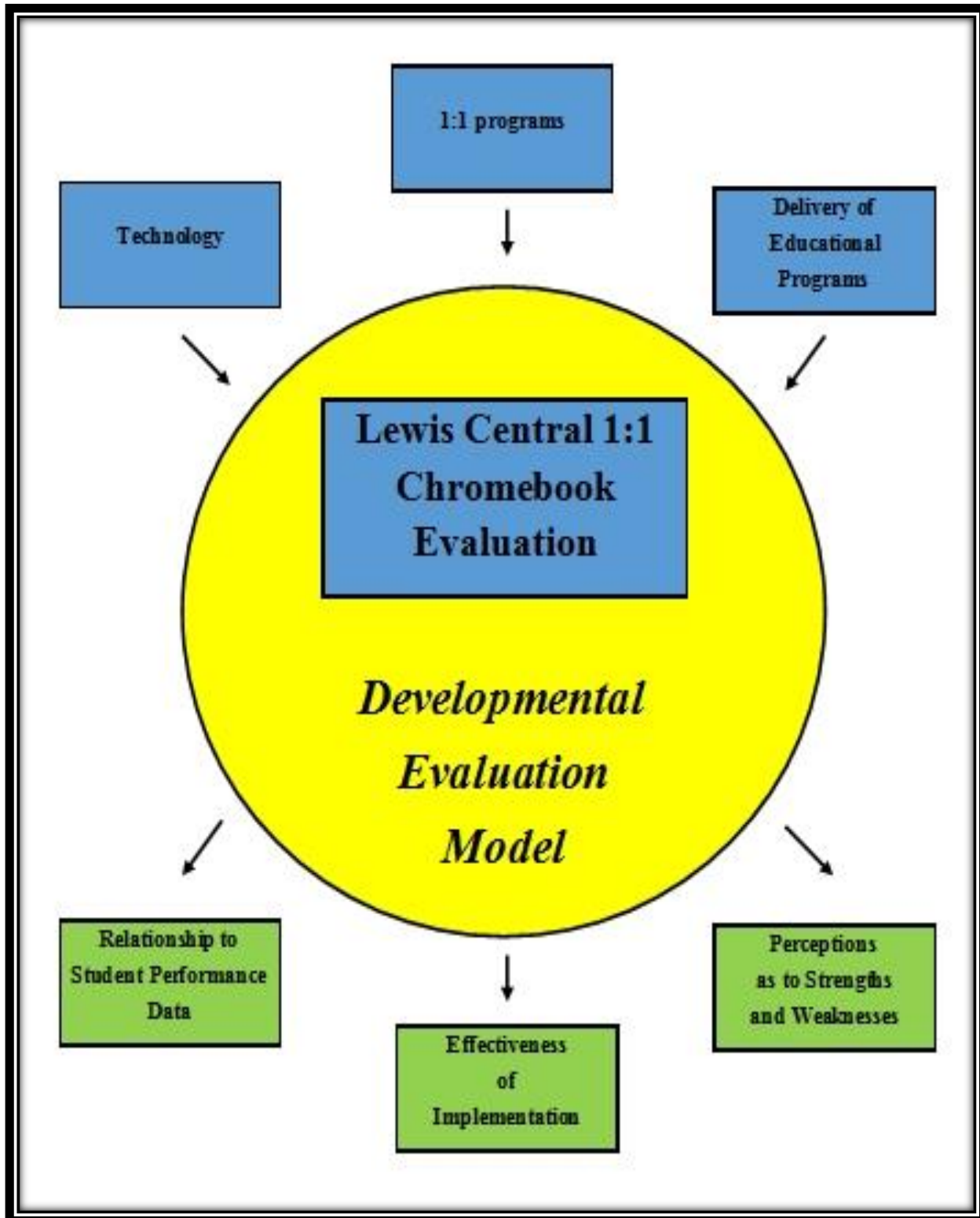
Definition of Terms

The following terms are used throughout the study on a consistent basis:

Developmental Evaluation: An evaluation that targets assessing or measuring the understandings and inner workings of the activities within a program operating in dynamic, novel environments with complex interactions.

Attendance: A measure of how many days a student participates or attends school during a given school year.

Composite ACT Scores: The American College Test is a standardized test administered to students which measures a students' aptitude for success at the college level. ACT scores are used by colleges as a measure of achievement for high school students and serve as a measure of student potential for scholarship, career path, or college course selection.

Graduation Rate: The number of students who completed all requirements to graduate from high school in a given school, measured against those students enrolled as measured by the state for and reported to the state of Iowa by all school districts.

No Child Left Behind (NCLB): Defined as public law 107-110, the No Child Left Behind Amendments to the Elementary and Secondary Education Act of 1964 was signed into law by then President George W. Bush on January 8, 2002. This federal law allows parents/guardians to choose any public school or take advantage of free tutoring if their child(ren) attends a school that needs improvement as defined by the confines of the law. Parents may also choose another public school if the school their child attends is labeled "unsafe." Finally, the law provides certain benefits for home school parents,

supports the growth of charter schools, and funds some services for children in private schools.

Individual Learning Plan (ILP): A plan designed for a student that lays out a course of study throughout high school, which could also include transition and modification into a career plan.

Assumptions

The conclusions assembled from this study are dependent upon the following assumptions:

1.   The questions in the survey, which involved input from a number of stakeholders and were designed to collect their views on various subjects, provided structure which generated both useful information for future technology initiatives as well as formative input for the 1:1 Chromebook initiative.

2.   A sufficient amount of time has passed since the initial implementation of the Chromebooks to give valid representation of the effectiveness of the implementation process.

3.   A large enough cohort from each group of respondents participated to give an accurate representation of the overall effectiveness of the implementation of the Chromebook initiative.

Limitations

1. This study was subject to the weaknesses inherent in survey research, including the following:

a. Electronic mail communication sent to parents' homes could have been answered by one parent only, rather than both parents, with both parties assuming this one response was the opinion of the household.

b. Not all parent emails in the computer system were used or are the same since they were last updated in August of 2014 during the yearly registration process.

c. Other district administration driven technology surveys from the Brightbytes Corporation, sponsored by the school, have been conducted this year. Because stakeholders participated in other surveys from the school district, they may have been less inclined to participate in this project due to being asked similar questions.

d. Stakeholder biases may have occurred based upon situational background history that may or may not be connected to the researcher or the subject matter of the survey material.

2. The 1:1 Chromebook initiative has been in existence for just over two years at Lewis Central.

3. The Lewis Central 1:1 Chromebook initiative was the only program included in this study.

4. Sample size was limited with parents because some stakeholders may or may not have interacted with the online survey due to computer, server, or individual habits concerning survey-type materials.

5. The researcher was involved in the 1:1 Chromebook initiative, so there was a potential for bias.

6. "It is possible that different results might have been obtained in schools
   representing additional socioeconomic levels located in diverse regions of the
   United States" (Creswell, 2011, p. 417).

7. It is possible that students or parents who report the percentages for personal vs.
   academic Chromebook use may have found these two uses highly subjective.
   Recent activity on the Chromebook may have also proven to be a bias depending
   upon whether or not recent and overall activities are accurately depicted in the
   percentages indicated.

8. Student performance could have been influenced by many factors in and out of
   school. There was no attempt to establish a cause and effect relationship between
   student performance data and the 1:1 Chromebook initiative.

   Delimitations

1. This study was completed using electronic surveys deployed electronically and
   anonymously at pre-determined times from Lewis Central PowerSchool with a
   link through the provider *Survey Monkey*.

2. The boundaries of this study included the use of the Developmental Evaluation
   Model through Survey Research.

3. A portion of this study used PowerSchool data systems to assemble Lewis Central
   High School student performance data as required. This study also utilized data
   presented by district administration for the School Improvement Advisory
   Committee (SIAC) and other Lewis Central High School Staff Development
   presentations. This data was reviewed in Chapter 5 as a means to confirm or deny
   stakeholder survey results.

Significance of the Study

Providing effective tools that increase student engagement and achievement with relevance to their postgraduate plans has been a goal in education for many years. If technology helps bridge the gap between the learning that occurs in schools and the world that lies ahead of students post-graduation, then many districts are on their way to implementing a more relevant method for training and educating our youth.

This study and experience with this topic has the potential to propel more students to greater success and post-school readiness through the acquisition of an education that includes tools for the "3 R's" and could also help students create, collaborate, and innovate through technology. In the past, people viewed education in relatively simple terms. Students went to school, hoped they were assigned good teachers, made the best of it regardless, and then moved on. Education as we know it today is a far more complex enterprise, and the stakes are higher than ever for both students and teachers. "All parties are keenly aware that they're being monitored and measured to acquire performance gains" (Ferguson, 2013).

If a school is to reinvest in technology after the lifespan of an initial technological tool has passed, student achievement results and post-graduate readiness must be central motivators for additional investment. Technology in schools is here to stay, and technology policy must be in a cycle of change as technology changes. Since the early 1990s, schools, districts, and the federal government have invested heavily in instructional technology (Miranda & Russell, 2011). The implications for all educators is clear through this study. If 1:1 helps student achievement, student engagement, and student preparation for college/military/careers, then it is a resource worth investing in.

The findings will be used to evaluate and provide recommendations to the Lewis Central Community Schools for future school improvement initiatives. The findings could also serve as a basis for other school districts to evaluate the effectiveness of technology integration as part of their curriculum and learning process.

Outline of the Study

A review of literature is presented in Chapter Two. The review provides literature on the history of computers, 1:1 computer programs, implementation strategies, the importance of effective district leadership, staff development as a vehicle for effective change and implementation of new initiatives, and the idea of collaboration as a framework to release ownership of the learning process into the student's hands. In Chapter Three, the researcher describes the use of the Developmental Evaluation framework as a basis for the design of the study. The researcher also defines the design of the study, the research questions, who the subjects were, how data was collected, the instruments for collecting said data, and the basis for the analysis that produced results. In Chapter Four, the researcher presents the findings related to the surveys and addresses the research questions posed by the study. Chapter Five includes interpretations of the findings and discussion with respect to the student performance data. Conclusions and recommendations for future technological projects for the Lewis Central Schools and other school districts working to implement 1:1 Chromebook initiatives or other school improvement programs are also presented.

Chapter 2: Review of the Literature

This chapter begins with a summary of historical literature concerning the evolution of computers, technology use in education, and criticisms of 1:1 computers. A case for 1:1 is built through looking at the relationship to technology that can exist with stakeholders, including student interaction through personalized and customized learning. Finally, the chapter hones in on the leadership, staff development, and collaboration that can take place through the implementation of 1:1 technology.

The Evolution of Computers

Laptop computers can be traced back to the very first computers, which were large machines that captured the space of entire rooms. The first giant was the Electrical Numerical Integrator and Calculator (ENIAC) machine, invented by J. Presper Eckert and John W. Mauchly at the University of Pennsylvania, and was used from 1946 to 1955. This machine was so large in fact, that it required over 1,800 square feet of floor space (Wolfe, 2003). By the 1950s the invention of the transistor and integrated circuit or chip caused a significant shift in the computer technology movement as they replaced vacuum tubes previously used in radios, computers, and other electronic devices (Wolfe, 2003). The mainframe computer came about after the development and evolution of the transistor in the late 1950s and early 1960s (Grundmeyer, 2012).

Through the 1960s, large mainframe computers became more and more prevalent in space programs and the U.S. Military (Wolfe, 2003). These machines were rare for most civilians to view or use as they were large, prone to mistakes, very expensive, and difficult to use. The practicality of these primitive machines put them out of touch for public schools as costs, concerns about dependability, stakeholder use, and the sheer

space needed to house them made the investment a moot point, even at the collegiate level.

During the time of the Cold War, competition brought a greater urgency to U.S. legislatures to push for advancement with technology. This led to increased federal funding for education and American public schools (Grundmeyer, 2012). By 1965, mainframes and minicomputers were placed in some schools but mostly for bookkeeping and administrative purposes (Cosper, 2009). Schools and vocational programs also began using computer-assisted instruction (CAI) and teaching computer setup and maintenance. CAI allowed the basic instruction of computer skill development for students (Murdock, 2004).

Steve Jobs and Steve Wazniak brought the explosion of the personal computer in the 1970s with the exhibition of the Apple II at the First West Coast Computer Fair in San Francisco. This machine had a built-in system called BASIC which included programming graphics, color language, and a 4100-character memory. Data and programs could be stored on an audio-cassette recorder, a commonly found item at the time. Before the end of this particular fair, Jobs and Wazniak received more than 300 orders for the Apple II and from there, sales of this brand continued to what is seen today (Wolfe, 2003).

Tandy Radio Shack brought out the first home computer in 1977 called the TRS-80. The TRS-80 Model II was designed with a 64,000-character memory along with a disk drive for storing data. The disk drive changed the capacity to distribute software and catapulted sales for both Tandy Radio Shack and Apple, which were both putting this feature into personal computers at the time (Wolfe, 2003).

International Businesses Machines (IBM) was also looking to expand market share into home computers, as it was selling minicomputers and mainframes for medium to large businesses. This expansion involved invading the PC market with the Acorn, later called the IBM PC. When brought to market, IBM's PC was equipped with a 16,000-character memory, a keyboard from a typewriter, and a connection for a cassette player. Designed specifically for the home market, this machine was assembled with components from outside IBM because building the PC with IBM parts would have increased costs to the point of being out of reach for most households looking to acquire this type of technology (Wolfe, 2003).

In 1984, Apple and IBM companies both launched new computers for home use. Apple released the first generation Macintosh, the first computer equipped with a graphical user interface (GUI) and a mouse (Grundmeyer, 2012; Wolfe, 2003). This GUI took a leap forward with its ease of use, which resulted in sales of the machine soaring. The 286-AT was also introduced by IBM with applications such as Microsoft Word and Lotus 1-2-3. These quickly became favorites of industry and business as seen today (Wolfe, 2003).

"Today there is an almost seamless integration between Macintosh (Mac since 1998) and PC computers, smart phones, and networks that allow them to function in multiple interconnected ways" (Grundmeyer, 2012). "The connectivity and ability to speak to many platforms and machines is a primary reason the Lewis Central Schools chose the Google Chromebook as a basis for the 1:1 initiative" (Black, 2014). Computers have changed dramatically over the years, going from being used by a select few to a mainstay in today's society, including use in education (Hermes, 2009).

Technology Use in Education

Most technology development, invention, adaptation, and use has been the result of needs/innovations that center on a business setting (Grundmeyer, 2012; Hermes, 2009). Time has brought about a change from the business-driven model to that of a model where human interest, necessity, and curiosity have brought about an increase in dependence upon this tool for home and personal use. Through this dependence, mixed in with a dose of entertainment, comes an increase in engagement with the tool in hand.

Student engagement and student achievement were found to be influenced by a number of factors as examined through the relationship between academic achievement and student engagement. Key findings from these examinations by Grundmeyer (2012) and Apple Computer, Inc. (2005) follow:

- Students, especially those with few advantages in life, learn basic skills - reading, writing, and arithmetic - better and faster if they have a chance to practice those skills using technology.

- Technology engages students, and as a result, they spend more time on basic learning tasks than students who use a more traditional learning approach.

- Technology offers educators a way to individualize curriculum and customize it to the needs of individual students so all children can achieve their potential.

- Students who have the opportunity to use technology to acquire and organize information show a higher level of comprehension and a greater likelihood of applying what they learn later in their lives.

- Students with access to a broader range of resources and technologies can express their ideas more clearly and powerfully.

- Technology can decrease absenteeism, lower dropout rates, and motivate more students to continue their education after high school.

- Students who regularly use technology take more pride in their work.

Educators have known for some time that a one-size-fits-all approach to learning does not lead to the level of student engagement and academic success that schools wish to achieve. In their search for a more customized approach to delivering instruction, they've explored project-based learning, addressed different learning styles, and increased collaborative learning among students. Educators have also looked to technology for customizable solutions, implementing 1:1 laptop programs, BYOD (Bring Your Own Device) initiatives, utilizing data-driven decision-making tools, and setting up learning management systems to access digital content. For the most part however, schools have incorporated these 21st century instructional techniques and tools as add-ons to the teacher-centric, 19th century classroom structure, in which the majority of the curriculum is pulled from a textbook, and despite best intentions, most students learn the same thing in the same way at the same time (Demski, 2012).

A recollection might be drawn concerning the first exposure to the Internet in schools 20-plus years ago. At the time, the Internet was in its infancy, with awe and wonder for teachers and students alike, as both marveled at cutting-edge technology. This image of learning is no longer the reality faced by stakeholders in schools. In a study by Stefl-Mabry, Radlick, and Doane (2010), the authors contend that the school is not on the cutting edge of technology as once before, but rather it is the consumer marketplace. Students describe school computers as slow, frequently crashing, and restrictive. Although students view filters as "necessary to keep them safe," they feel

filtering hinders their ability to find information for assignments: "They block almost everything that's not linked [to the district] (Stefl-Mabry, et al., 2010, p.71). This honest reflection provides a means to understand how technology is provided for students, yet this type of resource does not match the expectation of reality outside of school. The students further emphasize this point, stating: "We have a lot of technology, but we're not allowed to use it" (Stefl-Mabry, et al., 2010, p.71).

Some researchers have advocated that the school of the future should be developed based on the integration of innovation, interactive creativity, and new technology (Natriello, 2007; Sawyer, 2006). The teacher is naturally the first person who can examine factors that impact classroom technology uses (Zhao, Pugh, Sheldon, & Byers, 2002). Personalized learning works to engage the learner. Thinking about each individual as a "high ability learner" will work to increase motivation to think, create, innovate, and invent a greater future. It is these authentic tasks which involve hands-on, minds-on activities that connect to the everyday life of the learner (Zozakiewicz & Rodriguez, 2007).

Advocates of personalized and customized learning have even advocated for gaming as a part of the learning process. A traditional point of view concerning computer games might see them as a source of entertainment, leisure, or even a waste of time. Through other educational research for the benefit of student outcomes, games have included problem solving and adaptive learning (Prensky, 2005). These types of games and stakeholder interactions are providing learners with challenging tasks and feedback, where learners construct their knowledge, develop their innovative solutions to problems, and further spark their flow and creativity (Kiili, 2005; Prensky, 2005).

Critics of 1:1 Computing

Shapley, Theyehan, Maloney, and Caranikas-Walker (2008) contend that 1:1 computing is a tool that can bridge the gap between students who achieve at various levels. They believe the exposure to a similar technological tool both in and out of school will produce positive results for learning. No matter the quality or depth of implementation by the school or educators, the students' use of the laptop outside of school for learning-games and homework was the greatest predictor of achievement with technology (Shapley, Theyehan, Malony & Caranikas-Walker, 2008).

Some would also argue that technology changes the core of what happens in all life experiences, not just in or around the classroom. Instead of relying on skill such as driving manually to plant straight corn rows, the farmer now touches a button and the tractor drives itself. The factory worker operates an arm robotically instead of welding components by hand. An eye surgeon uses a laser to correct vision in minutes using a joystick. Structural engineers use computer design programs to simulate the stresses on a bridge, and a salesperson uses customer management software to predict future inventory needs. Technology has profoundly changed the way individual professionals work, manage, operate, and assemble (Westin & Bain, 2008).

Other critics have called laptop computers and other initiatives for students "missing the forest for the trees." When students can type 100 words per minute but can't write in cursive, is something lost in society? Are leaders diverting stakeholders away from the real problem with expensive and flashy "toys" that create human robots instead of problems-solvers who appreciate art and beauty? "Perhaps work is being

focused too narrowly on protecting the status quo by blaming the innovation or the innovator when students succeed or fail" (Weston & Bain, 2008, p. 9).

A Case for 1:1

Long gone are the days of Encyclopedia Britannica, the card catalog or microfiche. A strong catalyst for the transition from paper-based materials to a digital footprint is rooted within technology as a whole, and from this world, there is no turning back (Friedman, 2005, p. 273). It was only recently that computers were just entering the world of education, and since then, stakeholders have witnessed the dependence upon them grow as the technology itself becomes cheaper, faster, easier to access, and a reflection/derivative of our lives. "Many educators and policy makers believe that technology can be a catalyst for educational reform" (Crichton, Pegler, & White, 2012, p.23).

Never before has the classroom reality and the world's reality been farther apart. Students' lives are different out of the classroom (Lent, 2012). This world is changing rapidly, and our challenge is to match the needs that are presented to students today and prepare them for careers, jobs, and tasks of the future. Educators must expand the knowledge base and perceptions if we are going to meet these needs. The jobs of tomorrow will not use the skills of today; much like the problems of today cannot be solved with the solutions from yesterday (Jacobs, 2010, p.7).

A challenge that is faced in bridging the productive citizen of tomorrow and student of today is how to create a student who is engaged. Engaging the learner becomes ever challenging, and without this engagement, any textbook or Internet resource is powerless (Lent, 2012, p.14). "Technology to the learner of today is all about

engagement. It is in this way that we meet them in the middle, so to speak, and begin where they are in life outside of school. If you watch the intense look on a child or teen's face when they play video games, text, Skype, Facebook, Instagram, Twitter, watch YouTube or juggle websites simultaneously with TV or conversation, you can clearly see there is a level of engagement" (Rosen, 2011, p. 15). The key to this engagement is the ability for each student to proceed through a series of learning tasks at his or her own pace in a way that is not only engaging, but also challenging. Whether on a smartphone, video game or other laptop-based electronic device with or without the web, the individualization of instruction engages the learner, which is significant and indicative of the future (Dunleavy, Dextert, & Heneckert, 2007).

"The 1:1 student to networked laptop ratio added value to the teaching and learning process by providing an increased: (i) ability to formatively assess learning, (ii) ability to individualize instruction; (iii) capacity for self-guided pacing; (iv) ability to access online resources; (v) capacity for student interaction and collaboration; and (vi) capacity for networked communication and materials management" (Dunleavy, et al., 2007, p. 449). Here in the 21st century, students are expected to do the above tasks easily in order to be competitive in society, the workplace, for research, and for most every task of life.

Students who are textbook-tied to learning face disadvantages that are significant and long-lasting. "If you are dependent upon a textbook, the disadvantages you face are great and your ability to problem-solve creatively is greatly diminished" (Lent, 2012, p. 174). Students using computers are put into workplace-like circumstances that require self-directed learning (much like students might find in video games), which, through

independence and proper training (according to Reiss), helps prepare them for college and career-oriented experiences (Reiss, 2013, p. 61).

The morality of preparing students for life in one way, and expecting them to live this life in another way, is highly limiting. Part of the American dream is for our children to experience success and opportunities the previous generation did not have (Demski, 2012). If a society expects this dream to be a reality, the education that prepares students for an improved future must also fit this model. Workers need to be able to find meaningful work, solve problems that have not been thought of, be contributing members of a local, national, and international global marketplace, and, most importantly be prepared for the future – not just function using the educational experiences of the past (Demski, 2012).

Technology and Stakeholders: A Relationship

Technological innovations will continue to impact education at all levels and many educational leaders are leveraging this technology in order to create meaningful, engaging learning environments for 21st-century learners (Lowenstein, 2014). Society's expectations about what skills students should learn in schools and how they should learn them are changing. Technology must not be used as merely a fancy card catalog or for word processing applications only, but rather for a means of play, collaboration, creativity, expression, and real-world application that is fluid. The focus is drifting further away from traditional academics — language arts, mathematics, sciences, and social studies — toward the conception of more modern, interdisciplinary curricula that reflect real world work environments (Johnson, Adams-Becker, Estrada, and Freeman, 2014). While skeptics and critics may view a multidimensional student-centered model

as an abandonment of high standards, proponents of personalized learning believe this model actually promotes core learning better than the 19th-century industrial learning model currently in place, in which all students learn the same thing in the same way at the same time (Demski, 2012). Timely staff development is key in the implementation of said technologies, and development using student input can sharpen a picture of what the fully implemented program might look like (Johnson, 2013).

Providing a personalized or adaptive learning path has become a trend in education because a single learning path cannot meet every learner's requirements (Kalloo, Kinshuk, & Mohan, 2010). As learning becomes more fluid and student-centered, some teachers and administrators believe schedules should be more flexible to allow opportunities for learning to take place and ample room for independent study (Johnson, et al., 2014).

Teachers are no longer the primary sources of information and knowledge for students when a quick web search is at their fingertips. Instead it is up to teachers to reinforce the habits and discipline that shape life-long learners — to ultimately foster the kind of curiosity that would compel their students to continue beyond an Internet search and dig deeper into the subject matter (Johnson et al., 2014).

As long as these perspectives are excluded from conversations about schooling and how it needs to change, efforts at reform will be based on an incomplete picture of life in classrooms and schools and how that life could be improved (Cook-Sather, 2002). Although the student voice, particularly in relationship to teaching and learning, is rarely present in educational research, more needs to be done to ensure the student voice is at the forefront of any dialogue concerning school reform or curriculum design (Stefl-

Mabry et al., 2010). Historical images of and attitudes toward young people have helped to ensure students' exclusion from policy making and practice-shaping conversations. Although it is rarely articulated as such, the most basic premise upon which different approaches to educational policy and practice rest is trust—whether or not adults trust young people to be good (or not), to have and use relevant knowledge (or not), and to be responsible (or not) (Cook-Sather, 2002).

Technology is a pervasive part of modern life, yet society tends to be very cautious about its use when it comes to children and schools. Read an article about cell phones or iPods in schools, and it will almost certainly be about their disruptive influence – cheating, bullying, distracting – rather than on the powerful options for learning that mobile devices offer (Kirkland, 2009). Also, the degree to which teachers have a role in incorporating technology into teaching practices will vary with the responsibilities of staff members, their skill levels, and the availability of other technical support in the school (Coish, 2005).

Personalized Learning

Many educators agree that engaging each learner to achieve his or her full potential should be a goal in education. Personalized learning programs empower learners to adjust or create learning paths by themselves (Toh, Chen, Zhang, Norris, & Soloway, 2009). Personalized learning is not individualized learning in which students share the same learning goals but progress through the curriculum at their own pace. Nor is it differentiated instruction, in which students also share learning goals but receive instruction that is tailored to their learning needs (Demski, 2012). As each student comes

to school with a different lens shaped by his or her previous experiences, combined with attitudes and perception about education, which is then shaped by staff strengths and goals, the process of harnessing the power of self-motivation can be an ever-complicated process. Figure 1 below illustrates the personalization of learning for students using technology through the lens of the self-directed learning (SDL) conceptual framework.

Figure 3. Self-Directed Learning (SDL) Conceptual Framework

Kim, Olfman, Ryan & Eryilmaz / Computers & Education 70 (2014) 150-160

SDL is a theory where learning conceptualization, design, conduct, and evaluation of the effort are at the center of the learner's control (Brookfield, 2009). The fundamental concepts of SDL theory offer a means for online students to enhance their skills for taking better control of their learning processes. The idea that students can take initiative and be intrinsically and extrinsically motivated to learn has long been identified as critical to the functioning of academic institutions (Guglielmino, 1977). Personalized

education aims to provide learners with customized recommendations through interactions and, furthermore, to fulfill the requirements of various learners (Cristobal, Sebastian, Amelia, & Paul, 2009). With the rapid development of e-learning techniques, developing personalized e-learning programs has received a considerable amount of attention.

Personalized learning must keep students and student learning at the center of the design and implementation of instruction. As education systems transition to digital and personalized learning, educators are taking on new roles, which include being a user of data and assessments. For true learner-centered instruction, teachers need to have a better understanding of what students know and understand and how they learn most effectively. Technology allows teachers more immediate access to data and assessments, ideally including learning style preferences and feedback from other teachers, and to focus more on formative assessment to drive instructional decisions. Based on effective use of data, staff members can make decisions about what a student needs to learn and the most appropriate content and activities to support deeper learning. The new Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards emphasize that teachers need to have greater knowledge and skill through developing a range of assessments, balancing the use of formative and summative assessments as appropriate, and using assessment data to understand each learner's progress and adjust instruction as needed (Wolf, 2014).

With the advent and expansion of technology in our everyday interaction, the divide between technological advances available to stakeholders outside of school and the use of technology in school continues to widen. No longer is the school the center of

resource allocation through ever-easier access to knowledge. With this divide comes frustration from stakeholders about the acquisition of knowledge in school compared to its ease of use in the world outside of school walls.

High school and middle school students surveyed by Jenkins in 2007 voiced frustration with restricted Internet access and the district's ban on personal information and communication technology (ICT) devices. Although valid reasons exist to restrict young students' Internet access, a unilateral digital lockdown across all grades prevents older students from learning to negotiate and evaluate information online, to recognize manipulation and propaganda, and to cultivate ethical values in a responsible way (Jenkins, 2007). These are critical skills that are widely accepted as being essential to 21st-century education (American Association of School Librarians, 2007).

Clark (1995) suggests that as stewards of prioritizing the values to instill in young people, educators and administrators must move to a paradigm that seeks the input of the learner when making decisions about the use of technology and the use of ICT devices. No longer is the teacher the expert in the classroom when it comes to the use of technology, and as educators we must embrace this reality. Authorizing student perspectives can directly improve educational practice because when teachers listen to and learn from students, they can begin to see the world from those students' perspectives.

Customized Learning

In early 2014, a group of CEOs penned an open letter to the chairman of the United States Federal Communications Commission to loosen restrictions on Internet usage in schools and increase connectivity, a sentiment that reflects an attitude shift on

how the web is valued for learning (Johnson, Becker, Estrada, & Freeman, 2014). Rather

than placing significant restriction upon the use of the Internet, educators should examine

the values that go into decision making. Consumers of information must be able to

synthesize data and be decision makers about the way to use, interpret, or disregard said

information.

An example of the ability for students to use, interpret, or disregard information

comes in the form of gaming. Research points to using play and games as a means for

significant knowledge acquisition. Stefl-Mabry et al., (2010) argue that middle school

students want video games such as *Call of Duty* integrated into classwork, explaining that

video games could help them learn strategy skills for social studies and life. Middle

school students want to create videos for assignments: "I like making movies because

you get to take nothing, bits of nothing, and make it into your own project." High school

students want to view their grades online so they can see what assignments are missing

and what they need to do to improve their grades, explaining: ''…it would be awesome to

have worksheets and extra credit assignments online." Students also wanted courses and

all textbooks available online: *"So that we don't have to carry heavy backpacks."* High

school students suggested more classroom visuals explaining: "…the classes will be more

interesting, and PowerPoint slides are easier to read than teachers' handwriting*"* (Stefl-

Mabry et al., 2010, p. 73).

A method of incorporating game-based learning and personalized learning into

the learning of creativity is one such example of customized learning. Other results of

customizing the learning for individual students can be seen both in and out of the

classroom. At Sunset Elementary School in Colorado, for example, a first-grade teacher

incorporated Kinect (a motion sensor add-on for the Xbox 360 gaming console), into her classroom for lessons on animals, geography, and science, and she credits her learners' outstanding standardized test scores and improved student engagement to the use of the interactive learning tool (Johnson et.al, 2014). She reports, "What makes natural user interfaces especially appealing for teaching and learning is the burgeoning of high fidelity systems that understand gestures, facial expressions, and their nuances, as well as the convergence of gesture-sensing technology with voice recognition, which allows users to interact in an almost natural fashion, with gesture, expression, and voice communicating their intentions to devices" (Johnson et al., 2014, p.18). Through this study, the implication of customized learning can be seen through the individualized patterns that all learners would use as they interact with this type of learning.

Figure 4 below illustrates how a Personalized Creativity Learning System with decision trees can improve current limitations in personalized learning or learning creatively. Much like other task-accomplishment through learning, the cycle presents an idea centered on learning as a motivator. Through this model, students gain success through achievement. Success creates a level of engagement that may lead to increased motivation to learn and increased creativity.

Figure 4. Learning of Creativity Decision Tree Cycle
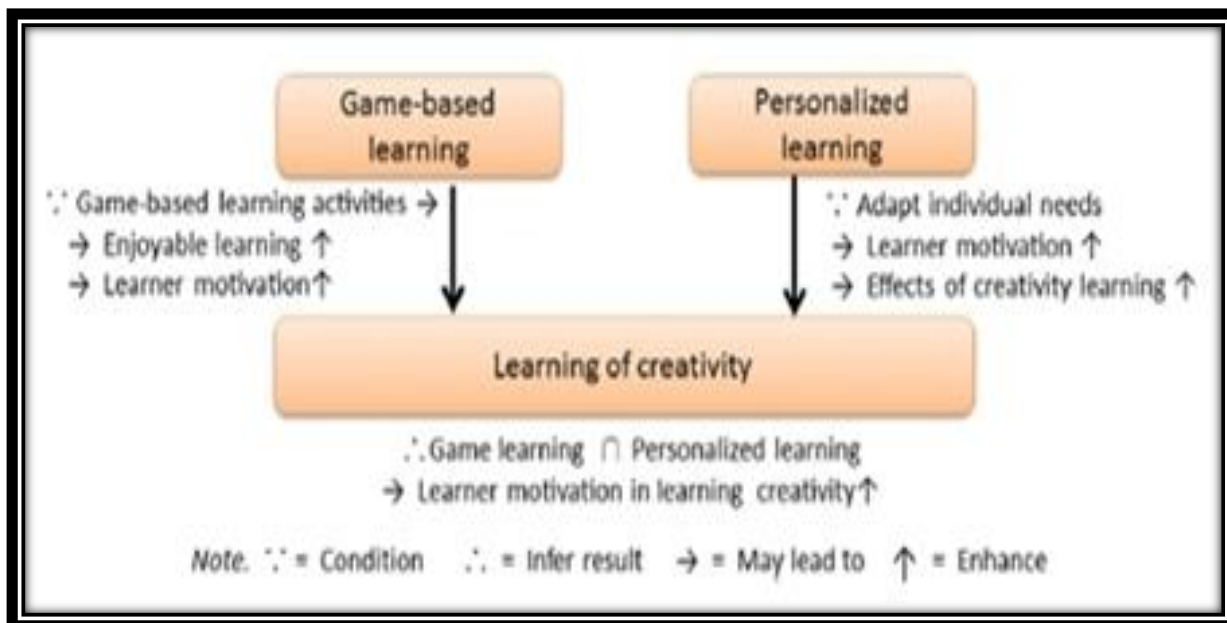
Lin, Yeh, Hung, & Chang, / Computers and Education 68 (2013) 199-210.

Leadership

Any organization is simply a mirror of the party or parties that lead it, and technology integration presents no exception. "There is a wide agreement among scholars that for a school to be effective with technology, it must have a principal who is effective at providing time for adults and students to integrate learning, with or without technology use, at the center of all daily activities" (Harvey, Holland, 2011). Principals must not only be the leader of the building, they must also be the "lead teacher," and their learning of technology is paramount to that of their students and staff. Principals show support for learning with technology through the allowance of technology integration.

Coley, Cradler, and Engel (1997) report that technology must be supported through all aspects of the curriculum. While it is important to have an administration that is on the cutting edge of technology, it is also important to see this work used by

librarians, counselors, arts instructors, specialty teachers, and physical education

instructors. The authors would contend that English is not just a class; it is something

used in all aspects of learning, with common norms that are applicable to all content

areas. Technology use through a 1:1 initiative is very much the same. If all staff

members see themselves as leaders of technology, or at the very least are willing to

experiment with technology, they will ultimately be more successful with this tool

throughout an entire school. Administrators are key to the successful implementation of

technology in the classroom and the adoption of technology innovations in schools

(Coley, et al., 1997). Leadership is more than one person leading or giving commands

with others following. It is an organization of systems which produce a common

direction for all parties in the educational system.

If a school is to have ultimate success with 1:1 and all technology education, it

needs to have school leaders who see themselves as leaders in technology who must work

to remain on the cutting edge of said technology and be examples for those they lead and

interact with (Demski, 2012).

Staff Development

Edward T. Jayner, a former professor at Yale University and middle school

principal, wrote of the three primary functions of staff development: 1) Look at real

challenges faced by the school, 2) Use action learning at the session and in follow-up,

and 3) Utilize leadership and community engagement (Senge et al., 2012, p.397-399).

Jayner would argue that technology is constantly changing, and through the sharing of

ideas, discovery, and transitioning, new technologies for the classroom can all be justified

through the professional development process to improve the skills of educational

practitioners. Teacher-leaders must be used in the educational setting through professional development to enhance the skills of teachers, staff, and administrators to improve the lives of students (Creighton, 2003).

What is the purpose of professional development? What purpose does it really serve in the school system, and why should educators (often) give time to this endeavor in sacrifice to contact time with students? Ideally, professional development is a means to an end. A philosophical grounding must occur that enables all links from professional development to relate to students. Professional development helps educators close the gap between current practices in their given field and the practices needed to achieve success for all students (Sparks & Hirsh, 1997, p.24).

The cry from many in education revolves around the allocation of time. Priority toward specific outcomes is truly reflected in the amount of time allocated toward specific endeavors. If schools implement technology into curriculum through 1:1, but do not give adequate time for staff training, experimentation, acquisition of skills for content and other educator concerns, initiatives are bound to be quickly abandoned or viewed as unimportant to staff. For technology to support quality instruction in the classroom, school systems must provide ongoing targeted professional development with a collaborative and technological focus (Pitler, 2011).

The more comfortable staff members are with the tools they have available to them, the more likely they are to implement these tools into their daily teaching practice (MacNeil, 1998). As 1:1 programs become more popular, the daily use of this tool will become more prevalent in the classroom. Repetition is the mother of all learning, and the

quality and depth of preparation that staff members receive for implementation becomes a central predictor of program or initiative success (Bebell & O'Dwyer, 2010).

An aspect of technology use in schools that can be easily overlooked in the professional development process is the structures that support the 1:1 initiative. It is not enough to hand a student a laptop and say "go." Expectations and guidelines must be specified that provide students with the knowledge-base to make good choices with this tool. Teachers need opportunities to learn what instruction and assessment practices, curriculum resources, and classroom management skills work best with students using technology. The ultimate goal is a classroom lecture, group work, and independent study process that will transfer to college, the workplace, military, or job experience once outside of school (Dunleavy, et al., p. 440).

Penuel (2006) would argue that time put into an initiative equals output for that initiatives' stakeholders. True technology learning must be given structured time with clear goals to work well. It is not enough to simply "skim the surface" when it comes to this type of learning; technology must be given the time, energy, and focus of any other initiative to produce results. Formal professional development has been a, if not the, critical component of large-scale urban and smaller 1:1 programs.

Implementation

Greaves, (2010) would argue that while the amount of this investment into technology is in the hundreds of thousands of dollars, the technology can be a powerful agent for change only if properly implemented. That implementation must come from the support and cooperation of instructors, students, and system administrators. Teacher training and professional development would need to take place for widespread and

effective use (Hall, 2010, p. 232). Classroom layout, traffic patterns, and teacher classroom etiquette would need to be discussed. Updates to the wireless system and other infrastructure pieces need to fall into place, along with ensuring the quality and quantity of staff and student support being up to date. Implementation would require certain boundaries that needed to be followed through thorough communication, yet with all of the above, an adaptability would need to exist to account for the human element involved in teaching and decision making (Overbay, Mollette, & Vasu, 2011, p. 57-58).

The human element of any initiative can provide success or usher in a roar of failure. Educators speak often of the value of time and its necessity. While some value the allocation of more time, others look introspectively at the efficiency of time as they plan for their students. "Much like any family, business, school, or regiment on a personal level, the truest test of what is really important is the allocation of where time goes - and the professional development process would need to reflect the impending change with 1:1" (DuFour & Eaker, 1998, p. 111). The interplay of all parties with the delivery of goods and time to staff is crucial. Perceived climate of the school may mediate the relationship between technology, the planning process, and the perceived effectiveness of the deployment of the technology (Bellamy, 2007). All parties need to work together and provide enough time to staff for implementation, so the success of this program can be given a chance. "All too often, new technological innovations have proven unusable to a wide variety of teachers, because the schools lack the capacity to implement them well, policies are not congruent with technology use, or the culture of the school is not supportive of the technology adoption" (Blumenfield, Fishman, Krajcik, Marx, & Soloway, 2000; Penuel, 2006 p. 333).

Collaboration

Many would argue that technology is simply a means to connect individuals based upon common goals or interests. Through the collaboration process, staff are constantly in various stages of development. They not only develop skills to be able to do, but also to think, to create, and to connect. They form interdependent relationships with others who have common goals or who would like similar ideas, products, or outcomes in their lives. It is through this continual and ever-increasing network that educators draw upon each other for inspiration, help each other through trials, share victories, but also build the foundational blocks through interactions that shape who they are (Consemius & O'Neill, 2001).

Fullan (2004) has said that collaborative cultures create commonalities among their members. Using music as an example, if one is to grow with another person, the achievement felt when music is made and perfected feeds the human need for acceptance and belonging within any group. Technology, much like music, can be a bridge that bonds different individuals or groups of people together. This type of sharing creates feelings of collegiality, professionalism, sharing, and trust, thus enabling the search for greater improvement, capacity, and professionalism (Fullan, 2004).

Principals must build their schools around groups of students, teachers, and peers who collaborate. Whether teachers work in a Professional Learning Community, in professional development or a meeting, an informal conversation at lunch or breakfast, or an online discussion in the classroom, principals must work to bring about a catalyst for collaboration that involves analysis of results, adaptation, experimentation, a cycle of

reflection, and the improvement of planning for the future that is concise and continual (DuFour & Eaker, 1998).

Educators must also find ways to grow and flow through our journey toward expertise in given fields and relationships. Professional learning community work, common clinics, guest speakers, and common professional development sessions give educators a chance to network, compare, and collaborate to build upon each other's strengths. People are products of every interaction and challenge they have been presented, and it is through this learning together that they achieve meaningful growth. Collaborative inquiry and dialog become the main focus of communication, and it is through technology that they achieve this means.

This collaboration skill is something that teachers and principals can not only model in their own work, but also serves as a preview or model of what is to come in college, military, and marketplace for students. Groups of people working together are often seen as being more productive than individuals working alone. Collaboration is just as much of a job skill as listening or communicating and is equally as critical in most enterprises (Ash & Persall, 1999).

When new technology is put forth, the implementation should not just be viewed through the lens of what hardware to buy, or how it is be used in class. Collaboration and communication must also be considered. Collaboration should not be overlooked as a successful component in the adoption of new technology. Technology is a tool, not the education. One of the main reasons for technology use in school, workplace, or the home is because it functions as a collaborative tool (White & Myers, 2001).

It is through all of these components together that educators create successful 1:1 implementation programs. Simply having the tool is not enough. The time to utilize and learn the tool is critical. If teachers are expected to use and collaborate with this tool, they must be given the opportunity for whatever learning is necessary to implement said technology. Collaboration must be set forth with a driving leader who sets up systems that allow him or her to be seen as a collaborative/technological leader who will motivate, support, and encourage others to grow, take risks, and be willing to learn with technology in hand. "Respondents at higher implementing schools reported that committed leaders, thorough planning, teacher buy-in, preliminary professional development for teachers, and a commitment to the transformation of student learning were keys to their successful implementation of Technology Immersion" (Shapley, Theyehan, Maloney, & Caranikas-Walker, 2010, p. 4).

Summary

Technology in schools is here to stay, and technology policy must be in a cycle of change at all times. Since the early 1990s, schools, districts, and the federal government have invested heavily in instructional technology (Miranda & Russell, 2011). Yet, according to Cuban (2001), despite the widespread investment in IT during the 1990s, access to technology may not have translated into increased computer use. To maximize educational technology's benefits for student learning, organizational leaders will need to understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011). Through the examination of the evolution of computers and how they are used in education, educators understand the place of technology in this system. The human element of collaboration, networking, and the usefulness of the tool is understood

through examining the critics of 1:1 technology, a philosophy behind the 1:1 initiative,

application to student-use through personalized and customized learning, and the

educational leadership required for a successful implementation.

Chapter 3 Methodology

Overview

The methodology used in this study included survey research composed of questions concerning the implementation of a 1:1 Chromebook initiative at Lewis Central High School. The methodology was based on principles from Michael Patton's Developmental Evaluation Theory as depicted in Figure 1. This theory itself is relatively new, and it is also new in relationship to its use with technology projects. The survey research was conducted using a digital survey created on *Survey Monkey* using questions developed by the researcher, several staff, and administrative faculty from Lewis Central Community Schools, three faculty from the University of Nebraska at Omaha, and a team of teachers and administrators from Fort Calhoun Community Schools. Parents, staff, and students were surveyed. Analysis of the survey data involved generation of descriptive statistics (e.g. means and percentages) and comparisons across groups with chi square analysis. In addition, student performance trends were reviewed. This included the following variables: ACT scores, graduation rate, and attendance rates. This information was considered in relation to the survey findings. Findings and recommendations from this evaluation research could be utilized as the district looks at new initiatives throughout the system and is available to the stakeholders of the Lewis Central Community Schools as well as other researchers and surrounding school districts.

Figure 1. Savin-Baden Active/Survey Research Model

Adapted from Savin-Baden, 2010, p.133

Action/Survey Research

Developmental Evaluation Approach:

Seeking deeper understanding within a system

Learning to inform action

Information Needed

Student Perception of 1:1 Chromebook initiative

Parent Perceptions of 1:1 Chromebook initiative

Teacher Perceptions of 1:1 Chromebook initiative

Data Collection

Survey Monkey survey with Likert Scale items and open-ended comments

Performance Trend Data assembled through PowerSchool

Data Analysis

Descriptive Statistics and Chi square with cross tabs for Likert scale items

Qualitative treatment for open-ended comments

Presentation of student performance data

Data Interpretation:

Comparison of like-items by population /subject matter

Responses to research/evaluation questions

Comparison of performance data with survey findings

Recommendations for the 1:1 initiative

Recommendations for other/future technology initiatives, etc.

Overall Conclusions

Present findings to Lewis Central High School Building leadership, Lewis Central District Leadership/School Board and Phi Delta Kappa members

This study centered on a framework that examines the effectiveness of the 1:1 Chromebook implementation program in Lewis Central High School using the Conceptual Framework adapted above from Saven-Baden & Howell-Major, 2013 (139).

The purpose of this study was to evaluate the success of the Lewis Central High School 1:1 Chromebook initiative. The Lewis Central initiative began in 2013 and included providing a Chromebook computer to all Lewis Central High School students and staff. This evaluation replicated a study by Dr. Don Johnson regarding implementation of a technology initiative within the Fort Calhoun Community Schools. The resulting data could enable the Lewis Central Community School District to implement future school-wide initiatives in a more effective and efficient manner. The research findings will be reported to the school board, administration, Phi Delta Kappa, and District Leadership Team (DLT). The research findings could be used as a guide for modification and adaptation of this school-wide initiative for district school improvement. Results of questionnaires completed by students, parents, and staff were used to formulate all conclusions. In addition, the performance data for students in high school over a 5-year period was compared as a vehicle to consider the 1:1 Chromebook initiatives' relationship to student performance at Lewis Central High School.

Design

This study, generating both inferential and descriptive data, consisted of a cross-sectional survey to examine the opinions of Lewis Central High School parents, staff, and students. Cross-sectional studies examine practices, opinions, beliefs, and current attitudes about a particular topic given a specific group of individuals (Creswell, 2011). Because only two years have passed since the 1:1 Chromebook initiative was

implemented, a cross-sectional design served as the best tool to evaluate current practice and use. The survey consisted of stakeholders associated with Lewis Central High School in Council Bluffs, Iowa. Lewis Central High School serves approximately 975 students in grades 9-12.

To evaluate the 1:1 Chromebook initiative, there were five Overarching Questions that were the primary focus for the study. Within each of these questions were individual and more specific questions that addressed specific topics within each Overarching Question. Specific questions were used to formulate individual survey questions for each stakeholder using language, structure, and verbiage that was specific for parents, teaching staff/administration, and students. The Overarching Questions were as follows:

- What are the staff members' perceptions regarding the implementations of the 1:1 Chromebook initiative?

- Does the perception regarding the implementation of the Chromebook initiative differ based upon years of experience?

- What are the students' perceptions regarding the implementation of the 1:1 Chromebook initiative?

- What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?

- How did the 1:1 initiative relate to student performance at Lewis Central High School?

Michael Scriven noted a list of nearly 60 terms for evaluation that applied to context, which included adjudge, appraise, analyze, assess, critique, examine, grade, inspect, judge, rate, rank, review, score, study, test, and so on (cited in Patton, 2010, p.7).

In the formative years of evaluation, Patton defined evaluation as judging the worth or merit of something. In his seminal paper, "The Methodology of Evaluation," Patton argued that evaluation has a single goal or purpose: to determine the worth of merit of whatever is being evaluated, including the merit and worth of a specific object (Scriven, 2005).

Developmental evaluation must "offer questions that connect with the ideas, language, and framework of the innovators with whom you're working" (Patton, 2010, p 228). "Developmental evaluation is a way of being useful in an innovative setting where goals are emerging and changing rather than predetermined, and fixed time periods are fluid and forward-looking rather than artificially imposed by external deadlines, and the purpose is learning, innovation, and change rather than external evaluation (Patton, 2010, p. 318). "Developmental evaluation supports learning to inform action that makes a difference" (Patton, 2011, p.11). Through this research, the definitions of program evaluation and developmental evaluation are applied to the data gathered from stakeholders who have encountered various experiences related to the 1:1 Chromebook initiative at Lewis Central High School.

Research Questions

The research questions below were synthesized through various screens to determine the overall usefulness and effectiveness as a means to carry out this study. Creswell, (2011) advocates for "strategies for good question construction," as it helps to create "clear language...posing questions that are applicable to all participants" (p. 385). As the Lewis Central and UNO teams worked to modify the existing instruments from the Fort Calhoun team, careful consideration about all stakeholders, outcomes, and

perspectives was considered in development of the evaluation chart later in this document as adapted from Fitzpatrick, Worthen, and Sanders, 2011.

Overarching Questions 1 through 4 are the corresponding Research Questions that were the genesis for the three research surveys to be administered to staff, students, and parents. The review of student performance data related to Overarching Question #5 and its corresponding research questions.

Overarching Question #1: What are the staff members' perceptions regarding the implementations of the 1:1 Chromebook Initiative?

1.1   What is the percent of staff who believe the 1:1 program is good for staff?

1.2   Did the staff at Lewis Central believe they were provided enough professional development to make the 1:1 initiative work?

1.3   How often do staff utilize Chromebooks in their daily lesson planning?

1.4   What percent of staff believe the implementation process was done on a reasonable timetable?

1.5   Has there been adequate ongoing professional development to properly educate staff during the Chromebook implementation?

1.6   What percentage of staff believe that students are more engaged in their own learning progress because of the 1:1 Chromebook program?

1.7   What percentage of staff felt that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time?

1.8   What percentage of staff would recommend that other school districts utilize the 1:1 Chromebook program for student learning?

1.9   What suggestions would staff have for school districts considering implementing

the Chromebook program?

1.10   Qualitative, open-ended response from Lewis Central High School staff.

Overarching Question #2: Does the perception regarding the implementation of the

Chromebook initiative differ based upon years of experience?

2.1   Does the perception of the staff who believe the 1:1 program is effective for

student learning differ based upon years of experience?

2.2   Does the perception of whether the staff received adequate professional training

for implementation of the 1:1 initiative differ based on years of experience?

2.3   Does the percentage of staff who utilize the Chromebook in their daily lesson

planning differ based upon years of experience?

2.4   Does the percentage of staff who believe there was a reasonable timetable for the

implementation of the 1:1 program differ based upon years of experience?

2.5   Does the feeling that the staff received ongoing professional development to

adequately prepare their students differ based upon years of experience?

2.6   Does the percentage of staff who believe students are more engaged in their own

learning because of the Chromebook program differ based upon years of experience?

2.7   Does the percentage of staff who believe there are adequate rules and guidelines

in place to keep students from misusing their Chromebooks during school time differ

based upon years of experience?

2.8   Does the percentage of staff who would recommend that other schools utilize the

1:1 Chromebook program for student learning differ based upon years of experience?

Overarching Question #3: What are the students' perceptions regarding the implementation of the 1:1 Chromebook initiative?

3.1   What percent of the students believe that their technology use skills improved with the implementation of the Chromebook program?

3.2   What percent of time are students using the Chromebook in an academic versus non-academic way?

3.3   Do the students believe the teachers are incorporating the Chromebook into their instruction on a regular basis?

3.4   Do the students perceive specific classes/subject areas as more engaging because of the use of the Chromebook in the delivery of instruction?

3.5   Do the students feel they learn more with the Chromebooks?

3.6   What additional Chromebook training would be helpful to students now?

3.7   If another technology were introduced to students at Lewis Central, what changes would they make?

3.8   Do the students believe they are better able to access information after the Chromebook implementation?

Overarching Question #4: What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?

4.1   How often do parents see their students using the Chromebook at their homes in an educational way?

4.2   What percent of time do parents see their student using the Chromebook in an academic versus non-academic way?

4.3   Do parents believe the Chromebook is helping their students learn?

4.4   Do parents believe the Chromebook is helping prepare their student for the future?

4.5   Qualitative, open-ended response from parents.

4.6   Do parents have enough information about how the 1:1 Chromebook initiative operates?

Overarching Question #5: How did the 1:1 initiative relate to student performance at Lewis Central High School?

5.1   How have the attendance percentages at Lewis Central High School changed since the Chromebook initiative?

5.2   How have students' composite ACT scores changed since the Chromebook initiative?

5.3   How have 4-year cohort graduation rates changed since the implementation of the 1:1 initiative?

Instrumentation

The survey questions were an adaptation of the doctoral research conducted by Dr. Don Johnson at Fort Calhoun Community Schools and were further developed by three members of the University of Nebraska Omaha faculty, and members of the Lewis Central High School staff and administration. The first researcher-designed survey was administered to the staff of Lewis Central High School. A second researcher-designed questionnaire was administered to the ninth through twelfth-grade students who participated in the 1:1 Chromebook program. A third researcher-designed survey was administered to parents of ninth through twelfth-grade students. In addition, student performance data on attendance and achievement was accessed from the PowerSchool

data system utilized by Lewis Central High School and the researcher examined trends across time in relationship to the implementation of the 1:1 Chromebook initiative and the survey results.

The questions utilized in the surveys centered on the following: (1) adequacy of the rules and guidelines, (2) amount of utilization of the Chromebooks in daily experiences, (3) implementation timeline, (4) professional training, and (5) perception regarding the success of the program for increasing student learning and achievement. For analysis purposes, the researcher also collected demographic information regarding years of experience to give a clearer picture of the whole implementation program.

There were three surveys administered during this study. The first survey examined student views, and was mailed electronically to 825 student users who were enrolled and in good standing at Lewis Central High School during spring of 2015. This survey included 12 Likert-scale study questions and two optional short answer responses which allowed for reflection and are located in Appendix D in this study. The second survey examined parent views and was mailed electronically to 1,131 parent users with students enrolled and in good standing at Lewis Central High School during spring of 2015 (for whom email addresses were available). This survey included four Likert-scale study questions and two optional short answer responses that allowed for reflection and are located in Appendix E in this study. The third survey examined Lewis Central High School staff views, and were mailed electronically to 80 staff users who were either teachers, cooks, custodians, school nurse staff, or administration at Lewis Central High School during spring of 2015. This survey included nine Likert-scale study questions and

two optional short answer responses which allowed for reflection and are located in Appendix F in this study.

For purposes of this study, extensive revisions and research went into formulating individual research questions through two educator groups. The first group consisted of members of the Education Leadership Department at the University of Nebraska Omaha, including Dr. Kay Keiser, Dr. Jill Russell, Dr. Peter Smith, and Dr. Elliott Ostler. The second group consisted of Lewis Central High School staff members Brian Johnson, Sara Langdon, Rob Saucey, Lori Jasa, Kim McLaughlin, Dr. Joel Beyenhof, Todd Johnson, and four additional student assistants. These individuals' proofread questions, checked for grammar and audience-specific language, and took practice surveys to ensure the evaluation/data synthesis practices utilized by the program *Survey Monkey* were functioning properly. Only after the survey passed through the Lewis Central High School staff, administration, students, and the University of Nebraska Omaha teams were questions administered to Lewis Central High School stakeholders for research purposes.

Creswell, 2011, would advocate for a reduction in measurement error, using a good instrument with clear, unambiguous questions and response options. Johnson (2013) stated that a weakness of his study was the use of both four and five response option formats to multiple choice questions. This study made use of a consistent format in order to improve upon that weakness. The surveys were sent to all stakeholders at Lewis Central High School, with the intent of reducing sampling error, as a large sample was selected from the population (Creswell, 2011), using the questions parameters below.

The questions regarding professional training referred to the adequacy of both start-up instruction and transitions into ongoing education as the implementation of the program developed.

The questions regarding perceived success of the Chromebook program were used to measure both the perception of worth and the engagement of students and staff using the 1:1 Chromebook program.

The implementation timetable questions referred to the sequence of activities and events that helped the district ensure the launch of the Chromebook initiative was successful.

The questions regarding the use of Chromebooks in the classroom by individual staff members helped provide a vision into the depth of implementation by years of teaching experience.

The questions regarding sufficiency of rules and regulations were used to give the Lewis Central Schools a perception of how stakeholders felt the Chromebook was working for all students. These results could also be used by the district to evaluate the current practices being used through internal filtering and a re-examination of school policies for rules and regulations.

Overarching questions number 1, number 3, and number 4 are more quantitative in nature and were analyzed using descriptive statistics while looking for themes and patterns. Overarching question 2 was also qualitative, but statistics of a correlational nature were used to evaluate this data. Overarching question number 5 referred to student performance in relation to the 1:1 initiative.

Reliability and Validity

As mentioned previously, there were three primary teams of educators who came together to formulate the questions used in this specific program evaluation: the Fort Calhoun team, the UNO Team, and the Lewis Central team. This review by professionals helped assure validity of the surveys.

To maximize educational technology's benefits for student learning, organizational leaders must understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011). Through surveying Lewis Central High School parents, students, staff, and review of student performance data, we examined the benefits of this learning tool and how it contributed to the use of technology in students' lives and in their achievement. The data from the surveys comprised the central findings of this study. However, student performance data from 2010 to 2015 addressed the following variables: ACT scores, Iowa Assessment scores, and attendance rates. This data was reviewed in light of the survey findings through Overarching Question 5.

Figure 5 was adapted from Fitzpatrick, et al., (2011), p. 357. It presents the evaluation plan for this study. The surveys were administered to staff, students, and parents via electronic mail in the spring of 2015.

Figure 5. Sample Worksheet for Summarizing an Evaluation Plan

Evaluation Questions	Information Required	Information Source	Methods of Collecting Information	Information Collection: To whom, how and when	Analysis	Interpretations	Reporting: To whom, how and when
Overarching Question #1: What are the staff, perceptions regarding the implementations of the 1:1 Chromebook Initiative?	Teacher perceptions as gathered by Likert Scale survey information.	Lewis Central High School Staff	Staff 1:1 Chromebook Survey.	Survey Monkey Survey distributed electronically on May 20, 2015 during Professional Development time at Lewis Central High School, collected for 1	Summary of data direct from the Survey Monkey Results	Based on what the majority of teacher/staff responses, which guided discussion in Chapter 5.	Reported to Phi Delta Kappa during a poster session, the LCHS Building Leadership Team and the Lewis Central School Board via electronic presentation during the Spring of 2016.
Overarching Question #2: Does the perception regarding the implementation of the Chromebook initiative differ based upon years of	Staff perceptions as gathered by Likert Scale survey information and demographic information for staff gathered by the survey.	Lewis Central High School Staff	Staff 1:1 Chromebook Survey.	Survey Monkey Survey distributed electronically on May 20, 2015 during Professional Development time at Lewis Central High School, collected for 1	Descriptive Statistics and Chi square with cross tabs for Likert scale items and qualitative treatment for open-ended comments	Examining trends that exist based upon age, which drove discussion and results in Chapter 5.	Reported to Phi Delta Kappa during a poster session, the LCHS Building Leadership Team and the Lewis Central School Board via electronic presentation during the Spring of 2016
Overarching Question #3: What are the students perceptions regarding the implementation of the 1:1 Chromebook initiative?	Student perceptions as gathered by Likert Scale survey information.	Lewis Central High School Students	Student 1:1 Chromebook Survey.	Survey Monkey Survey distributed electronically on May 20, 2015 during school class time at Lewis Central High School, collected for 1 week.	Summary of data direct from the Survey Monkey Results	Based on what the majority of student responses, which guided discussion in Chapter 5.	Reported to Phi Delta Kappa during a poster session, the LCHS Building Leadership Team and the Lewis Central School Board via electronic presentation during the Spring of 2016
Overarching Question #4: What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?	Parent perceptions as gathered by Likert Scale survey information.	Lewis Central High School Parents and Guardians	Parent 1:1 Chromebook Survey	Survey Monkey Survey distributed electronically on May 20, 2015 at Lewis Central High School, collected for 1 week.	Summary of data direct from the Survey Monkey Results	Based on what the majority of parent responses, which guide discussion in Chapter 5.	Reported to Phi Delta Kappa during a poster session, the LCHS Building Leadership Team and the Lewis Central School Board via electronic presentation during the Spring of 2016
Overarching Question #5: How did the 1:1 initiative relate to student performance at Lewis Central High School?	ACT Scores, Iowa Assessment Scores and attendance data	PowerSchool data systems at Lewis Central High School	Data collection from PowerSchool Information Systems	Data gathered from PowerSchool data systems at Lewis Central High School during spring of 2015.	Summary of data direct from Power-School Data Systems	Based upon trends and achievement results achieved comparing scores and results from 2013-2015.	Reported to Phi Delta Kappa poster session, the LCHS Building Leadership Team and the Lewis Central School Board via electronic presentation.

Subjects

The survey populations included 825 students, 1151 parents, and 80 Lewis Central High School staff members. All surveys were administered through *Survey Monkey*. Students were prompted to use their Chromebooks to take an electronically administered survey through *Survey Monkey* (Appendix D) provided them during the school day during a shortened class period with permission of their instructors. A total of 825 copies of the survey were distributed through an email, delivered to their inbox with a brief introduction letter (Appendix A), and with responses collected.

At the time of student registration each school year, parents, and guardians are given the opportunity to provide current demographic information for communication purposes from the school. This demographic information is collected using a database known as PowerSchool for the purposes of stakeholder communication, data tracking, reporting, and regular communication. A primary form of communication from the school to parents using PowerSchool is the use of email from teachers and administrators. During the spring of 2015, through the use of an email communication/introduction (Appendix B) provided them by the researcher and the head principal, parents were prompted to respond to a *Survey Monkey* survey (Appendix E). Responses to the survey were collected and analyzed.

There were 80 individuals on staff at Lewis Central High School during the spring of 2015. Teachers/administrators on staff ranged in experience from one to 32 years of teaching experience. While not all current staff were employed by the district during the rollout of the Chromebook in 2013, all present teaching staff members were exposed to the Chromebook initiative through Professional Development, classroom interaction, and

student use as employees of the Lewis Central District. During the spring of 2015,

teaching staff/administrators were prompted to use technology to take an electronically

administered survey from the researcher and head principal (Appendix F) provided them

during Professional Development. Teaching staff/administration responses to the surveys

were collected and analyzed as a short description of the survey was given verbally. An

email was delivered to staff/administration inboxes (Appendix C), and responses were

collected while the researcher stepped away to allow for any questions. The principal

was present to answer questions during the time of the survey.

Data Collection

Data collection was completed in two ways. First, the researcher used data

generated from electronic questionnaires completed by Lewis Central High School

faculty and building level administrators, as well as Lewis Central High School parents

and students. The questionnaire was administered at the completion of the second full

year of implementation.

Second, the researcher accessed performance data over time from the Power

School data system and various presentations assembled by the Lewis Central High

School building principal.

Data Analysis

Descriptive statistics (frequency, percentage, and measures of central tendency)

were generated for each item of each survey. The responses to all open-ended questions

were transcribed and reviewed for themes and patterns. For those open-ended questions

with interesting responses, the Survey Monkey word map was generated. In addition, for

the staff survey, the years of experience item was compared to all other staff items to see

if that variable related to the responses to the remaining items using chi-square. Survey results were then examined in relation to the student performance data (attendance, achievement) over time. This analysis did not presume cause and effect, but was considered in the interpretation.

Presentation of Findings and Interpretation

In Chapter 4, the data from the Likert-scale questions is presented in the form of answers to the research/evaluation questions. In Chapter 5, possible interpretations are presented. This includes statements of significance from stakeholders being used to verify or deny results as they may exist in relationship to quantitative data or research-based outcomes of the impact of the 1:1 Chromebook Initiative, and a comparison of the student performance data with the survey findings.

Many factors in a school can contribute to student achievement, including change of administration and teaching staff. While both changes occurred before and after the 1:1 Chromebook initiative, the research narrowed the student performance trends to include the following variables: ACT scores, Iowa Assessment scores, and attendance rates. This information was not intended to determine cause and effect per student performance, but rather, was considered in interpreting the survey findings.

Summary

The methodology used in this study was an adaptation of survey research completed by the Fort Calhoun Community Schools with input from Lewis Central Community School staff, University of Nebraska Omaha staff, and the researcher. The methodology was based on the principles of the Developmental Evaluation Theory of Michael Patton. The Developmental Evaluation Theory is a newer theory, specifically

with the ties to education technology. The survey research was conducted using *Survey Monkey* with qualitative and quantitative results presented in Chapter 4. The data was analyzed through descriptive statistics and chi square with cross tabs for Likert scale items, and qualitative treatment for open-ended comments. The student performance trend data was reviewed to supplement interpretation of the survey results. Information from this research could be utilized by the Lewis Central Community Schools and other schools as new initiatives are implemented throughout the school systems. Survey results will be available to all stakeholders in the Lewis Central Community Schools as well as neighboring schools wishing to examine the process of the 1:1 Chromebook initiative implementation.

Chapter 4. Results

This study utilized Patton's Developmental Evaluation Model to assess the implementation of the 1:1 Chromebook initiative. Generating both inferential and descriptive data, this study consisted of a cross-sectional survey to examine the opinions of Lewis Central High School parents, staff, and students. "Developmental evaluation is a way of being useful in an innovative setting where goals are emerging and changing rather than predetermined, fixed time periods are fluid and forward-looking rather than artificially imposed by external deadlines, and the purpose is learning, innovation, and change rather than external evaluation" (Patton, 2010, p. 318). Gamble (2008) reinforces this idea through the belief that developmental evaluation is the most suitable means to evaluate on-going initiatives as it supports a process of innovation in ways that enable development, modification, and exploration.

Purpose of the Study

The purpose of this study is to evaluate the effectiveness and implementation of the Lewis Central High School 1:1 Chromebook initiative. This study replicated a similar undertaking by Dr. Don Johnson from Fort Calhoun Community Schools, which worked to identify and analyze the necessary data and use it to determine the success of the implementation process used for a 1:1 Ipad program in a senior high school. As the Lewis Central and UNO teams worked to modify the existing instruments from the Fort Calhoun team, careful consideration about all stakeholders, outcomes, and perspectives was considered. Use of this data will enable the Lewis Central Community Schools to consider the present state of Chromebook use for the delivery of instruction and how this

1:1 rollout is affecting student achievement and technology-skill readiness for post-graduation roles.

To evaluate the 1:1 Chromebook initiative, there were five Overarching Questions that were the primary focus for the study. Specific questions were used to formulate individual survey questions for each stakeholder using language, structure, and verbiage that was specific for parents, staff, and students. The Overarching Questions were as follows:

- What are the staff members' perceptions regarding the implementations of the 1:1 Chromebook initiative?
- Does the perception regarding the implementation of the Chromebook initiative differ based upon years of experience?
- What are the students' perceptions regarding the implementation of the 1:1 Chromebook initiative?
- What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?
- How did the 1:1 initiative relate to student performance at Lewis Central High School?

The survey populations included 825 currently enrolled students in grades nine through twelve at Lewis Central High School, 1151 parents and guardians with current emails who have students enrolled at Lewis Central High School during the time of the survey, and 80 Lewis Central High School staff members who were either support staff, administrators, or teachers. Of the 825 students who were surveyed, 312 responses (37.82% response rate; 95% confidence level; 5% margin of error) were collected. Of the

1151 parents surveyed, 117 responses (10.17% response rate; 95% confidence level; 9%

margin of error) were collected, and of the 80 staff members who were surveyed, 50

responses (62.5% response rate; 95% confidence level; 9% margin of error) were

collected. All surveys were administered through *Survey Monkey* for the purpose of

anonymity during the spring of 2015, with a period of three weeks given to answer the

survey for all three groups of stakeholders. Many households had emails sent to more

than one parent, resulting in a lower response rate as one parent may have responded as

the voice for the entire household. Implications for confidence level and margin of error

could be skewed slightly because of the low response rate (10.17%) for the parent survey

group.

Research Results

Frequencies and percentages were generated for every Likert-scale item on all

three surveys. Chi squares were calculated for like items, and responses to open-ended

questions were assembled. All tables referred to in the narrative can be found at the end

of Chapter 4 narrative in sequential order. The numbering of the tables aligns with the

research question numbering. Following are the results/data for all research questions

presented in the order of the three surveys: staff, students, and parents.

Overarching Question #1: What are the staffs perceptions regarding the

implementations of the 1:1 Chromebook initiative?

Research Question 1.1

What is the percentage of staff who believe the 1:1 program is good for teachers?

As indicated in Table 1.1, there is generally an agreement among staff that the Chromebook initiative is good for teachers at Lewis Central High School. Out of the 50 staff responding to the survey, 17 staff members (34.00%) strongly agree the Chromebook initiative is good for teachers, 22 staff members (44.00%) agree the Chromebook initiative is good for teachers, and eight staff members (16.00%) indicated they were neutral. A total of three staff members disagree that it is good for teachers, with two teachers (4.00%) disagreeing, and one staff member (2.00%) strongly disagreeing that the Chromebook initiative is good for teachers at Lewis Central High School. Illustration shown in Table 1.1.

Research Question 1.2

Did the staff at Lewis Central believe they were provided enough professional development to make the 1:1 initiative work?

As indicated in Table 1.2, slightly over half of the staff agree that there was sufficient professional development for training and preparation before students were issued the Chromebooks. Out of the 50 staff responding to the survey, nine staff members (18.00%) strongly agree that there was sufficient professional training, 17 staff members (37.00%) agree that there was sufficient professional training, and 12 staff members (24.00%) were neutral. A total of 12 staff members disagree that there was sufficient professional training with seven staff members (14.00%) disagreeing, and five staff members (10.00%) strongly disagreeing that there was sufficient professional training and preparation before students were issued the Chromebooks in 2013. Illustration shown in Table 1.2.

Research Question 1.3

How often do staff utilize Chromebooks in their daily lesson planning?

As indicated in Table 1.3, the amount of time teachers spent utilizing the Chromebook for students into their lesson plans is as follows. Out of the 50 staff responding to the survey, 14 staff members (28.00%) incorporate the Chromebook into their lesson plans daily, 19 staff members (38.00%) incorporate the Chromebook into their lesson plans a few times a week, and five staff members (10.00%) indicated that they incorporate the Chromebook into their lesson plans once a week. A total of seven staff members (14.00%) incorporate the Chromebook into their lesson plans once every other week and five staff members (10.00%) incorporate the Chromebook into their lesson plans once every month. Illustration shown in Table 1.3.

Research Question 1.4

What percentage of staff believe the implementation process was done in a reasonable timeline?

As indicated in Table 1.4, there is majority agreement among staff that the Chromebook implementation was carried out using a reasonable timeline. Out of the 50 staff responding to the survey, nine staff members (18.00%) strongly agree the Chromebook implementation was carried out using a reasonable timeline, 28 staff members (56.00%) agree the Chromebook implementation was carried out using a reasonable timeline, and five staff members (10.00%) indicated they were neutral. A total of eight staff (16.00%) disagree, as they indicate the Chromebook implementation was not carried out using a reasonable timeline. Illustration shown in Table 1.4.

Research Question 1.5

Has there been adequate ongoing professional development to properly educate staff

during the Chromebook implementation?

As indicated in Table 1.5, there is a slight majority of staff who believe that there

has been adequate ongoing professional development to properly educate staff since the

Chromebook implementation. Out of the 50 staff responding to the survey, six staff

members (12.00%) strongly agree that there has been adequate ongoing professional

development to properly educate teachers since the Chromebook implementation, 16 staff

members (32.00%) agree, and 14 staff members (28.00%) indicated they were neutral. A

total of 14 staff members disagree that there has been adequate ongoing professional

development to properly educate staff since the Chromebook implementation with 11

teachers (22.00%) disagreeing, and three staff members (6.00%) strongly disagreeing that

there has been adequate ongoing professional development to properly educate staff since

the Chromebook implementation. Illustration shown in Table 1.5.

Research Question 1.6

What percentage of staff believe that students are more engaged in their own learning

progress because of the 1:1 Chromebook program?

As indicated in Table 1.6, there is disagreement among staff concerning whether

or not students are more engaged in their own learning progress because of the 1:1

Chromebook initiative. Out of the 50 staff responding to the survey, five staff members

(10.00%) strongly agree students are more engaged in their own learning progress

because of the 1:1 Chromebook initiative, and 17 staff members (34.00%) agree students are more engaged in their own learning progress because of the 1:1 Chromebook initiative, yet 17 staff members (34.00%) remained neutral. A total of 11 staff members disagree that students are more engaged in their own learning progress because of the 1:1 Chromebook initiative with nine teachers (18.00%) disagreeing, and two staff members (4.00%) strongly disagreeing that students are more engaged in their own learning progress because of the 1:1 Chromebook initiative. Illustration shown in Table 1.6.

Research Question 1.7

What percentage of staff felt that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time?

As indicated in Table 1.7, a number of the staff did not feel that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time. Out of the 50 staff members responding to the survey, one staff member (2.00%) strongly agreed that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time; 13 staff members (26.00%) agree that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time, and 11 staff members (22.00%) remained neutral. A total of 25 staff members disagree that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time with 16 staff members (32.00%) disagreeing and nine staff members

(18.00%) strongly disagreeing that at the time of the launch there were adequate

safeguards, procedures, and guidelines in place to keep the students from misusing the

Chromebooks during school time. Illustration shown in Table 1.7.

Research Question 1.8

What percentage of staff would recommend that other school districts utilize the 1:1

Chromebook program for student learning?

As indicated in Table 1.8, there was a majority of staff members who would

recommend that other school districts utilize the 1:1 Chromebook program for student

learning. Out of the 50 staff responding to the survey, 11 staff members (22.00%)

strongly agree that other school districts should utilize the 1:1 Chromebook program for

student learning; 19 staff members (38.00%) agree, and 13 staff members (26.00%)

indicated that they were neutral. A total of seven staff members (14.00%) disagree that

other school districts should utilize the 1:1 Chromebook program for student learning.

Illustration shown in Table 1.8.

Research Question 1.9

What suggestions would staff have for school districts considering implementing a 1:1

Chromebook program?

This was an open-ended question. As indicated in table 1.9, staff had common

terms in their responses to this question, including the top three terms which were

"teachers" with eight responses (32.00%), "technology" with five responses (20.00%),

and "classroom management" with three responses (12.00%) as indicated in Table 1.9.

This indicates that teachers would suggest districts should spend more time with merging

the technology with more training/emphasis on classroom management. A total of 25

responses were gathered, and 25 respondents skipped the question. A portion of the comments that had a common theme among all responses are offered below:

- I worked at another school that also did a 1:1 initiative prior to working here. I felt that my other school gave a lot more teacher preparation in setting up Google Classrooms and sharing useful apps prior to passing out the Chromebooks. Teachers were given a few months to get used to using them before students received their Chromebooks.

- I am not certain that Chromebooks are the appropriate technology for integrating technology into the learning of our students. Even though the bang for the buck is strong, I would recommend the exploration of other technologies to serve as the best learning tool.

- Making sure the network is supported. It was INCREDIBLY frustrating when we had network problems. It's not okay to have the network down for hours at a time when we've planned to use technology with students.

- I think it would be worth the cost to implement a 1:1 program with a better quality device - i.e. laptop or MacBook. I would also love to see a classroom management program where students would have to log in through me and then I could monitor and disable their device.

- Make sure to focus on teaching the teachers on how 1:1 does not make teaching completely different. All it does is enhance current teaching.

- The 1:1 initiative is valuable, but the Chromebooks we have are cheaply built, small, and do not hold a charge well. What's more is that many students do not have chargers, so they must constantly borrow the

teacher's or a peer's. Another more durable device would be preferable. I don't think these models will last more than another year.

Research Question 1.10

Qualitative, open-ended response from Lewis Central High School staff.

The question posed to staff was, "What other comments do you have about the 1:1 Chromebook Initiative?" This was an open-ended question. As indicated in Table 1.10, staff had common terms in their responses to this question, including the top three terms which were "students" with nine responses (42.86%), "Chromebooks" with seven (33.33%) responses, and "needs" with four (19.05%) responses as indicated in Table 1.10. This would indicate that staff had a majority of comments that centered on how the Chromebook is/could be used to meet the needs of students. A total of 21 responses were gathered, and 29 respondents skipped the question. Comments that had a common theme among several responses are offered below:

- I would like to see the school PUSH students/parents to get the insurance in case their original Chrome is "broken" for some reason... because many students are not able to work on the computer and I still have to make paper copies on the fly/middle of class. As a result, I have not required the use of the Chrome... Have resorted to requiring paper/pencil and my projection of my web presence on the board.

- Good amount of organization for the roll out. Infrastructure has come a long way. Student helpdesk has been helpful to handle the large amount of maintenance needed.

- Some of our most at-risk students cannot manage having technology in front of them. It becomes addictive and then I have had to take the Chromebook away and ask for alternative assignments.

- The Chromebooks are nothing but a distraction for the kids in class to take away from learning. I was new to the district after the initiative and received no training on using them.

- Again, the models we own are cheaply built. They feel cheap, the screens break easily, and less than two years into the initiative, the devices show serious signs of wear. Some of this is due to student misuse, but a lot of it is due to the design and materials used in the Acer model. It's important to note that it's easy for students to "check out" using these devices as well. Those who don't teach will say that teachers should be monitoring use. That's true, but if students are working online and helping individual students or small groups, they cannot see what every student is doing at all times. Many of them toggle back and forth between YouTube or Netflix and Google Classroom, Docs, etc. There are times when paper and pen is more efficacious than a Chromebook.

- Students should be given not only the same Chromebook but also the same bag. Some students turned in a bag that was in great shape and were then returned a bag that smelled of smoke, full of pet hair, ripped, etc.

- Not having some printing really slows down things. Business classes need to adjust to allow Workplace and Consumer Survival Skills to use Chromebooks.

Overarching Question #2: Does the perception regarding the implementation of the Chromebook initiative differ based upon years of experience?

Research Question 2.1

Does the perception of the staff who believe the 1:1 program is effective for student learning differ based upon years of experience?

Staff beliefs about effectiveness of the Chromebook 1:1 program regarding student learning does not appear to vary in relationship to years of experience.

Research Question 2.2

Does the perception of whether the staff received adequate professional training for implementation of the 1:1 initiative differ based on years of experience?

Staff views about adequacy of professional training to support implementation of the 1:1 Chromebook program does not vary significantly in relation to years of experience.

Research Question 2.3

Does the percentage of staff who utilize the Chromebook in their daily lesson planning differ based upon years of experience?

Staff reporting on use of the Chromebook in daily lesson planning did not vary significantly in relation to years of experience.

Research Question 2.4

Does the percentage of staff who believe there was reasonable timeline for the implementation of the 1:1 program differ based upon years of experience?

Staff reporting on the belief there was a reasonable timeline for the implementation of the 1:1 program did not vary significantly in relation to years of experience.

Research Question 2.5

Does the feeling that the staff received ongoing professional development to adequately prepare their students differ based upon years of experience?

Referring to Table 2.5, the columns indicate the degree to which staff feel they received ongoing professional development to adequately prepare their students based upon zero to 15 years of experience (24 staff members) and 16 or more years of experience (26 staff members). While the most frequent responses was to agree or remain neutral about whether the staff feel they received ongoing professional development to adequately prepare their students, there was a statistically significant difference between the two groups with x^2(4df, n = 50) = 10.75, p < .05. As noted, four cells (40.00%) have expected count of less than five, with the minimum expected count of 1.44. The staff with zero to 15 years of experience were more likely to agree (10) or strongly disagree (3), while the staff with 16 or more years of experience were more likely to strongly agree (6) and did not strongly disagree (0). However, the distributions for both groups when merging agree/strongly disagree and when merging disagree/strongly disagree are fairly close.

Research Question 2.6

Does the percentage of staff who believe students are more engaged in their own learning because of the Chromebook program differ based upon years of experience?

Staff reporting on beliefs concerning student engagement in their own learning because of the Chromebook program did not vary significantly in relation to years of experience.

Research Question 2.7

Does the percentage of staff who believe there are adequate rules and guidelines in place to keep students from misusing their Chromebooks during school time differ based upon years of experience?

Staff reporting on adequate rules and guidelines in place to keep students from misusing their Chromebooks during school time did not vary significantly in relation to years of experience.

Research Question 2.8

Does the percentage of staff who would recommend that other schools utilize the 1:1 Chromebook program for student learning differ based upon years of experience?

Referring to Table 2.8, the columns indicate the degree to which staff would recommend that other schools utilize the 1:1 Chromebook program for student learning based upon zero to 15 years of experience (24 staff members) and 16 or more years of experience (26 staff members). While the most frequent responses were to agree or remain neutral about whether the staff would recommend that other schools utilize the 1:1 Chromebook program for student learning, there was a statistically significant difference between the two groups with x^2(3df, n = 50) = 11.23, p < .05. As noted, two cells (25.00%) have expected count of less than five, with the minimum expected count of 3.36. The staff with zero to 15 years of experience were more likely to strongly agree (nine) or disagree (eight), while the staff with 16 or more years of experience were more

likely to agree (13) and disagree (six). Neither staff with zero to 15 nor the staff with 16

or more years of experience elected to strongly disagree that they would recommend that

other schools utilize the 1:1 Chromebook program for student learning, and therefore, the

column was omitted from Table 2.8.

Overarching Question #3: What are the students' perceptions regarding the

implementation of the 1:1 Chromebook initiative?

Research Question 3.1

What percentage of the students believe that their technology use skills improved with the

implementation of the Chromebook program?

As indicated in Table 3.1, over half of the students believe that their technology

use skills improved with the implementation of the Chromebook program. Out of the

312 students responding to the survey, 45 students (14.42%) strongly agreed that their

technology use skills improved with the implementation of the Chromebook program,

136 students (43.59%) agreed, and 93 students (29.81%) indicated they were neutral. A

total of 23 students (7.37%) disagreed and 15 students (4.81%) highly disagreed with the

belief that their technology use skills improved with the implementation of the

Chromebook program. Illustration shown in Table 3.1.

Research Question 3.2

What percentage of time are students using the Chromebook in an academic versus non-

academic way?

As indicated in Table 3.2, there is strong agreement among students who believe

that they use their Chromebooks for primarily academic purposes a majority of the time.

Out of the 312 students responding to the survey, 100 students (32.05%) spend their use

of the Chromebook for 90% academic and 10% non-academic purposes, 97 students

(31.09%) spend their use of the Chromebook for 75% academic and 25% non-academic

purposes, 84 students (26.92%) spend their use of the Chromebook for 50% academic

and 50% non-academic purposes. A total of 22 students (7.05%) spend their use of the

Chromebook for 75% non-academic and 25% academic purposes, and nine students

(2.88%) spend 90% of their time for non-academic and 10% of their time for academic

purposes. Illustration shown in Table 3.2.

Research Question 3.3

Do the students believe teachers are incorporating the Chromebook into their instruction

on a regular basis?

Students were asked about frequency of Chromebook use in each of their classes

at Lewis Central High School. Each of the following summaries reflects the opinions of

the students as it relates to classes during their high school career. While not all high

school students have had exactly the same courses, students have had classes that fall

within each of the categories listed as part of their requirements to be a full time student

working toward a high school diploma.

Chromebook Frequency in English Classes

As indicated in Table 3.3.1, there is strong agreement among students about how

they use their Chromebooks during English classes. Out of the 312 students responding

to the survey, 129 students (41.35%) use their Chromebook in English classes daily, 111

students (35.58%) use their Chromebook in English classes a few times a week, and 21

students (6.73%) use their Chromebook in English classes once a week. A total of 31

students (9.94%) use their Chromebook in English classes once every few weeks, and 20

students (6.41%) never use their Chromebooks in English classes. Illustration shown in Table 3.3.1.

Chromebook Frequency in Math Classes

As indicated in Table 3.3.2, there is strong agreement among students about the Chromebook's lower level of use in Math classes. Out of the 312 students responding to the survey, 15 students (4.81%) use their Chromebook in Math classes daily; 21 students (6.73%) use their Chromebook in Math classes a few times a week, and 29 students (9.29%) use their Chromebook in Math classes once a week. A total of 112 students (35.90%) use their Chromebook in Math classes once every few weeks, and 135 students (43.27%) never use their Chromebooks in Math classes. Illustration shown in Table 3.3.2.

Chromebook Frequency in Science Classes

As indicated in Table 3.3.3, there is mixed agreement among students about their Chromebook use in Science classes. Out of the 312 students responding to the survey, 32 students (10.26%) use their Chromebook in Science classes daily; 98 students (31.41%) use their Chromebook in Science classes a few times a week, and 51 students (16.35%) use their Chromebook in Science classes once a week. A total of 77 students (24.68%) use their Chromebook in Science classes once every few weeks, and 54 students (17.31%) never use their Chromebooks in Science classes. Illustration shown in Table 3.3.3.

Chromebook Frequency in Social Studies Classes

As indicated in Table 3.3.4, there is mixed agreement among students about their Chromebook use in Social Studies classes. Out of the 312 students responding to the

survey, 130 students (41.67%) use their Chromebook in Social Studies classes daily, 66

students (21.15%) use their Chromebook in Social Studies classes a few times a week,

and 26 students (8.33%) use their Chromebook in Social Studies classes once a week. A

total of 38 students (12.18%) use their Chromebook in Social Studies classes once every

few weeks, and 52 students (16.67%) never use their Chromebooks in Social Studies

classes. Illustration shown in Table 3.3.4.

Chromebook Frequency in Arts Classes

As indicated in Table 3.3.5, there is agreement among students about their

Chromebook's lower level of use in Arts classes. Out of the 312 students responding to

the survey, 14 students (4.49%) use their Chromebook in Arts classes daily, 34 students

(10.90%) use their Chromebook in Arts classes a few times a week, and 34 students

(10.90%) use their Chromebook in Arts classes once a week. A total of 95 students

(30.45%) use their Chromebook in Arts classes once every few weeks, and 135 students

(43.27%) never use their Chromebooks in Arts classes. Illustration shown in Table 3.3.5.

Chromebook Frequency in Spanish Classes

As indicated in Table 3.3.6, there is agreement among students about their

Chromebook lower level of use in Spanish classes.   A total of 39 students (12.49%)

students use their Chromebook daily, 72 students (23.08%) use their Chromebooks a few

times a week, and 38 students (12.18%) use their Chromebook once a week. A total of

42 students (13.46%) use their Chromebook in Spanish classes once every few weeks,

and 34 students (10.90%) never use their Chromebooks in Spanish classes. Because

Spanish is not a graduation requirement, it is also noted that a sixth option existed on this

question, with 87 students (27.88%) reporting they have not had a Spanish class. Illustration shown in Table 3.3.6.

Chromebook Frequency in Other Electives

As indicated in Table 3.3.7, there is mixed opinion among students about their Chromebook use in Other Electives. Out of the 312 students responding to the survey, 29 students (9.29%) use their Chromebook in Other Electives daily, 76 students (24.36%) use their Chromebook in Other Electives a few times a week, and 58 students (18.59%) use their Chromebook in Other Electives once a week. A total of 95 students (30.45%) use their Chromebook in Other Electives once every few weeks, and 54 students (17.31%) never use their Chromebooks in Other Electives. Illustration shown in Table 3.3.7.

Research Question 3.4

Do the students perceive specific classes/subject areas as more engaging because of the use of the Chromebook in the delivery of instruction?

As indicated in Table 3.4, a majority of students chose to remain neutral or were in agreement about their perception of specific classes/subject areas as more engaging because of the use of the Chromebook in the delivery of instruction. Out of the 312 students responding to the survey, 49 students (15.71%) strongly agree that their classes/subject areas are more engaging with the implementation of the Chromebook program; 80 students (25.64%) agree, and 129 students (41.35%) indicated they were neutral. A total of 33 students (10.58%) disagree, and 21 students (6.73%) highly disagree with the belief that their classes/subject areas are more engaging with the implementation of the Chromebook program. Illustration shown in Table 3.4.

Research Question 3.5

Do the students feel they learn more with the Chromebooks?

As indicated in Table 3.5, a majority of students chose to remain neutral and a slight majority of students were in agreement about their perception of whether or not they learn more because of the use of the Chromebook in the delivery of instruction. Out of the 312 students responding to the survey, 36 students (11.54%) strongly agree they learn more when they use the Chromebook during class; 75 students (24.04%) agree, and 111 students (35.58%) indicated they were neutral. A total of 64 students (20.51%) disagree and 26 students (8.33%) %) strongly disagree with the idea that they learn more when they use the Chromebook during class. Illustration shown in Table 3.5.

Research Question 3.6

What additional Chromebook training would be helpful to students now?

Figure 3.6 is an Additional Chromebook Training Cloud Map that depicts the most frequent words and phrases represented in the student open-ended responses to this question. The larger words and phrases represent the most frequently used terms in the students open-ended responses. Comments that had a common theme among several responses are offered below:

Self-help issues with the Chromebook

- I think it'd be helpful to know how to solve some simple tech problems on my own without having to waste time and leave class.

- I think it would be helpful if we knew just the basics on how to fix it just in case something goes wrong and you can't get to the help desk. Sometimes you can't complete assignments because of the technology problems.

- We should have the knowledge to make basic repairs to our Chromebook, should they be needed.

- Perhaps simple maintenance things. Cleaning and how to get the mouse or screen to unfreeze.

- Learning how to type more efficiently, or problem solve on our own if an issue comes up rather than going straight to the tech office.

How to run apps or using the technology

- I feel that they should provide a class on operating the whole google account to allow students to better understand the technology that we use, in turn, that would help benefit us in our learning process.

- Making videos. That was definitely a tough one for me. I had no idea how to create a video, edit it, etc. so that wasted a class period in some classes.

- I heard that you can screenshot things on the computers, so I would want to know how to do that.

- Not so much training but it would be cool if there were apps or specific websites made just for our classes-like say math-so that if we had questions, we could ask them and get help or for a teacher to post videos for us to look at for references to help us complete homework assignments.

- One additional Chromebook training that would be helpful to me now, is how to use YouTube for certain classes. I know that in my speech class, we have to upload YouTube videos of our speeches onto our channel. It was difficult for me because I got frustrated with uploading a video.

- How to format. The formatting on these things is terrible for writing papers in MLA format because they do not have Microsoft Word. When writing papers, it is a major struggle with everything.

- I would like to be able to get to websites faster than making shortcuts because of all of the shortcuts that I have to make because of my classes.

- More of a chance to explain how you can tell good websites from bad websites.

Suggestions for making the initiative better:

- Well from experience, we had many problems with the Chromebooks when they were first introduced. I would make sure that whatever new technology you brought in you make sure it's going to work well. Yes, there will be problems with trying to figure it out, but make sure there are more positive things than negative.

- Find a core group of students that are proficient with technology and get buy-in from them. See that there are a sufficient amount of students to help the general student body with any technology needs.

- Pretty much I think we'd need a bigger talk about how careful we need to be with them. They break very easily. Also tell students not to be careless with the websites they get on in class because now we have so many websites that are blocked because kids are disrupting classroom time with games and online shopping, etc.

- I believe that all teachers should know how to deal with problems with the Chromebooks. Having to deal with a year of getting used to the new technology is expected, but it is frustrating when you get told to go to the tech office, and

when you go down to the tech office, they usually tell you they are busy or they

aren't there. Another issue is blocking every website. This hinders me,

personally and academically, to do school work. (A personal thing was I was

trying to be published and the website to get published was blocked.)

- If you slowly introduced the technology with the students and teach them how to

  use it properly, I believe you will have a better outcome in the long run.

- I would suggest that the technology is introduced slowly, starting with a small

  pool of students in each grade level to work out any kinks in the system. Then,

  the technology usage could be expanded to include the entire student population.

Research Question 3.7

If another technology were introduced to students at Lewis Central, what changes would

they make to the implementation process?

Figure 3.7 is an Another Technology Cloud Map that depicts the most frequent

words and phrases represented in the student open-ended responses to this question. The

larger words and phrases represent the most frequently used terms in the students open-

ended responses. Comments that had a common theme among several responses are

offered below:

Use the same format as the Chromebooks:

- Just the same way Chromebooks were introduced. Have a day where you go over

  how to use the technology, so people can then take the time to explore how to use

  it. Show off some of its neat features. Although it might have been boring sitting

  in Titan Times for two hours getting Chromebooks, it was definitely worth it!

- Just let the kids figure it out for themselves; most of us know more about the technology given to us than the adults giving it to us. Also allow more freedom and access to the tech desk for any questions that the students have.

- I think the rollout was pretty solid.

- I feel that the way that we introduced the Chromebooks at Lewis Central was a very smooth transition. If I were to change anything, I would say that we would have a test of some kind to make sure it would be a good idea.

Research Question 3.8

Do the students believe they are better able to access information after the Chromebook implementation?

As indicated in Table 3.8, a majority of students believe their ability to locate high quality information has improved with the implementation of the Chromebook program. Out of the 312 students responding to the survey, 40 students (12.82%) strongly agree their ability to locate high quality information has improved with the implementation of the Chromebook program; 114 students (36.54%) agree, and 120 students (38.46%) indicated they were neutral. The results indicate 26 students (8.33%) disagree and 12 students (3.85%) highly disagree with the belief that their ability to locate high quality information has improved with the implementation of the Chromebook program. Illustration shown in Table 3.8.

Research Question 3.9

Do the students perceive a difference in 1:1 usage in different classes?

As indicated in Table 3.9, students perceived Chromebook usage in different classes based upon their classroom experience in each subject. Table 3.9 depicts the

number of student responses for each category of Strongly Agree, Agree, Neutral, etc. Students concluded that they use their Chromebooks the most frequently in English and Social Studies Classes, and use their Chromebooks the least in Arts and Math classes. Students had mixed responses in Science, Spanish, and Other Electives, as they were inclined to agree that Chromebooks were used, but did not strongly agree. Not all students have taken a Spanish class, so the total number of responses for this question was answered by 225 students rather than 312 responses as gathered for the other class choices.

Overarching Question #4: What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?

Research Question 4.1

How often do parents see their students using the Chromebook at their homes in an educational way?

As indicated in Table 4.1, parents report a range of responses about their perception of the amount of time they see their child using the Chromebooks at home for educational purposes. Out of the 117 parents responding to the survey, 24 parents (20.51%) see their child use the Chromebook two or more times daily, 31 parents (26.50%) see their child use the Chromebook daily, and 42 parents (35.90%) parents see their child use the Chromebook a few times a week. A total of nine parents (7.69%) see their child use the Chromebook once a week and 11 parents (9.40%) see their child use the Chromebook once every few weeks. Illustration shown in Table 4.1.

Research Question 4.2

What percentage of time do parents see their student using the Chromebook in an academic versus non-academic way?

As indicated in Table 4.2, there is strong agreement among parents who believe their children use their Chromebooks for primarily academic purposes a majority of the time. Out of the 117 parents responding to the survey, 67 parents (57.26%) see their child use the Chromebook for 90% academic and 10% non-academic purposes, 21 parents (17.95%) see their child use the Chromebook for 75% academic and 25% non-academic purposes, and 17 parents (14.53%) see their child use the Chromebook for 50% academic and 50% non-academic purposes. A total of seven parents (5.98%) see their child use the Chromebook for 75% non-academic and 25% academic purposes, and five parents (4.27%) see their child spend 90% of the time for non-academic and 10% of the time for academic purposes on their Chromebooks. Illustration shown in Table 4.2.

Research Question 4.3

Do parents believe the Chromebooks are helping their students learn?

As indicated in Table 4.3, a majority of parents believe that the Chromebook is helping their student learn. Out of the 117 parents responding to the survey, 27 parents (23.08%) strongly agree that the Chromebook is helping their student learn; 43 parents (36.75%) agree, and 35 parents (29.91%) indicated they were neutral. A total of six parents (5.13%) disagree, and six parents (5.13%) highly disagree with the belief that the Chromebook is helping their student learn. Illustration shown in Table 4.3.

Research Question 4.4

Do parents believe the Chromebooks are helping prepare their students for the future?

As indicated in Table 4.4, there is generally an agreement among parents that the Chromebook is helping their student prepare for the future. Out of the 117 parents responding to the survey, 33 parents (28.21%) strongly agree that the Chromebook is helping their student prepare for the future, and 47 parents (40.17%) agree, and 26 parents (22.22%) indicated they were neutral. A total of six parents (5.13%) disagree, and five parents (5.13%) strongly disagree with the belief that the Chromebook is helping their student prepare for the future. Illustration shown in Table 4.4.

Research Question 4.5

Qualitative, open-ended response from parents.

The question posed to parents was, "What other comments do you have about the 1:1 Chromebook Initiative?" This was an open-ended question. Parents had common terms in their responses to this question, including the top three terms which were "school" with 15 responses (25.42%), "kids" with 13 (22.03%) responses, and "think" with 12 (20.34%) responses as indicated in Table 4.5. This would indicate that parent responses about the 1:1 Chromebook initiative would focus on their student, the role their student plays in the initiative and what they think about a specific topic. A total of 59 responses were gathered, and 58 respondents skipped the question. Comments that had a common theme among several responses are offered below:

Positive responses from parents about the Chromebook initiative:

- I think this is where technology is going, and the kids need the right tools to succeed.

- Although much of the curriculum is on the Chromebook, it does seem like there is still a lot of class discussion and social activities, which I'm happy about.

- I think that the Chromebook is very useful, and I'm glad that LC provides the students with them every year!

- I believe this has been very beneficial - ended up purchasing a Chromebook at the close of school last year as my student had become dependent upon the capabilities/use and wanted that ability during the summer.

Negative Responses from Parents about Chromebook initiative:

- I am told that there are many online sites that are blocked that teachers have asked their students to look at and they can't. It would also be nice if these could be hooked up to at-home printers so kids can print their work and review it. I am also told that the internet at school is hit and miss which I find funny since most of the work they have to do is web-based. What about those students who don't have Wi-Fi at home?

- I do not like having one more thing (the Chromebook) I need to keep track of. If it gets damaged or stolen, I'm liable and I wish the schools would have the students return them before the end of the day like the middle school does. Or at least give parents an option to make the student return it each day or not. We have a PC at home, so we don't need our child to keep it.

- We need to provide the students with technology that doesn't break at a drop of the hat. My daughter had her Chromebook in her book bag in choir, and other students piled their book bags on top of hers and cracked the screen. It happened twice! That is ridiculous. Half the time when she tried to use it, it wouldn't connect for her to share her homework. Also, it froze a lot of the time so she couldn't use it at all.

- My student complains all the time that they do not work well: slow, crashes, can't get it to log on. May be time to update!

- I don't believe the Chromebook is helping my student prepare for the future because of its many limitations. In college and in the work force, no one uses the Google products, but the Chromebooks are limited to those software products. Therefore, the kids are no longer learning to use the more widely used Microsoft products. Also, I don't believe that the students have the ability to back up files onto an external drive. When the school network goes down, the students become unproductive. Can't print at home from the Chromebook and sometimes teachers request that? Proxy errors sometimes prevent kids from using Chromebook at home. Parents should not be liable for damages.

- Teachers are underutilizing the power of the Chromebooks. Student learning needs to be more transformative. I would love to see my daughter or son do something that extends outside the classroom walls.

- You forgot that not everyone has access to internet. Some in the district live in rural areas and have satellite internet. Some may be not be able to

afford the internet. Although the teachers tell the students that the Chromebook will run without internet, it doesn't do it well. I am not sure that the product was well thought out before it was bought. Teachers need to work on all the same software so students don't have to learn six different programs every term to find their assignments.

- I think care of Chromebooks and dangers of cracked screens etc. must be looked at carefully. Other students can damage someone else's Chromebook easily, and they should be required to pay for the damage since they do it. Have heard of instances of this from a few people. BETTER carrying cases or protections??

- These seem like cheaply made computers. I keep hearing how they don't work even at school due to internet issues. I feel that a quality product would have been a better long-term investment. We are fortunate to have internet access at home; I still don't see how these will help a child who doesn't have that luxury at home.

- I think that the use of the Chromebook is a great tool for my student to learn on. However, that is not what I see it being used for. The days of having homework are few and far between. The focus on education has been diminished, as it seems like the No Child Left Behind Act has made homework and learning at school a thing of the past. Having good grades has lost its meaning in society, as social status on Facebook is now the priority of our children.

Research Question 4.6

Do parents have enough information about how the 1:1 Chromebook initiative operates?

The question posed to parents was, "Do parents have enough information about how the 1:1 Chromebook Initiative at Lewis Central High School Operates? Why or Why not?" This was an open-ended question. As indicated by Table 4.6, parents had common terms in their responses to this question, including the top three terms which were "insurance" with five responses (9.09%), "parents" with four (7.27%) responses, and "student" with four (7.27%) responses as indicated in Table 4.6. This would indicate that many of the responses about more information that is needed would center on the themes of parent and student procedures and the insurance offered by the school for the Chromebook. A total of 55 responses were gathered, and 62 respondents skipped the question. Comments that had a common theme among several responses are offered below:

Yes – Parents have enough information:

- I believe this has been very beneficial - ended up purchasing a Chromebook at the close of school last year as my student had become dependent upon the capabilities/use and wanted that ability during the summer.

- Yes information sent home either by E-mail or the postal service is very useful.

- I think we have information we can access if needed. I feel that I can always contact staff if I have a question.

- Yes, because I see her typing assignments and checking PowerSchool. I see her researching online and using stuff I have no clue how to use!

- Yes. Administration has ensured that parents are aware through e-mails/mail many times.

- Yes. Just wish there was a way to check what kids are on. They know how to delete history on Chromebooks which makes it hard for teachers to babysit.

No, Parents do not have enough information:

- No, I don't remember really going over much about it.

- My only knowledge is the insurance plan for it. I know nothing about how it is used in the classroom. Even conferences do not shine a light on how they are being used.

- Other than the initial letter and insurance information, I have not received any information about the Chromebook initiative.

- I think that more information needs to be sent to parents about the insurance, what it covers, what it doesn't cover, and the cost (per item) if damages occur or straps or lost, etc. Information should be sent out in the beginning of the year to advise parents and also towards the end of the year as a reminder right before the Chromebooks and cords need to be turned in. It should include the cut-off date as to when they are due. To save money, email the information or post it on the website.

- I think we know that they are issued a Chromebook and it is our child's responsibility to keep it safe (or take the insurance). Beyond that, I don't know about the initiative. I think it would be smarter to get the kids into the programs they will be using in the future...Outlook, Word, Excel, and PowerPoint.

- No. We were never told we would have to get internet. There needs to be better insurance options. The burden of paying for the Chromebook is on the parent and we are given no choice in the matter. Students cannot decline the Chromebook. We have a laptop my son could take to school, and it would be less expensive than the Chromebook to replace. However, I was never given an option; it was shoved down our throats and told we would pay for it if our kids broke it. We would purchase insurance and pay the very high deductible if our kids broke it. You need to ask more questions and involve more parents before you shove this stuff out.

- We need more information, and the school has to realize that some families don't have good internet service. Limits on satellite usage, weather, and etc. cause havoc.

Overarching Question #5: How did the 1:1 initiative relate to student performance at Lewis Central High School?

Research Question 5.1

How have the attendance percentages at Lewis Central High School changed since the Chromebook initiative?

In looking at the data, it appears that from 2010 until 2015 indicates there has been an improvement in attendance rates overall through the introduction of the Chromebook initiative at Lewis Central High School. The overall attendance rate for the 2010-2011 school year was 91.6% average, and for the 2014-2015 school year was 95.3%. With 950 students in Lewis Central High School, this would be an approximate increase of between three and four more students attending school during each school

day. Table 5.1 illustrates the exact attendance percentages during each school year from 2010-2011 to 2014-2015.

Research Question 5.2

How have students' composite ACT scores changed since the Chromebook initiative?

Reviewing the data from 2010 to present, composite ACT scores have remained constant, with a slight decrease in the number of students testing through the introduction of the Chromebook initiative at Lewis Central High School. The overall ACT composite average in 2010 was 22.5, with 140 students testing during that period. In 2014, the composite score was 22.1 with 128 students testing during that period. Table 5.2 illustrates the composite ACT scores during each school year from 2010 to the latest data available, 2014.

Research Question 5.3

How have 4-year cohort graduation rates changed since the implementation of the 1:1 initiative?

In reviewing the data from 2010 to present, the 4-year cohort graduation rate has dramatically increased through the time period that includes the introduction of the Chromebook initiative at Lewis Central High School. The overall 4-year cohort graduation rate for the 2010-2011 school year was 83.65%, and in 2014-2015 was projected to be at 94.70% based upon current figures from attendance. Table 5.4 illustrates the 4-year cohort graduation rates for each school year from 2010-2011 to 2014-2015.

Table 1.1. Good for Teachers - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q2 I believe the Chromebook Initiative is good for teachers at LCHS.

Answered: 50   Skipped: 0
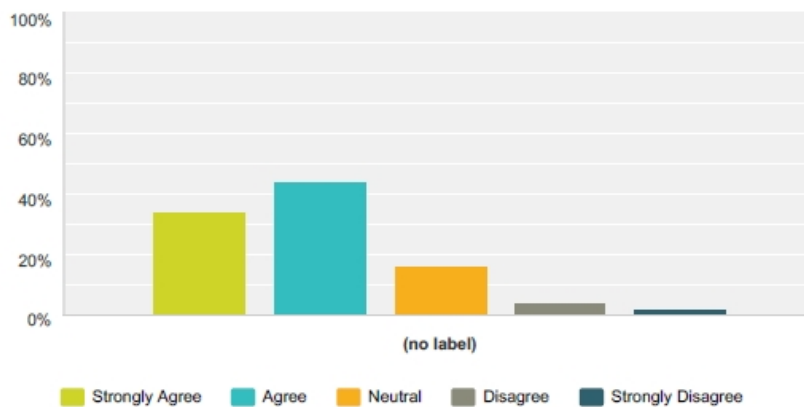
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	34.00% 17	44.00% 22	16.00% 8	4.00% 2	2.00% 1	50	1.96

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	1.96	0.92

Table 1.2. Sufficient PD - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q3 I felt I was provided sufficient professional development for training and preparation before students were issued Chromebooks in 2013.

Answered: 50   Skipped: 0
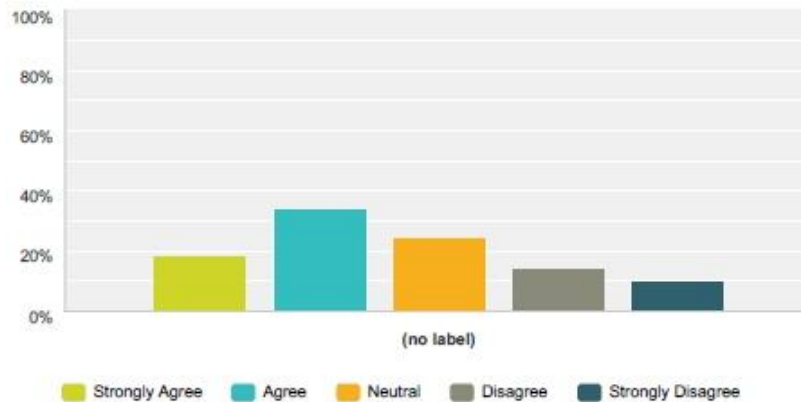
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	18.00% 9	34.00% 17	24.00% 12	14.00% 7	10.00% 5	50	2.64

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.64	1.21

Table 1.3. Incorporate Into Lesson Planning - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q4 I incorporate student use of the Chromebook into my lesson planning:

Answered: 50   Skipped: 0
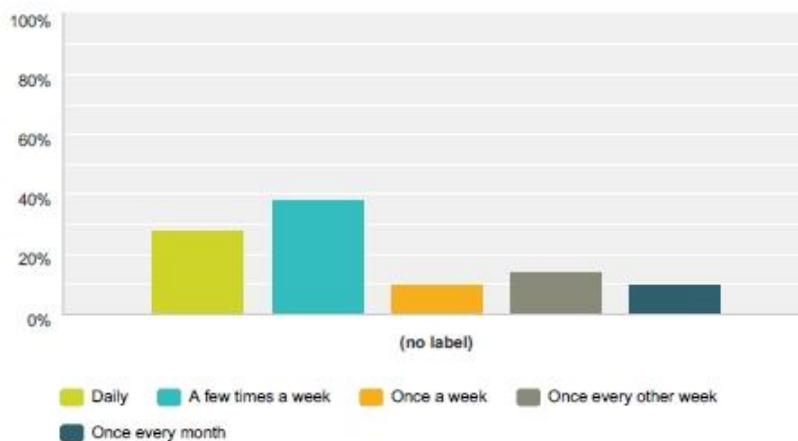
	Daily (1)	A few times a week (2)	Once a week (3)	Once every other week (4)	Once every month (5)	Total	Weighted Average
(no label)	28.00% 14	38.00% 19	10.00% 5	14.00% 7	10.00% 5	50	2.40

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.40	1.30

Table 1.4. Reasonable Timeline - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q5 I believe the Chromebook implementation process was carried out using a reasonable timeline.

Answered: 50 Skipped: 0
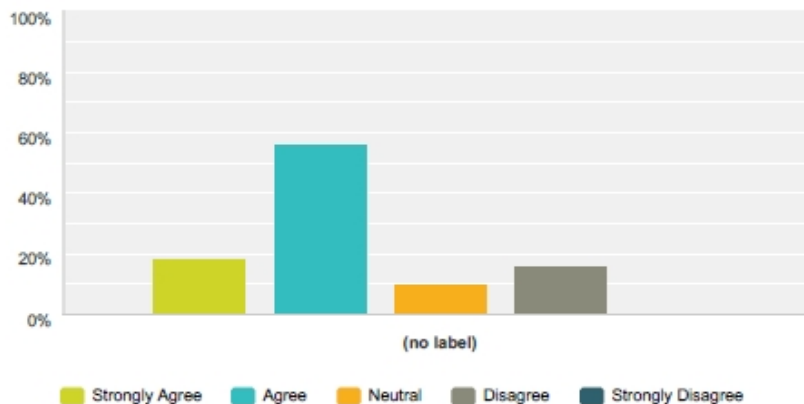
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	18.00% 9	56.00% 28	10.00% 5	16.00% 8	0.00% 0	50	2.24

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	4.00	2.00	2.24	0.93

Table 1.5. Ongoing PD - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q6 I believe there has been adequate ongoing professional development to properly educate teachers since the Chromebook implementation.

Answered: 50   Skipped: 0
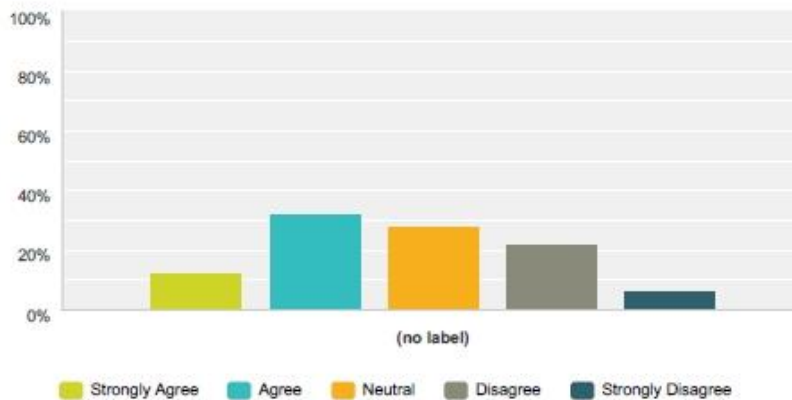
Legend: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	12.00% 6	32.00% 16	28.00% 14	22.00% 11	6.00% 3	50	2.78

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	2.78	1.10

Table 1.6. Students are More Engaged - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q7 I believe students are more engaged in their own learning progress because of the 1:1 Chromebook Initiative.

Answered: 50   Skipped: 0
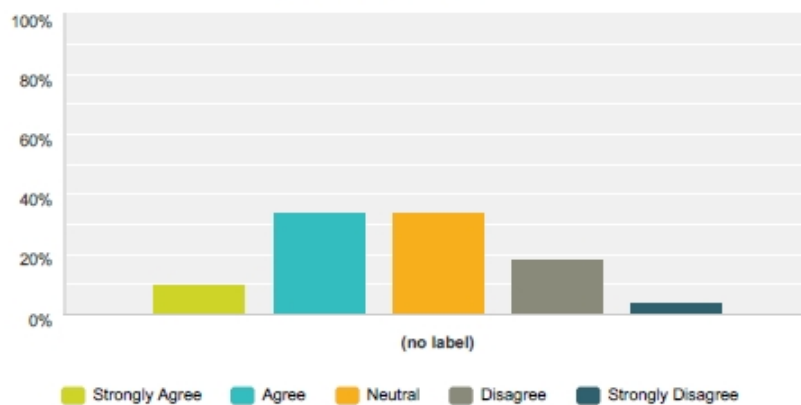
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	10.00% 5	34.00% 17	34.00% 17	18.00% 9	4.00% 2	50	2.72

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	2.72	1.00

Table 1.7. Adequate Safeguards - Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q8 I believe there are adequate safeguards, procedures and guidelines in place to keep students from misusing the Chromebooks during school time.

Answered: 50   Skipped: 0
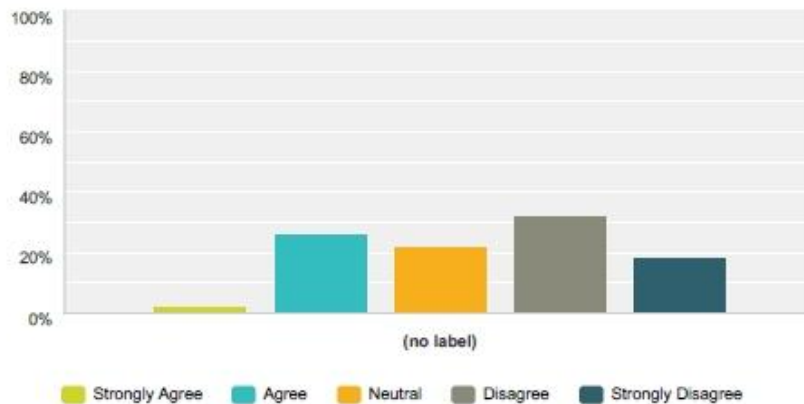
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	2.00% 1	26.00% 13	22.00% 11	32.00% 16	18.00% 9	50	3.38

Basic Statistics				
Minimum 1.00	Maximum 5.00	Median 3.50	Mean 3.38	Standard Deviation 1.11

Table 1.8. Recommend to Other Schools – Staff

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

Q9 I would recommend other school districts utilize a 1:1 Chromebook program for student learning.

Answered: 50   Skipped: 0
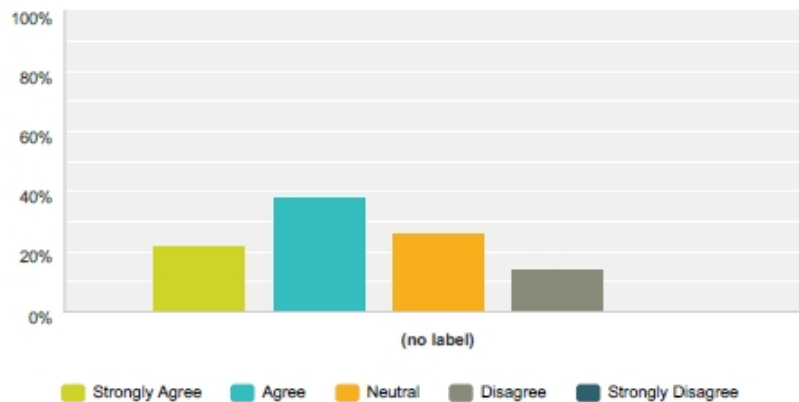
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	22.00% 11	38.00% 19	26.00% 13	14.00% 7	0.00% 0	50	2.32

Basic Statistics				
Minimum 1.00	Maximum 4.00	Median 2.00	Mean 2.32	Standard Deviation 0.97

Table 1.9. Suggestions for Other Schools – Staff

What other suggestions would you have for school districts considering implementing a 1:1 Chromebook Initiative?

Answered: 25   Skipped: 25

	Responses (25)	Text Analysis	My Categories (0)

Search responses

Showing 10 words and phrases

Word/Phrase		%	Count
Teachers		32%	8
Technology		20%	5
Classroom Management		12%	3
Device		12%	3
School		8%	2
Network		8%	2
Instruction		8%	2
Giving		8%	2
Problems		8%	2
Run		8%	2

Table 1.10. Open-Ended Responses – Staff

What other comments do you have about the 1:1 Chromebook Initiative?

Answered: 21   Skipped: 29

Responses (21)	Text Analysis	My Categories (0)

Search responses

Showing 9 words and phrases

Students		42.86%	9
Chromebooks		33.33%	7
Needs		19.05%	4
Technology		19.05%	4
Kids		14.29%	3
Paper		14.29%	3
School		9.52%	2
Access		9.52%	2
Internet		9.52%	2
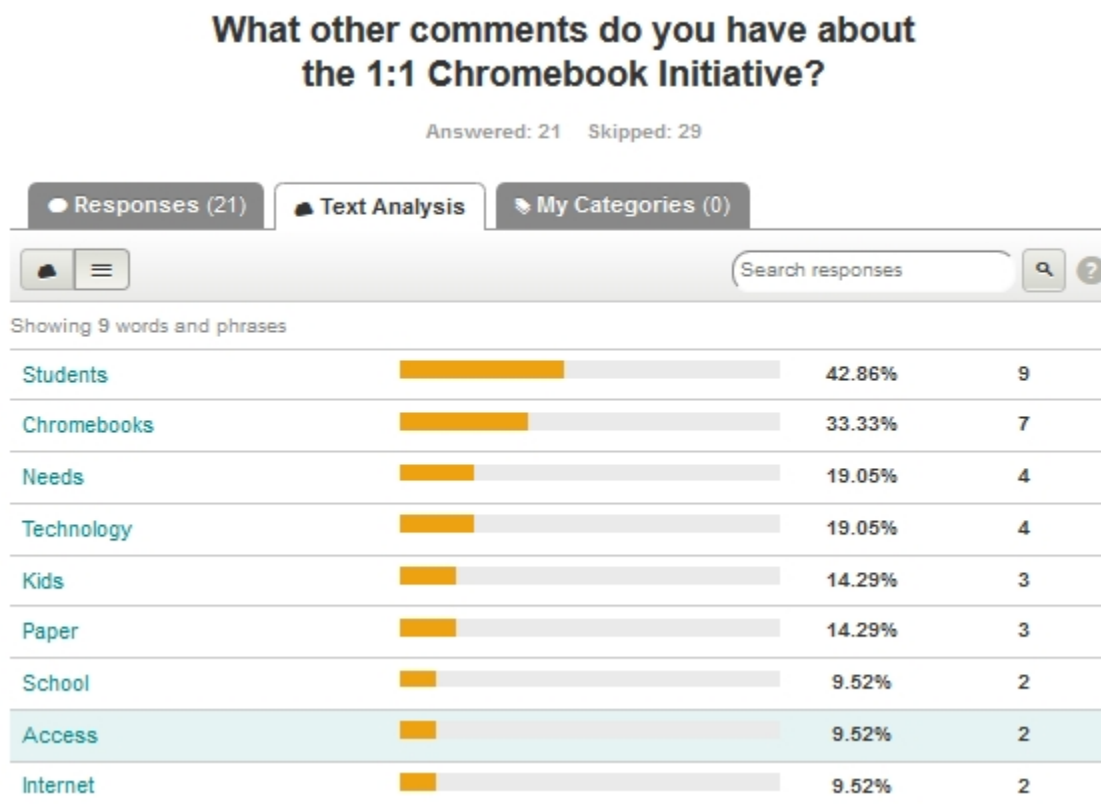
Table 2.5. Adequate PD Training for Chromebook - Staff

Adequate Preparation in PD Crosstab

			Question 2.5					
			Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Yrs_Grp	0 to 15 Years Experience	Count	0	10	7	4	3	24
		Expected Count	2.9	7.7	6.7	5.3	1.4	24.0
	16 or more Years Experience	Count	6	6	7	7	0	26
		Expected Count	3.1	8.3	7.3	5.7	1.6	26.0
Total		Count	6	16	14	11	3	50
		Expected Count	6.0	16.0	14.0	11.0	3.0	50.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.755[a]	4	.029
Likelihood Ratio	14.236	4	.007
Linear-by-Linear Association	1.807	1	.179
N of Valid Cases	50		

a. 4 cells (40.0%) have expected count less than 5.
The minimum expected count is 1.44.

Table 2.8. Other Schools Should Utilize 1:1 - Staff

Other Schools Utilize 1:1 Crosstab

			Question 2.8				
			Strongly Agree	Agree	Neutral	Disagree	Total
Yrs_Grp	0 to 15 Years Experience	Count	9	6	8	1	24
		Expected Count	5.3	9.1	6.2	3.4	24.0
	16 or more Years Experience	Count	2	13	5	6	26
		Expected Count	5.7	9.9	6.8	3.6	26.0
Total		Count	11	19	13	7	50
		Expected Count	11.0	19.0	13.0	7.0	50.0

Chi-Square Tests

|	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.235a	3	.011
Likelihood Ratio	12.040	3	.007
Linear-by-Linear Association	3.737	1	.053
N of Valid Cases	50		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.36.

Table 3.1. Computer Skills - Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q1 I think my computer skills have improved since getting Chromebooks at Lewis Central.

Answered: 312 Skipped: 0
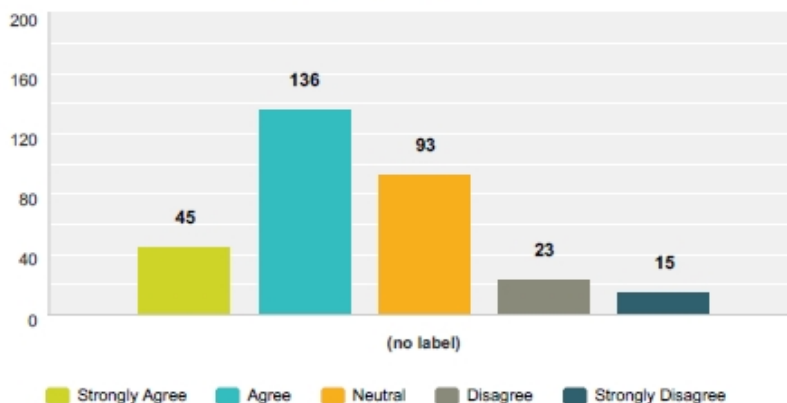
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	14.42% 45	43.59% 136	29.81% 93	7.37% 23	4.81% 15	312	2.45

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.45	0.99

Table 3.2. Chromebook Use - Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q2 When I use the Chromebook, my time is spent in the following way:

Answered: 312   Skipped: 0
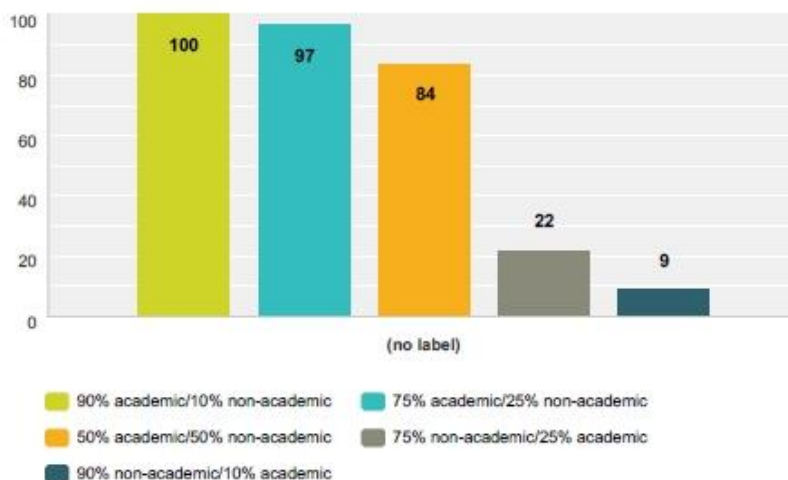
- 90% academic/10% non-academic
- 75% academic/25% non-academic
- 50% academic/50% non-academic
- 75% non-academic/25% academic
- 90% non-academic/10% academic

	90% academic/10% non-academic (1)	75% academic/25% non-academic (2)	50% academic/50% non-academic (3)	75% non-academic/25% academic (4)	90% non-academic/10% academic (5)	Total	Weighted Average
(no label)	32.05% 100	31.09% 97	26.92% 84	7.05% 22	2.88% 9	312	2.18

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.18	1.05

Table 3.3.1. Chromebook in English - Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q3 How often do you use your Chromebook in English classes?

Answered: 312   Skipped: 0
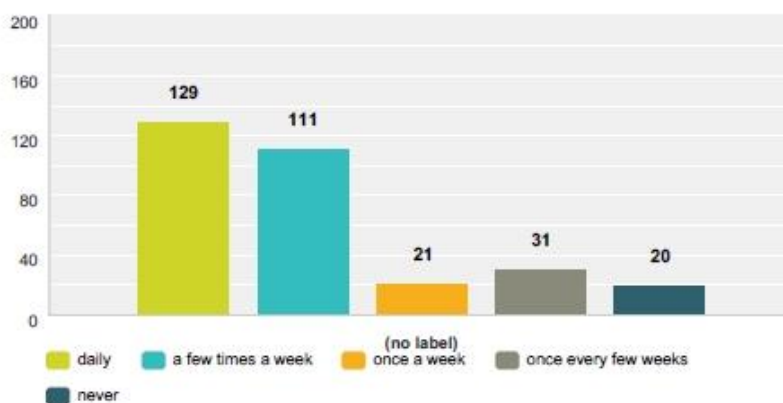
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	41.35% 129	35.58% 111	6.73% 21	9.94% 31	6.41% 20	312	2.04

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.04	1.21

Table 3.3.2. Chromebook in Math – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q4 How often do you use your Chromebook in Math classes?

Answered: 312   Skipped: 0
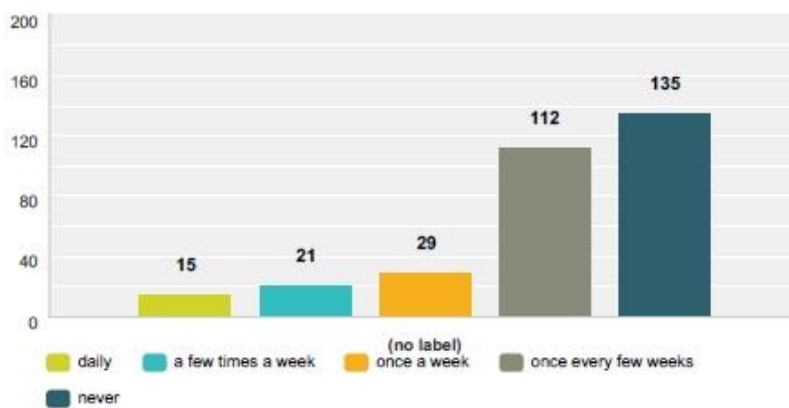
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	4.81% 15	6.73% 21	9.29% 29	35.90% 112	43.27% 135	312	4.06

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	4.00	4.06	1.11

Table 3.3.3. Chromebook in Science – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q5 **How often do you use your Chromebook in Science classes?**

Answered: 312   Skipped: 0
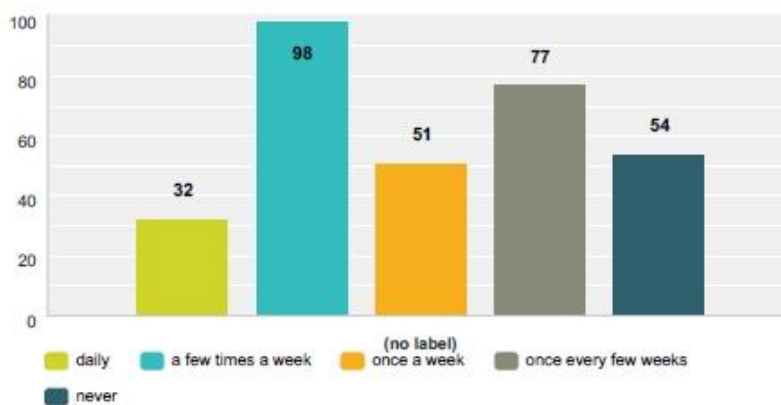
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	10.26% 32	31.41% 98	16.35% 51	24.68% 77	17.31% 54	312	3.07

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	3.07	1.29

Table 3.3.4. Chromebook in Social Studies – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q6 How often do you use your Chromebook in Social Studies classes?

Answered: 312   Skipped: 0

	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	41.67% 130	21.15% 66	8.33% 26	12.18% 38	16.67% 52	312	2.41

Basic Statistics				
Minimum 1.00	Maximum 5.00	Median 2.00	Mean 2.41	Standard Deviation 1.52

Table 3.3.5. Chromebook in Arts – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q7 How often do you use your Chromebook in Arts classes?
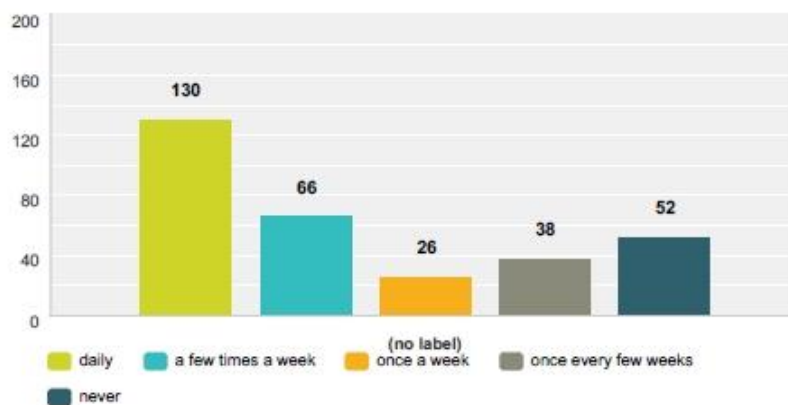
Answered: 312   Skipped: 0
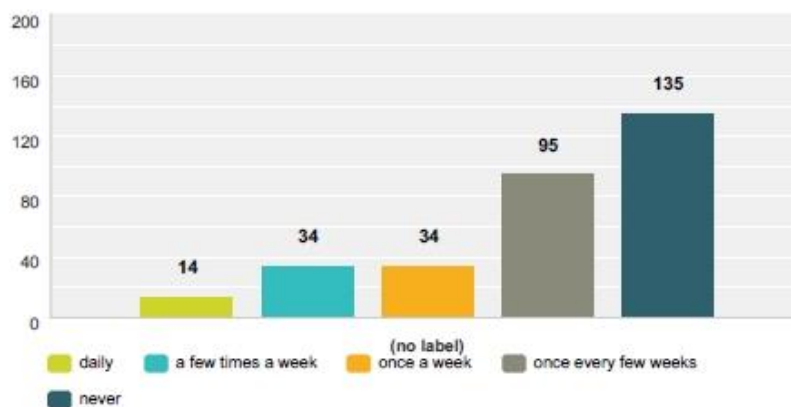
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	4.49% 14	10.90% 34	10.90% 34	30.45% 95	43.27% 135	312	3.97

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	4.00	3.97	1.17

Table 3.3.6. Chromebook in Spanish – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q8 How often do you use your Chromebook in Spanish classes?

Answered: 312   Skipped: 0
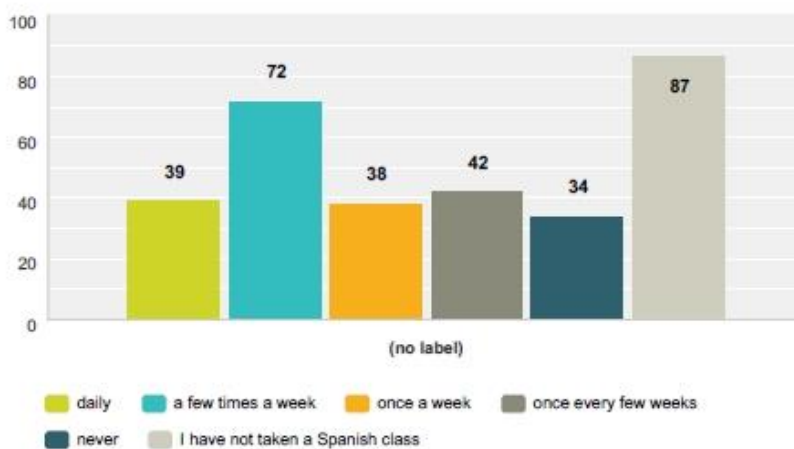
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	I have not taken a Spanish class	Total	Weighted Average
(no label)	12.50% 39	23.08% 72	12.18% 38	13.46% 42	10.90% 34	27.88% 87	312	2.82

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	2.82	1.33

Table 3.3.7. Chromebook in Other Electives – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q9 How often do you use your Chromebook in other Elective classes?

Answered: 312   Skipped: 0
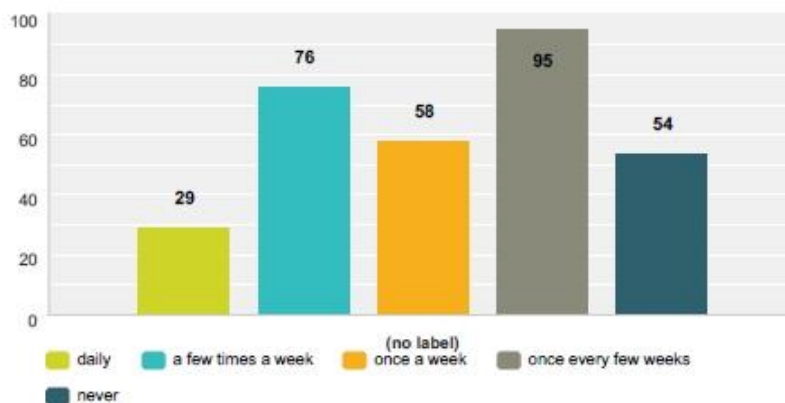
	daily (1)	a few times a week (2)	once a week (3)	once every few weeks (4)	never (5)	Total	Weighted Average
(no label)	9.29% 29	24.36% 76	18.59% 58	30.45% 95	17.31% 54	312	3.22

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	3.22	1.25

Table 3.4. Classes More Interesting – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q10 I think classes are more interesting when I use the Chromebook.

Answered: 312   Skipped: 0
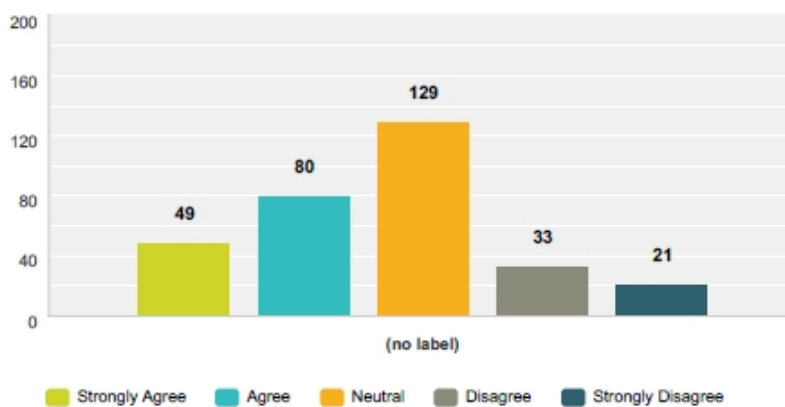
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	15.71% 49	25.64% 80	41.35% 129	10.58% 33	6.73% 21	312	2.67

Basic Statistics				
Minimum 1.00	Maximum 5.00	Median 3.00	Mean 2.67	Standard Deviation 1.07

Table 3.5. Learn More in Classes – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q11 I feel like I learn more when I use the Chromebook during class.

Answered: 312   Skipped: 0
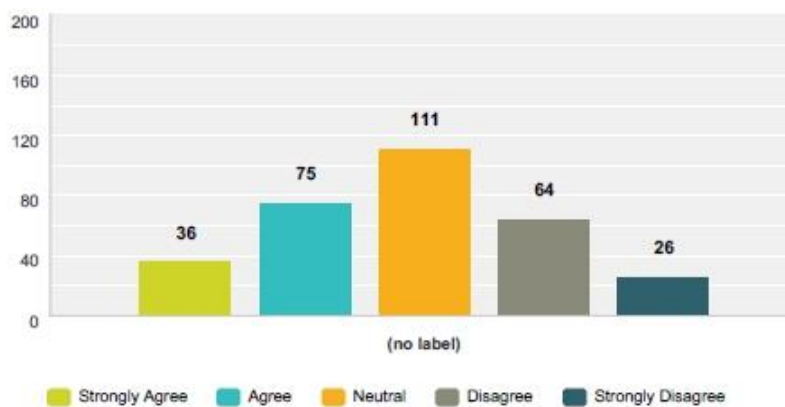
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	11.54%	24.04%	35.58%	20.51%	8.33%		
	36	75	111	64	26	312	2.90

Basic Statistics				
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	2.90	1.11

Table 3.6. Additional Chromebook Training Cloud Map - Students
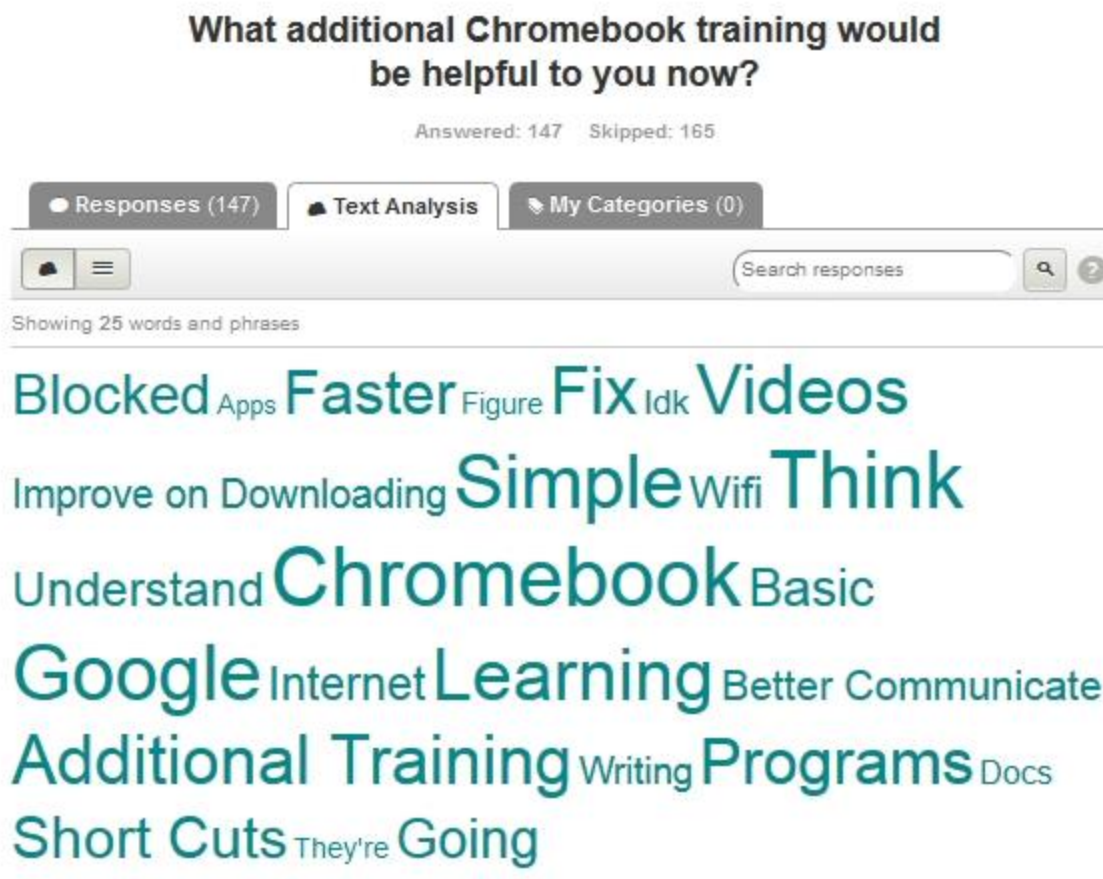
Table 3.7. Another Technology Cloud Map - Students
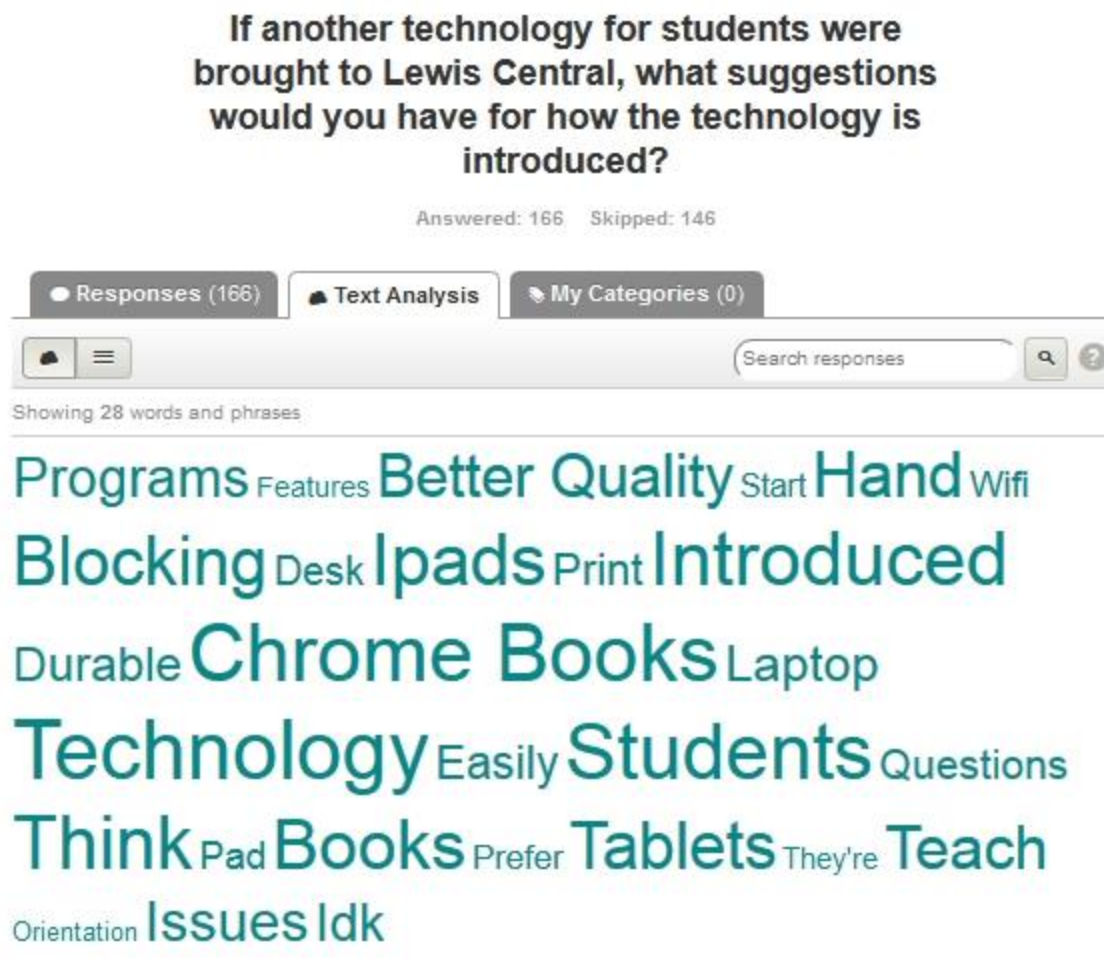
Table 3.8. High Quality Information – Students

Lewis Central High School Student 1:1 Chromebook Initiative Survey

Q12 I believe my skills at locating high quality information have improved since getting the Chromebooks in the Lewis Central Schools.

Answered: 312   Skipped: 0
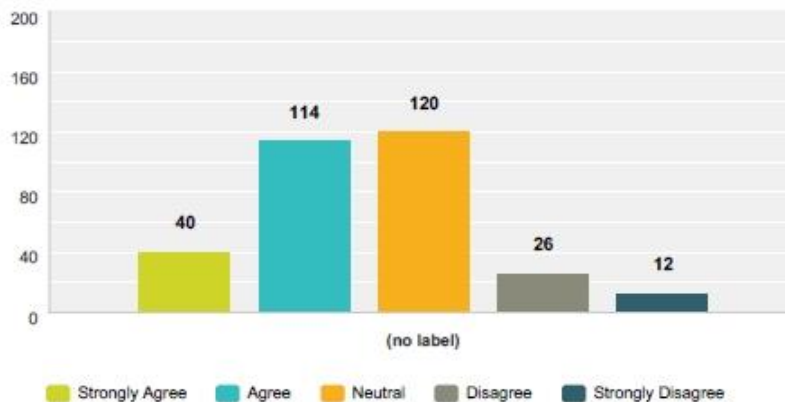
	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	12.82% 40	36.54% 114	38.46% 120	8.33% 26	3.85% 12	312	2.54

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	3.00	2.54	0.95

Table 3.9. Chromebook Use by Class Comparison – Students

Sub	S.Agree	Agree	Neutral	Dis	S.Dis	Total
English	129	111	21	31	20	312
Math	15	21	29	112	135	312
Science	32	98	51	77	54	312
S. Studies	130	66	26	38	52	312
Arts	14	34	34	95	135	312
Spanish	39	72	38	42	34	225
Electives	29	76	58	95	54	312
Total	388	478	257	490	484	2097

Table 4.1. Students Using Chromebooks – Parents

Lewis Central High School Parent 1:1 Chromebook Initiative Survey

Q1 How often do you see your student using his/her Chromebook at home for educational purposes?

Answered: 117   Skipped: 0
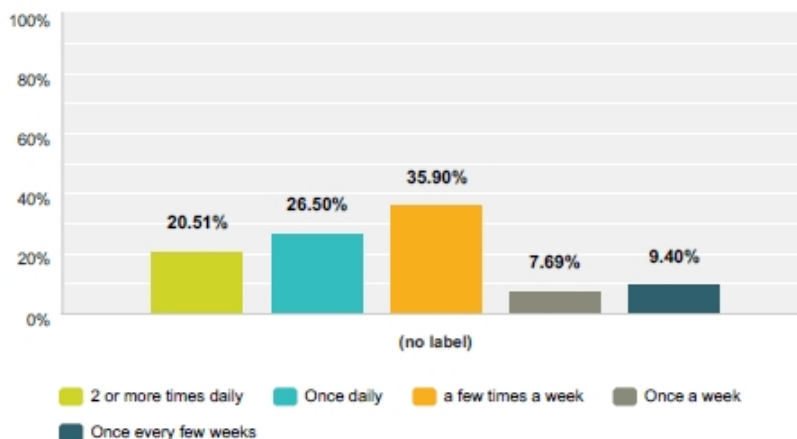
	2 or more times daily (1)	Once daily (2)	a few times a week (3)	Once a week (4)	Once every few weeks (5)	Total	Weighted Average
(no label)	20.51% 24	26.50% 31	35.90% 42	7.69% 9	9.40% 11	117	2.59

Basic Statistics				
Minimum 1.00	Maximum 5.00	Median 3.00	Mean 2.59	Standard Deviation 1.17

Table 4.2. Students Using Chromebooks in Academic vs. Non-Academic – Parents

Lewis Central High School Parent 1:1 Chromebook Initiative Survey

Q2 When my child uses the Chromebook, his/her time is spent in the following ways?

Answered: 117   Skipped: 0
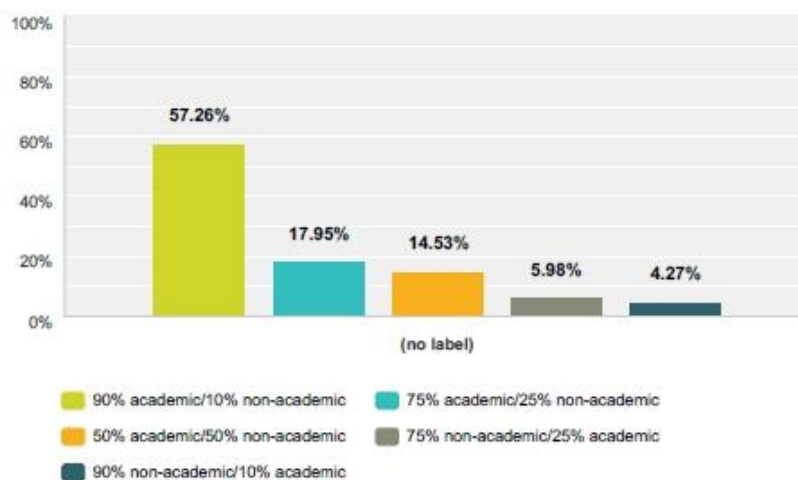
	90% academic/10% non-academic (1)	75% academic/25% non-academic (2)	50% academic/50% non-academic (3)	75% non-academic/25% academic (4)	90% non-academic/10% academic (5)	Total	Weighted Average
(no label)	57.26% 67	17.95% 21	14.53% 17	5.98% 7	4.27% 5	117	1.82

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	1.00	1.82	1.14

Table 4.3. Chromebook, Students Learn – Parents

Lewis Central High School Parent 1:1 Chromebook Initiative Survey

Q3 I believe the Chromebook is helping my student learn.

Answered: 117   Skipped: 0
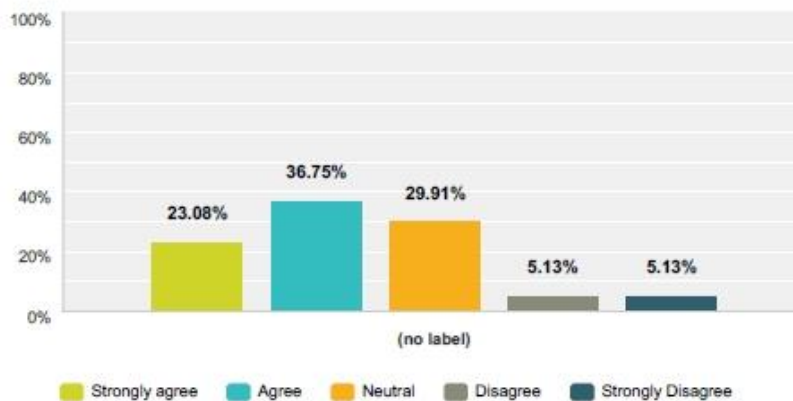
	Strongly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	23.08% 27	36.75% 43	29.91% 35	5.13% 6	5.13% 6	117	2.32

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.32	1.04

Table 4.4. Chromebooks Help Prepare for Future – Parents

Lewis Central High School Parent 1:1 Chromebook Initiative Survey

Q4 I believe the Chromebook is helping my student prepare for the future.

Answered: 117   Skipped: 0
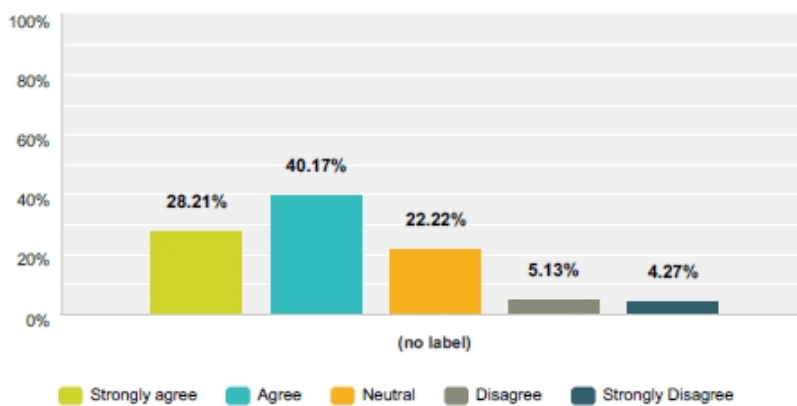
	Strongly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	Total	Weighted Average
(no label)	28.21% 33	40.17% 47	22.22% 26	5.13% 6	4.27% 5	117	2.17

Basic Statistics

Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.17	1.03

Table 4.5. Chromebooks, Other Comments – Parents

Other comments about the 1:1 Chromebook Initiative:

Answered: 59   Skipped: 58

| ● Responses (59) | ● Text Analysis | ● My Categories (4) |

Search responses

Showing 20 words and phrases

School		25.42%	15
Kids		22.03%	13
Think		20.34%	12
Teachers		15.25%	9
Not Work		13.56%	8
Access		13.56%	8
Internet		11.86%	7
Connect		6.78%	4
Believe		6.78%	4
Games		6.78%	4
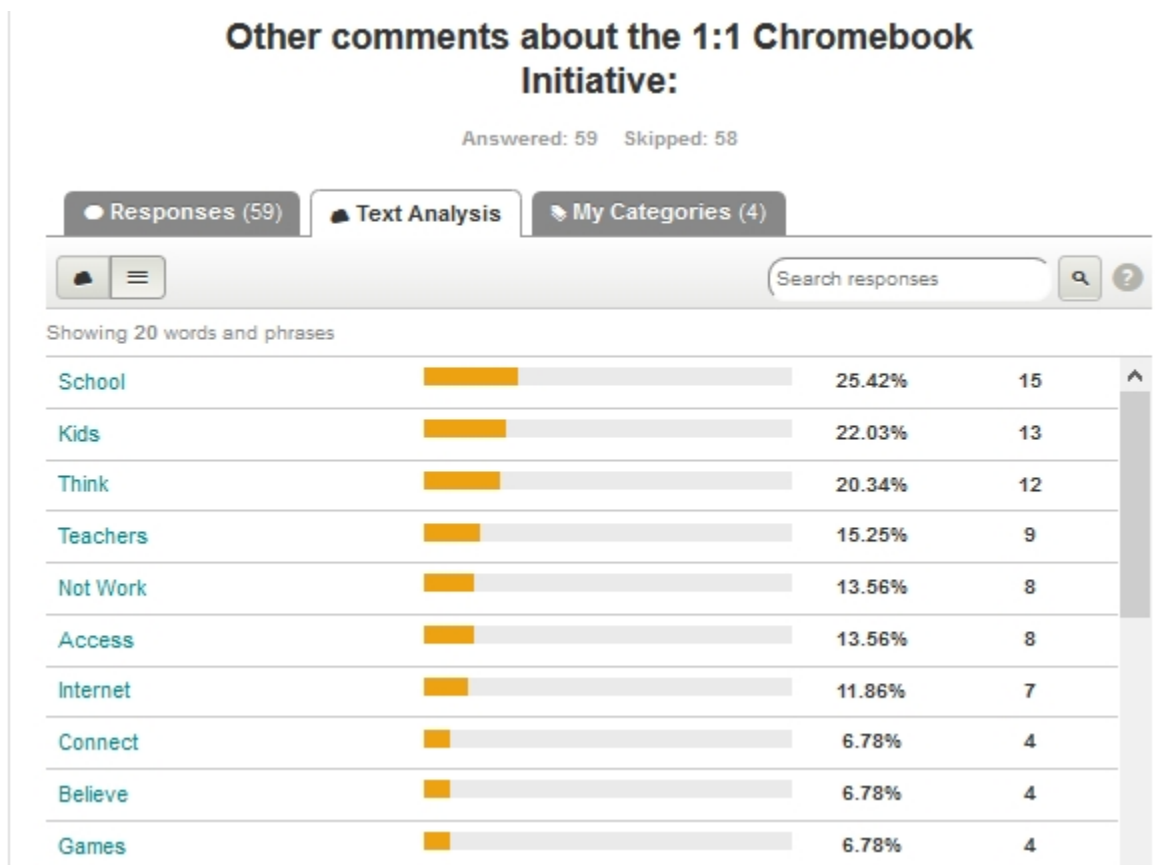
Table 4.6. Chromebooks, Enough Information – Parents

Do parents have enough information about how the 1:1 Chromebook Initiative at Lewis Central High School operates? Why or why not?

Answered: 55   Skipped: 62

| ● Responses (55) | ☁ Text Analysis | ✎ My Categories (4) |

Showing 13 words and phrases

Insurance		9.09%	5
Parents		7.27%	4
Student		7.27%	4
Kids		7.27%	4
Think		7.27%	4
Questions		7.27%	4
Believe		5.45%	3
School		5.45%	3
Pay		3.64%	2
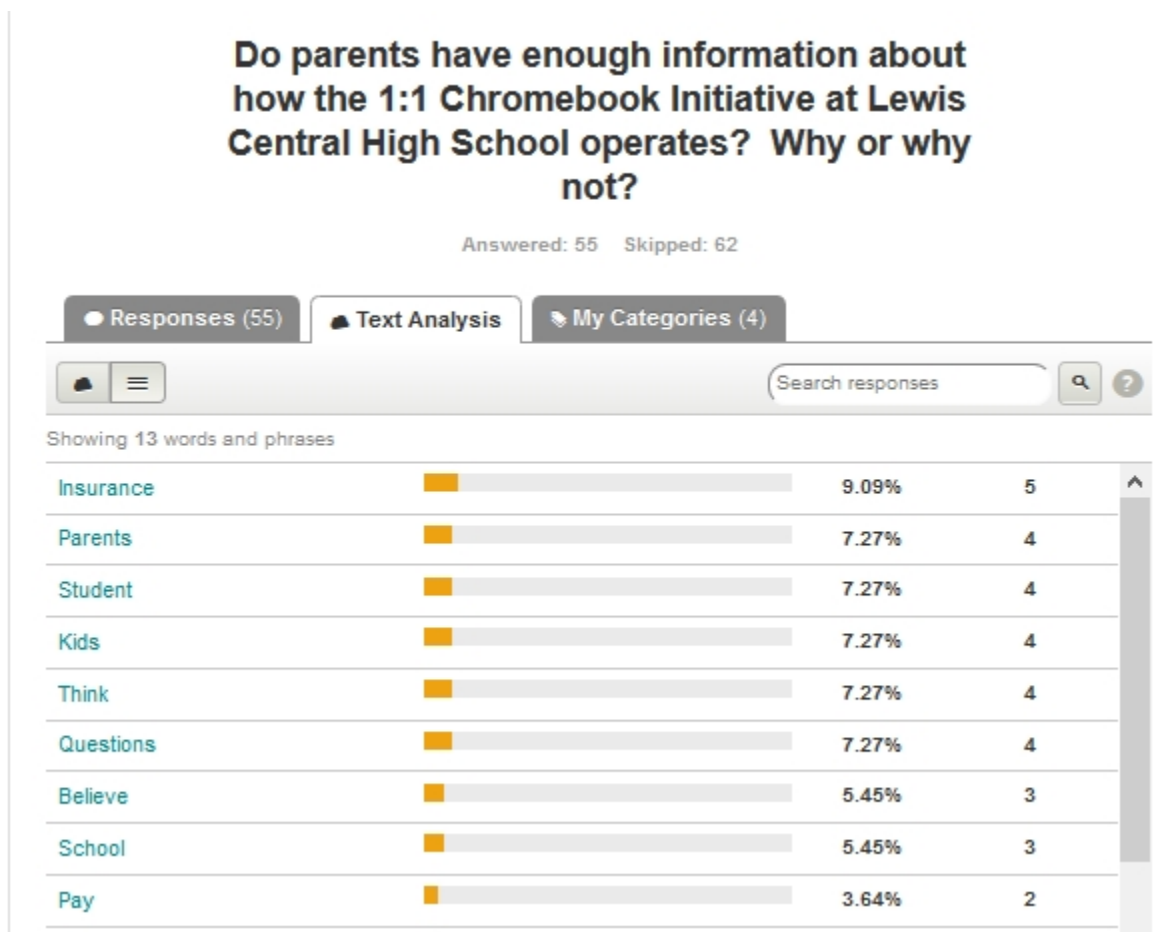
Table 5.1. LCHS Student Performance Attendance Percentages

School Year for Year	LCHS Attendance Average
2010 – 2011	91.6%
2011 – 2012	92.8%
2012 – 2013	94.33%
2013 – 2014	92.4%
2014 – 2015	95.3%

Table 5.2. LCHS Student Performance ACT Scores

Year	LCHS ACT Score Average	# of students tested
2010	22.5	140
2011	22.2	137
2012	21.3	151
2013	21.3	129
2014	22.1	128

Table 5.3. LCHS Student Performance 4-Year Cohort Graduation Rate

School Year graduation rate	LCHS 4-year cohort
2010 – 2011	83.65%
2011 – 2012	89.89%
2012 – 2013	92.42%
2013 – 2014	93.27%
2014 – 2015	95.30% projected

Chapter 5, Conclusions and Discussion

The results of the study were produced in Chapter 4. Chapter 5 includes discussion of achievement data for Lewis Central High School as it relates to the 1:1 Chromebook initiative. This chapter will conclude with recommendations for future initiatives for Lewis Central and technology for Lewis Central High School in general.

The data collected for this research project indicates that the implementation of the 1:1 Chromebook initiative at Lewis Central High School had a positive impact upon exposure, use, and attitudes about technology among students, staff, and parents alike. While themes exist among all three groups concerning areas of improvement, such as internet connectivity in the school, blocking of websites, and the reliability of the technology, the overall perception about the 1:1 Chromebook initiative was positive. A relationship between the success of the technology immersion programs and the link to (1) support from administration, (2) buy-in from teachers, and (3) professional development opportunities as well as other systemic program supports is noted by authors Bebell and O'Dwyer (2010) and is reflected in the results of this study. Professional development for staff at Lewis Central High School has embraced these three functions through the 1:1 Chromebook initiative as discussion and learning have utilized feedback from the classroom/staff, have provided opportunity for individual/group learning, and have utilized staff as experts through sharing experiences/examples of technology use.

Conclusions

Overarching Question 1 Conclusion

The purpose of Overarching Question 1 was to determine the perceptions of the staff regarding the implementation of the 1:1 Chromebook initiative. Staff were in agreement or had positive responses toward items such as recommending the 1:1 Chromebook initiative for other districts, believing the Chromebook initiative is good for teachers, and believing the Chromebook initiative was carried out in a reasonable timeline. Staff had mixed reviews (overall favor toward agreement, but a substantial amount of disagreement) about professional development and the Chromebook initiative. They felt a need for more professional development for training and preparation before the students received them in 2013 and had mixed opinions about ongoing professional development concerning the 1:1 Chromebook initiative. Staff also had mixed reviews about students being more engaged in their own learning progress because of the 1:1 Chromebook initiative.

The majority of staff either disagreed or strongly disagreed that there are adequate safeguards, procedures, and guidelines in place to keep students from misusing Chromebooks during school time. Staff believe the Chromebook initiative was and is positive for students, yet room for improvement exists as the overall initiative moves forward.

Overarching Question 2 Conclusion

The purpose of Overarching Question 2 is to determine the perception regarding the implementation of the Chromebook initiative and if it differs based upon years of experience for staff. Based upon staff responses in the survey, they were divided into

two groups based upon years of experience. Sixteen staff had 0 to 15 years of experience, and 14 staff members had 16 or more years of experience. Lewis Central High School staff were asked questions about their perceptions regarding the implementation of the Chromebook initiative. Of these 11 questions, 9 responses did not vary significantly in relation to years of experience, while two of them, using a chi-square analysis, did differ based upon years of experience.

Regarding question 2.5 about the belief concerning adequate professional development training for the Chromebook initiative, although there was a statistically significant difference according to years of experience, the distributions for both groups when merging agree/strongly agree and when merging disagree/strongly disagree are fairly close.

Regarding question 2.8 about whether or not other schools should utilize a 1:1 program in their district, the staff with zero to 15 years of experience were more likely to strongly agree (nine) or disagree (eight), while the staff with 16 or more years of experience were more likely to agree (13) and disagree (six). However, neither staff with zero to 15 nor the staff with 16 or more years of experience elected to strongly disagree that they would recommend that other schools utilize the 1:1 Chromebook program for student learning.

Overarching Question 3 Conclusion

The purpose of Overarching Question 3 was to determine students' perceptions regarding the implementation and use of the 1:1 Chromebook initiative through the 1:1 Chromebook initiative. Miranda and Russell (2011), report that despite widespread investment in Information Technology, greater access to technology may not have

translated into increased computer use. Educators at Lewis Central would tend to agree with the authors, in that to maximize educational technology's benefits for student learning, organizational leaders must understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011). The overall findings with the Lewis Central High School Chromebook initiative would indicate that supports and systems have been put in place to increase the amount of technology use in and out of school at Lewis Central High School. However, additional tech support and enhanced internet accessibility could be helpful.

Students had a tendency to agree or strongly agree that their computer skills have improved since the 1:1 Chromebook initiative and that their skills at locating high quality information have improved since getting the Chromebooks at Lewis Central High School. The majority of students report using their Chromebooks for academic purposes a majority of the time, with most students using their Chromebooks for academic purposes at least 75% of the time and non-academic purposes 25% of the time. Students had a tendency to remain neutral about whether classes were more interesting because of the Chromebook initiative and whether or not they tend to learn more when they use the Chromebook in class, though a greater majority still agree or strongly agree with both of these statements.

In specific classes on a "general basis," the majority of students reported using their Chromebook daily in English and social studies classes. The majority of students reported using their Chromebooks a few times a week in Spanish and science classes. The majority of students reported using their Chromebooks approximately once a week in other elective classes, and finally, the students reported using their Chromebooks once a

week or once every few weeks in math and arts classes. It is important to note that students and teachers in individual consultation concerning this initiative point to the nature of current practice, instruction, and outcomes in math, arts, and other elective classes. Many classes in these content area are project, outcome, or performance-based. If the Chromebook were used daily, it would take away from many of the already required hands-on activities toward skill development/interaction in these classes. Math class, specifically, utilizes a current practice of using text books as a main form of content exposure, though online resources and materials are available in this subject area and within the arts and other electives. In this way, teachers and students are still evolving in the use of all tools toward learning and the acquisition of skills.

Overarching Question 4 Conclusion

The purpose of Overarching Question 4 is to determine parents' perceptions regarding the implementation of the 1:1 Chromebook initiative. Parent perception was positive toward the use of technology through the 1:1 Chromebook initiative. The majority of parents see their students using the Chromebook at home for 90% academic and 10% non-academic purposes. This perception is directly in line with student perception, as they too perceive themselves using the Chromebook for 90% academic and 10% non-academic purposes.

Parents see their child using their Chromebook at home at least a few times a week, with many seeing their child using the Chromebook at home once, or two or more times daily. A majority of parents also believe that the Chromebook is helping their student learn and that it is helping prepare their student for the future. Another overall theme for parents was accessibility for all students to technology, as the open-response

questions had many responses that thanked the Lewis Central Community School for implementing the 1:1 Chromebook initiative.

Overarching Question 5 Conclusion

The purpose of Overarching Question 5 is to determine how the 1:1 initiative may or may not have related to student performance at Lewis Central High School. As discussed in chapter two, a number of changes occurred between the 2010-2011 and 2014-2015 school years at Lewis Central High School. Relating to this study, the beginning of the 1:1 Chromebook initiative was happening in various stages during this period. Paradigm shifts that occurred during this time at Lewis Central High School included a change in administration and a change concerning the philosophy of students and achievement. To put a statement with this paradigm shift would include an approximation, such as going from "If you can't live up to our expectations, leave," (2009) to "We're going to support all students as a community of excellence" (2015). The results from this paradigm shift are reflected in achievement data results that were sampled from various Lewis Central High School presentations for the School Improvement and Achievement Committee Meetings in 2015 and reported by Dr. Joel Beyenhof as follows:

The graduation rate over the last 5 years has gone from 83.65% to a projected graduation rate of 94.1%. The positive nature of the 1:1 Chromebook initiative according to all three stakeholder groups in this study, as well as the increase in engagement in student learning from research in this study, would support the idea that the 1:1 Chromebook initiative had a positive impact upon LCHS in general.

Other achievement data for Lewis Central High School can be linked or substantiated as student achievement includes interaction with resources and technology. In Figure 6, one can see the state graduation rate for Iowa compared to the Lewis Central High School graduation rate. In Figure 7, one can see how this coincides with dropout numbers from the same time period. Also illustrated is the list of the number of high school dropouts from the senior classes during each given year. Students during these years would have been exposed to a change in leadership, educational philosophy, and increased supports from staff, community, and administration. Students would have also experienced the 1:1 Chromebook initiative and its benefits as it pertains to student engagement, achievement, technology integration, and change in outcomes for classroom homework and assignments.

In the Lewis Central Department of Education Accreditation Report and Non-Compliance Response, the Iowa Department of Education (2015) wrote in their site visit report of Lewis Central, "Lewis Central Community School District (CSD) has a focused goal to increase the graduation rate. The graduation rate of 83.65% for the 2010-11 school year has increased to 92.42% during the 2012-13 school year, which is above the state average. Significant resources have been put in place to support this goal area. Examples have included the addition of a School Based Interventionist (SBI) and the addition of alternative school programming to support at-risk learners. Additionally, teacher interviews also supported Positive Behavioral Interventions and Supports (PBIS) programs as well as leadership trainings and other programming that addressed school climate and student social skills. It would appear the allocation of full time staff and also

strong support of social-emotional programming for students is likely contributing to the
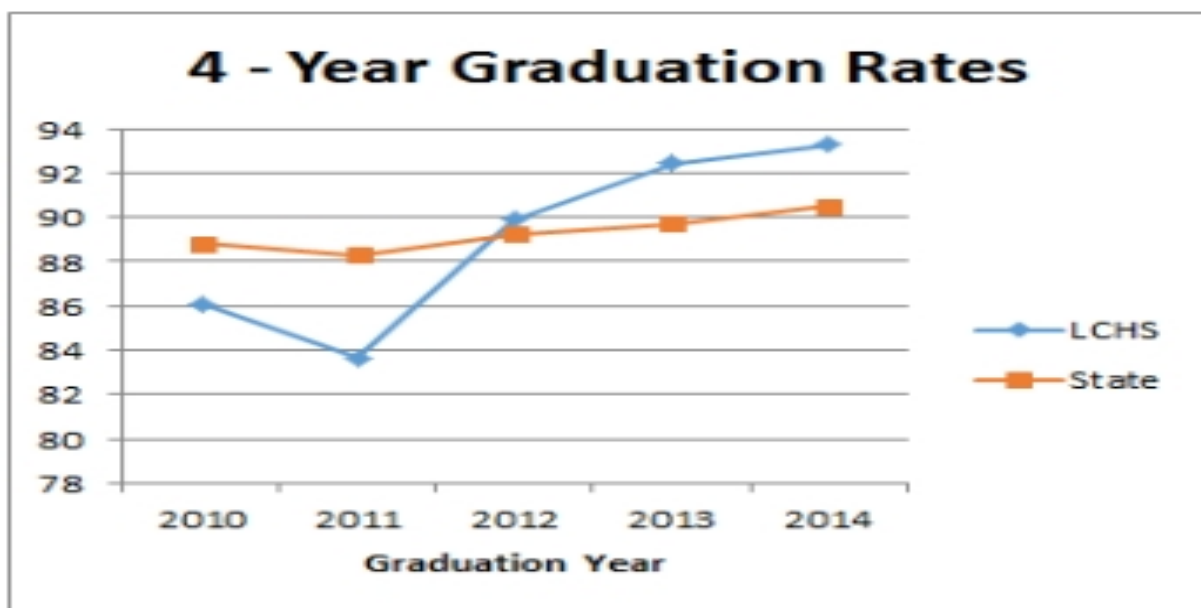
vision/goal of improving graduation rate."

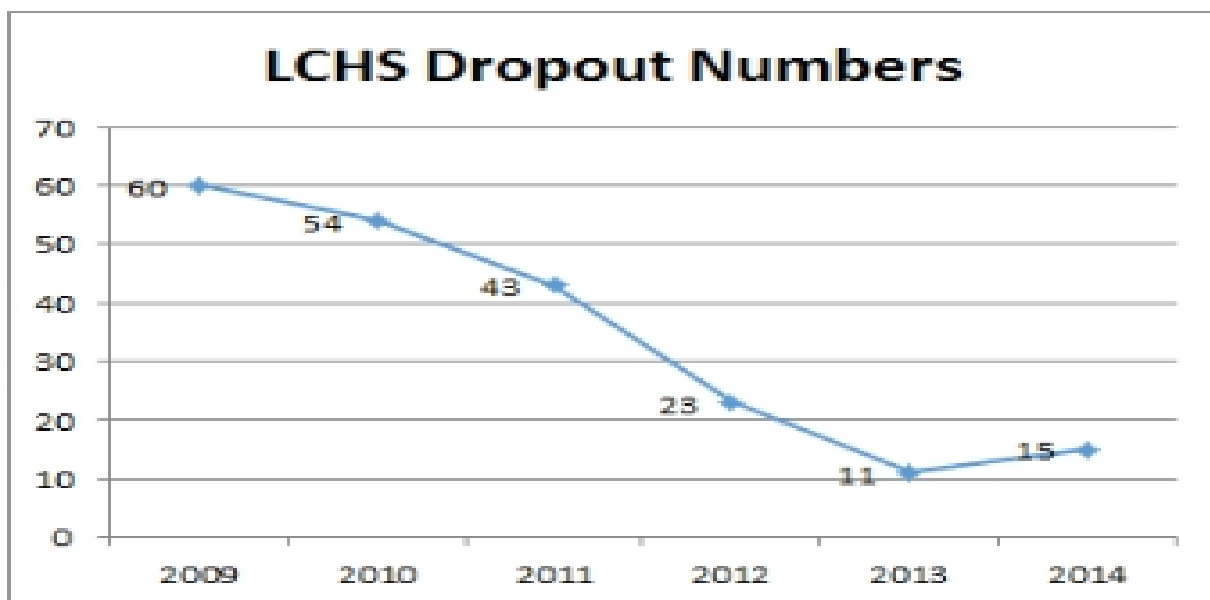Figure 6. Lewis Central High School and Iowa 4 Year Graduation Rates

Figure 7. Lewis Central High School Dropout Numbers, 2009 to 2014.

Discussion

Experts in the field were consulted both inside and outside of Lewis Central during the implementation of procedure for the Lewis Central Schools 1:1 initiative, and for this Developmental Evaluation, including Dr. Scott McLeod of dangerouslyirrelevant.org, who studied at Iowa State University in Ames, Iowa. Other students of his, including Dr. Trent Grundmeyer, have examined 1:1 technology through other studies and dissertation work - including how 1:1 technology programs impact college students' preparedness, and how socio-economic status and 1:1 technology can work together to improve student achievement. Through these different lenses, including this study and the study from Fort Calhoun, one can see benefits of 1:1 technology as it relates to student achievement, workplace readiness, and college preparedness across all socio-economic classes.

Triumphs

- Each child at Lewis Central High School, regardless of parental background, socio-economic class, or experience with technology has equal access to technology and the world around them through the Chromebook as an interactive tool.

- Personalized and customized learning for students from different backgrounds and achievement levels is now possible in and outside of the classroom using technology.

- Research, projects, and interaction with assignments has become far more collaborative, with more resources available to students for assignment and self-discovery.

- Many teachers are using technology on a daily and/or weekly basis as a means to aide in the learning process. While not all learning at Lewis Central High School is centered on technology all of the time, dedicated time is being utilized, making use of the technology through the 1:1 Chromebook initiative now available to students.

- Learning at LCHS is more collaborative as evidenced through classroom projects, assignments, and a learning process that incorporates self-discovery and creativity. Evidence exists through interaction with parents, students, and staff as all three groups reported classroom experiences.

- Students and parents both agree that use of the Chromebook by the students is happening at home at least a few times a week, and that use of the Chromebook is at least 75% academic and 25% non-academic, and very often is 90% academic and 10% non-academic.

Concerns

- A significant concern from staff was the misuse of the Chromebook and the element of distraction it can cause in and out of the classroom.

- Parents also share concern about the role of technology in the students' lives, though parents report that the majority of the time they see their child using the Chromebook is for academic purposes.

- Students and parents report trouble with the durability/reliability of the technology, citing examples where it was broken non-intentionally, yet the family entity had to absorb the cost for repairs or replacement. They also reported

systematic disparities, including turning in a Chromebook bag that was clean, and getting one the following year that smelled of smoke or other unpleasant odors.

- Staff were concerned about the rollout process, in that they did not feel adequate safeguards were in place to prevent students from misusing/abusing the Chromebooks.

- Staff, students, and parents voiced concern about the Chromebooks' role as it relates to being able to print and interact with other commonly used computer products such as Microsoft Word, PowerPoint, and Excel.

Suggestions

- Provide staff time to collaborate throughout the school year to allow networking and sharing of ideas for what works in and out of the classroom.

- Continue and expand upon the use of the "Student Helpdesk" as it relates to not only maintenance and repair of the Chromebook, but also the use of programs within the Chromebook to complete projects. As adults come to the table with different technology backgrounds, so to do students. Some teachers are more technologically adept than many students and visa-versa. Class time does not always allow this gap to be bridged in a normal classroom setting.

- The school should consider a 1:1 program that incorporates a different device that is durable and accessible for all students. A great number of comments from students, parents, and staff about the overall initiative centered on the use of this particular technology. The overall view of this type of technology and the school district would be more favorable with a different tool.

- For classes that were reported as having less Chromebook use, an examination of individual class incorporation might be useful. Many students reported the use of the Chromebook in the majority of their classes. This included positive experiences through application, technology creating a more informative and collaborative environment, and more creativity being allowed through the exploration of knowledge. All of these increased the buy-in process from students for subject matter being studied through real-life application.

Implications for Future Research and Study Observations

Comparison to Original Study

This study replicated a similar undertaking by Dr. Don Johnson from Fort Calhoun Community Schools, which sought to collect and analyze the necessary data and use it to determine the success of the implementation process used for a 1:1 Ipad program in a senior high school. As the Lewis Central and UNO teams worked to modify the existing instruments from the Fort Calhoun team, careful consideration about all stakeholders, outcomes, and perspectives was considered.

In speaking with Dr. Johnson about his study upon initiating this particular study, he had several recommendations about the overall format, process, and procedure that he would do differently if replicated. Through work with the UNO and Lewis Central teams, those items were implemented into this study, such as Likert-scale items for each survey, specific types of questions for each group of stakeholders, and more background information/research on computers themselves and how successful programs have used them.

The overall picture of the Ipad program in Fort Calhoun seemed to be more strongly positive than the mid-level amount of positivity in the outcome at Lewis Central High School. A greater percentage of Dr. Johnson's outcomes, specifically from staff, were unanimously positive or contained a high majority of responses that were positive, while the Lewis Central High School staff had a moderate level of majority who viewed the Chromebook as beneficial. As a side note, the researcher in the Lewis Central High School study was a teacher/colleague in relationship to the staff, while the researcher in the Fort Calhoun study was a superintendent/authority figure. It is important to note this relationship from researcher to staff as it could sub-consciously influence choices made or opinions expressed by staff and students through the survey process.

The Ipad, as a form of exposure to technological resources, seemed to be viewed as a positive product for the Fort Calhoun stakeholders, while the Chromebook for the Lewis Central stakeholders kept many of the responses focused toward comments for future improvement, need for more information, and suggestions for future initiatives. While the Chromebook was certainly beneficial from a cost/benefit standpoint, the overall image of all "technology" at Lewis Central High School, including technology staff, information systems, and district leadership was at times given a negative "spin" through the lens of evaluating the most often accessed form of technology for stakeholders.

Response Collection and Timing

This study was carried out over a period of two years, with additional research/focus on 1:1 study happening over five years' time. Another replication study that examines more opinions of the 1:1 Chromebook program and overall perceptions of

use could yield more accurate results if a researcher could have more data from how this initiative has impacted student achievement over time. The overall goal of any initiative, program, technology, or legislation in any school district should be examining the impact upon student achievement. With the Chromebook initiative being rolled out in 2013, and this survey research happening in 2015, it would be interesting to review student data with five solid years of implementation, comparing achievement from 2008 to 2013 to achievement from 2013 to 2018. Data points such as ACT averages, attendance averages, and 4-year cohort graduation rates are not fully known until the following school year, making the 2019-2020 school year a good time to review this data comparison. With the hurried pace observed concerning technology invention, use, and evolution, it can be very challenging to evaluate results from an initiative over a long period of time and expect results to be viewed as acceptable. For technology change to have a lasting/renewable effect on school systems, results/outcomes that are positive for students need to be evaluated using a measuring process through a lens of extended time.

Low response numbers from parents as a measuring stick of opinion was also a challenge with this study. As discussed earlier, perhaps if two or three emails were sent to the same household, one parent or the other would have answered the survey and, through discussion, may have used that as the opinion of both parents. With such a variety in family makeup, parent perception of their own education process, parent perception of their child's experience in Lewis Central, and other surveys about technology being given to parents recently, one can only surmise as to some of the reasoning for a 10% response rate from parents.

An option at the time of the study was to send a "reminder" email or follow-up to parents. With a high response rate from staff, and a statistically significant response rate from students, it would have been a challenge to send a reminder to parents and not send a reminder to staff and students, as it may have increased bias. It was the opinion of Lewis Central school officials and the researcher that enough parent responses had been collected for this study with consideration given to the amount of open-ended, qualitative responses received that had common themes.

For future initiatives, a better response rate from parents would be desirable, along with a consistent reminder/follow-up system being given to all three groups of stakeholders. Surveys/communication to all stakeholders could also be mapped out with a strategic plan to avoid an over-saturation of surveys, but still allow stakeholder input to be gathered in a timely way. Perhaps allowing parents to take a similar survey using a number of access options, such as a mailing, phone interview or online link to the school website, in addition to the emailed survey, would produce a research sample with a higher participation rate.

Question Structure

The majority of questions from this particular research endeavor were reported through statistical analysis comparing stakeholder answers to other responses to the same question. More parallel questions for comparison purposes and the determination of statistical significance would be an interesting comparison for future endeavors. While it can be challenging to ask each group of stakeholders exactly the same question, formulating questions that will allow different types of stakeholder responses to be compared would produce results that would allow interpretation of patterns and opinions

to be put to use toward improving the initiative. While many similarities exist in this research endeavor that will allow for improvement/modification as intended through Patton's Developmental Evaluation, the potential for program shift through this paradigm has not been fully realized here. Stakeholder buy-in to the survey/research process will also be more fully realized if the stakeholders see active engagement from leadership to make changes based upon their recommendations in a timely way.

Implications for the Future

The Iowa Department of Education (2015) reports five goals the Lewis Central School District SIAC committee has set concerning the "district's major education needs and how the district has sought input from the local community…". Goal number two of five from the Lewis Central School District SIAC committee includes:

"2. Expand and improve the integration of technology throughout the system.

- o Invest in the technology, design, and infrastructure required for the classrooms of the future.

- o Provide personalized professional development and support to staff in the integration of technology into the curriculum.

- o Ensure that infrastructure and personnel support is in place that will enable effective implementation.

Each of these four bullets reflects opinions stated by stakeholders in this research. Teachers would benefit from more time being given in professional development for collaboration, comparison, and review of data, such as that collected in this study. Technology leaders in the school are not only administrators, instructional strategists, and teachers, but also students. Having the opinion of students and the sharing of positive

experiences from students has been well-received by members of the Lewis Central staff, and the sharing of technology for the whole staff, from the student perspective, would perhaps draw to light the impact that staff action with technology has in the classroom, and to a greater/more important extent, the impact it has outside the classroom. Parents see their children using their Chromebook to study as indicated by responses in this survey. More examination of what the application/implications occur outside of the classroom for teachers would be a guiding point for future decisions made concerning planning, use, and learning experience creation.

Students acknowledge that some of their time with the Chromebook is spent for academic and learning purposes, and some time is not being spent toward learning purposes. Through the survey process, perhaps defining what is learning and what is recreation would be beneficial for students. Parents believe their children are using their Chromebooks for academic purposes, yet all three groups of stakeholders agree that students could benefit by more time for academic use and by making better use of the time they have with access to technology. Just as teachers could benefit from technology skill examination, so too, could students. With the homeroom philosophy being utilized at Lewis Central High School, dedicating some of this time toward skill/basic repair/troubleshooting about technology, or the Chromebook itself, would be beneficial.

Was 1:1 technology a good move for Lewis Central in 2013? The opinion of this researcher would be "yes." All three stakeholder groups would point to the need to examine the choice of technology and the outcome of that technology use at Lewis Central High School, as a pattern of speaking about the chosen device in a negative way

seemed to be common amongst students, parents, and staff. Finding the "right tool for the job" will certainly make that job easier with better outcomes.

The decision to implement a 1:1 Chromebook initiative certainly helped bring many elements/dimensions to the educational process that were not present before 2013 at Lewis Central High School. As with any technology initiative, the technology itself has a "shelf-life" of about five to 10 years. That would apply to the Chromebook as well. As the Lewis Central District examines the results/comments from this study and the results from other surveys conducted through Brightbytes, careful examination into the technology that students/staff/parents touch each day will need to be completed. Did the outcome for what is expected of students equal the tool they were given to meet those outcomes? Perhaps in year four and five of this technology's life-span, this answer will become clearer. Research in year five would help to further substantiate or dispute these results through the ultimate goal of measurable, increased student achievement.

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Appendices:

Appendix A: Introductory email to Students to introduce survey:

Students:

Greetings! Attached is a survey concerning the use of your Chromebooks. The purpose of this survey is to learn your thoughts about the Chromebook introduction, training, and use. Thank you for your time and opinions.

Appendix B: Introductory email to Parents to introduce survey:

Parents

Greetings! Attached is a survey concerning the 1:1 Chromebook initiative. The purpose of this survey is to learn your thoughts about the Chromebook introduction, training, and use at Lewis Central. Thank you for your time and opinions.

Appendix C: Introductory email to Staff to introduce survey:

Staff:

Greetings! Attached is a survey concerning the rollout of the 1:1 Chromebook initiative.
The purpose of this survey is to learn your thoughts about the rollout process and
Chromebook use and your perceptions of the 1:1 initiative. The findings could be used to
help the school with future initiatives. Thank you for your time as you reflect upon this
entire process over the last three years!

Appendix D: Student Survey

Lewis Central High School Student 1:1 Chromebook Initiative Survey

This survey is designed to gather information about your use, opinions and thoughts concerning the 1:1 Chromebook Initiative at Lewis Central High School.

* 1. I think my computer skills have improved since getting Chromebooks at Lewis Central.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 2. When I use the Chromebook, my time is spent in the following way:

90% academic/10% non-academic	75% academic/25% non-academic	50% academic/50% non-academic	75% non-academic/25% academic	90% non-academic/10% academic
○	○	○	○	○

* 3. How often do you use your Chromebook in English classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 4. How often do you use your Chromebook in Math classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 5. How often do you use your Chromebook in Science classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 6. How often do you use your Chromebook in Social Studies classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 7. How often do you use your Chromebook in Arts classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 8. How often do you use your Chromebook in Spanish classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 9. How often do you use your Chromebook in other Elective classes?

2 or more times daily	once daily	a few times a week	once a week	once every few weeks
○	○	○	○	○

* 10. I think classes are more interesting when I use the Chromebook.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 11. I feel like I learn more when I use the Chromebook during class.

| Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 12. I believe my skills at locating high quality information have improved since getting the Chromebooks in the Lewis Central Schools.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

13. What additional Chromebook training would be helpful to you now?

14. If another technology for students were brought to Lewis Central, what suggestions would you have for how the technology is introduced?

Appendix E: Parent Survey

Lewis Central High School Parent 1:1 Chromebook Initiative Survey

Lewis Central COMMUNITY SCHOOLS
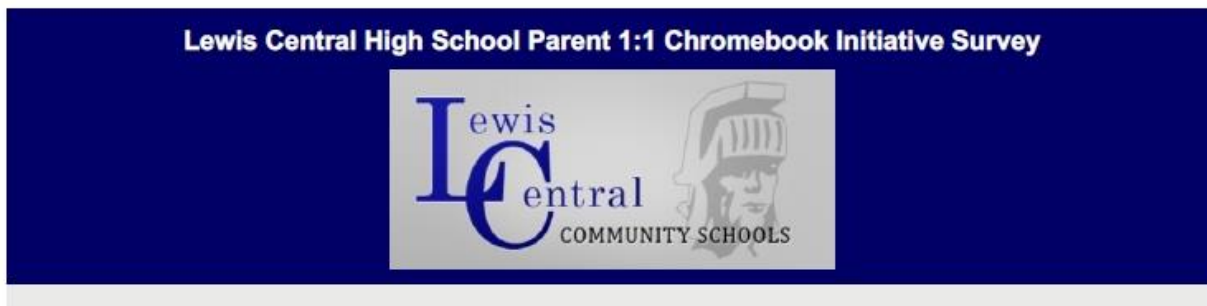
This survey is designed to gather information about your opinions and thoughts on the 1:1 Chromebook Initiative at Lewis Central High School and observed student use of the 1:1 Chromebook at home and school.

* 1. How often do you see your student using his/her Chromebook at home in an educational setting?

2 or more times daily	Once daily	a few times a week	Once a week	Once every few weeks
○	○	○	○	○

* 2. When my child uses the Chromebook, his/her time is spent in the following ways?

90% academic/10% non-academic	75% academic/25% non-academic	50% academic/50% non-academic	75% non-academic/25% academic	90% non-academic/10% academic
○	○	○	○	○

* 3. I believe the Chromebook is helping my student learn.

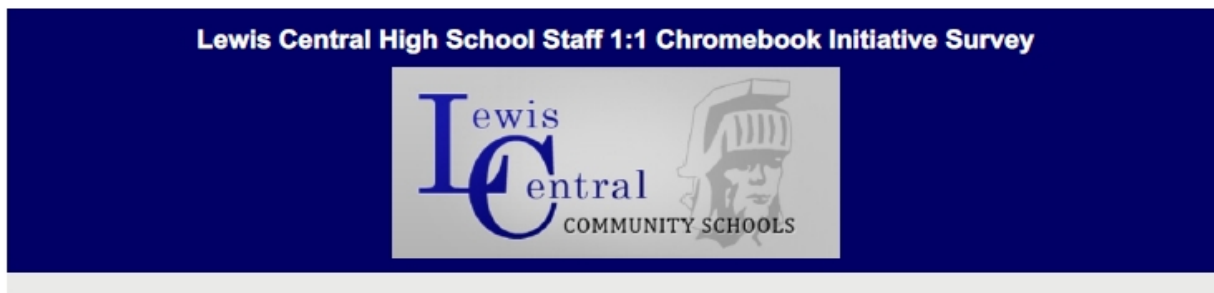| Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 4. I believe the Chromebook is helping my student prepare for the future.

Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

5. Other comments about the 1:1 Chromebook Initiative:

6. Do parents have enough information about how the 1:1 Chromebook Initiative at Lewis Central High School operates? Why or why not?

Appendix F: Staff Survey

Lewis Central High School Staff 1:1 Chromebook Initiative Survey

This survey is designed to gather information about your use, opinions and thoughts concerning the 1:1 Chromebook Initiative at Lewis Central High School.

* 1. How many years have you been in education as a profession?

0 to 5 years	6 to 10 years	11 to 15 years	16 to 20 years	21 or more years
○	○	○	○	○

* 2. I believe the Chromebook Initiative is good for teachers at LCHS.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 3. I felt I was provided sufficient professional development for training and preparation before students were issued Chromebooks in 2013.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 4. I incorporate student use of the Chromebook into my lesson planning:

Daily	A few times a week	Once a week	Once every other week	Once every month
○	○	○	○	○

* 5. I believe the Chromebook implementation process was carried out using a reasonable timeline.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 6. I believe there has been adequate ongoing professional development to properly educate teachers since the Chromebook implementation.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 7. I believe students are more engaged in their own learning progress because of the 1:1 Chromebook Initiative.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 8. I believe there are adequate safeguards, procedures and guidelines in place to keep students from misusing the Chromebooks during school time.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

* 9. I would recommend other school districts utilize a 1:1 Chromebook program for student learning.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
○	○	○	○	○

10. What other suggestions would you have for school districts considering implementing a 1:1 Chromebook Initiative?

11. What other comments do you have about the 1:1 Chromebook Initiative?