KIDS GETTING AWAY WITH LEARNING:

STUDENT PERCEPTIONS OF LEARNING IN ONE TO ONE PROGRAMS

By

Mark Standley

RECOMMENDED:

Dr. Robert Crumley

Dr. Spike Jorgensen

Dr. Rob Lang

Dr. Jean Richey

Dr. Roy Roehl

Dr. John Monahan, Advisory Committee Chair

Dr. Ray Barnhardt, Director, Center for Cross-Cultural Studies

APPROVED:

Dr. Anita Hartmann, Interim Dean, College of Liberal Arts

Dr. Lawrence K. Duffy, Interim Dean, Graduate School

July 31, 2012

Date

KIDS GETTING AWAY WITH LEARNING: STUDENT PERCEPTIONS OF LEARNING IN ONE TO ONE LAPTOP PROGRAMS

A Dissertation

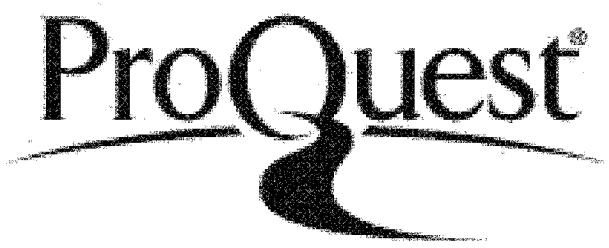
Presented to the Faculty
of the University of Alaska Fairbanks

in

Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF PHILOSOPHY

By

Mark Standley, B.A., M.S.
Fairbanks, Alaska
August 2012



ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Abstract

This research explores students' perceptions of learning in one to one laptop programs in rural Alaska. This research used constructing grounded theory methods by conducting five focus groups in rural high schools in order to gather and analyze data from the students themselves. The research intent was to let the students' words and experiences shape a new theory how about they learn with these laptop programs. From an epistemological standpoint the goal of this qualitative research was to create a more complete picture of learning in one to one programs using grounded data through gathering, analyzing, and working directly with the students in these programs as "co-participants" to learn from their perceptions of learning using laptops. The new literacies student develop through being 21st century learners were reflected in the student perceptions in one to one programs and challenge researchers to re-examine learning theory in light of the ubiquitous nature of digital learning. This research was part of a larger collaboration with the Tech Cohort (Appendix A) to conduct mixed methods research using the same population to create a more complete picture of the research topics and participants.

Table of Contents

List of Figures

Page

List of Tables

Page

List of Appendices

Page

Biographical Sketch

Mark Standley has worked in education and science careers in Alaska since 1980. He first came to the state working on a National Geographic/University of Alaska Museum archeology research project in limestone caves on the Porcupine River. For the next six summers he worked in the Arctic National Wildlife Refuge, Tetlin Wildlife Refuge, and Gates of the Arctic National Park, conducting survey archeology work. Winters were spent at the University Museum at University of Alaska Fairbanks or the National Park Service lab in Fairbanks, analyzing data, documenting collections, and writing up reports.

From archeology Mark moved back into the education field as a teacher in Northway. He began his teaching experiences through two years at a middle school in a rural mountain village in South Korea for the U.S. Peace Corps. He then spent third year doing cross cultural training for the U.S. Embassy in Seoul. Mark continued to work for a total of ten years as a teacher, principal, and assistant superintendent in the Alaska Gateway School District centered in Tok, Alaska. During this time Mark was elected President of the Alaska Society for Technology in Education (ASTE), a statewide education technology group. He also served as co-chair of the Alaska Technology Content Standards group, who created the first set of technology standards for Alaska students.

Mark moved from education into the business world as Statewide Account Executive for Apple Computer, Inc. During his six years with Apple, Mark became involved with many education projects including helped to found the "iDidaMovie" (www.aste.org) media contest for students across the state. After Apple, Mark accepted an assistant professor position at University of Alaska Anchorage (UAA) in Education Leadership. Mark began writing education leadership books dealing in subjects of School Business Partnerships, Technology Standards, and Global Project-based Learning (Visions Publishing, Eugene, OR) and doing leadership presentations in the U.S. and other countries. Other books include a series on Digital Storytelling for students and educators.

Mark left the UAA position for one year to work for the University of Alaska's President and State of Alaska Commissioner as Executive Director of the Alaska Center for Excellence in Schools. The Center created a mentoring project for rural principals to provide better training for these administrators through technology and University support. After one more year at UAA's Education Leadership program, Mark left the University to help start and lead Highland Tech School, a charter in the Anchorage School District. Highland Tech (www.highlandtech.org) is a student-centered, technology based, charter school in rented space in a shopping mall. Over six years, all Highland Tech stakeholders acted on a shared vision of mastery learning and standards based curriculum (Delorenzo, Battino, Schreiber & Gaddy, 2009). During this time Mark also help found and run with other educators Science and Storytelling Camps; week long exploration events for students doing science and digital storytelling in National Parks in Alaska, Hawaii, Walden Pond and the United Kingdom (www.teachingstory.com). They received funding for two years from the Office of Naval Research to study factors that would cause students in Alaska and Hawaii to want to pursue science careers (www.futurescientists.org) and Mark served as curriculum director and editor of the project's report.

After six years at Highland Tech, Mark retired from public education and began a non-profit, Educating 4 Leadership (www.educating4leadership.org) It focused on creating student leaders and providing training for student school leaders on one to one programs across Alaska. He also provided consulting and training for students and teachers across Alaska and Hawaii for several education technology firms and foundations. He also began a cohort, interdisciplinary doctoral program at the University of Alaska with a number of educators from Alaska. Since beginning work on this research, Mark has begun supervising education administrator interns at the University of Alaska Southeast, where he is teaching a course on Education Research in the Summer semester, 2012. Mark has also been elected to serve again as President for ASTE during the 2013 – 2014 year.

Mark is the very proud father of two children, Aron (24) and Robin (21), who make their parents proud by pursuing their dreams, passions, and curiosities in raw food, yoga, creative writing, art, spirituality, and organic farming in this country and others.

Acknowledgements

First and foremost, I want to extend my deep appreciation for the members of the Tech Cohort - Larry Ledoux, Pam Lloyd, and Bob Whicker. No one could ask for more intelligent, supportive, or courageous people to work through a doctoral, blue water sailing, research project together.

Second, a bottomless well of gratitude for Dr. John Monahan, committee chair and friend, and members of my committee and our UAF interdisciplinary doctorate faculty: Dr. Barb Adams, Dr. Bob Crumley, Dr. Spike Jorgensen, Dr. Rob Lang, Dr. Jean Richey, and Dr. Roy Roehl, for the patient wisdom of true scholarship to teach, to guide, and to mentor through one of academia's great challenges.

And to my good friends and family. Your wellspring of support and unending encouragement has meant everything over the years, and especially during the wonderful challenge of completing this research. Special thanks to Christine Bridges, Karen Cator, Arun Croll, John Crowder, Dr. John Davis, Melora Gaber, Robbie Kinner, Kim Hanisch, Mark Hines, Rebecca Midles, Jane Monahan, Steve Moss, Roxy Mourant, Chris Selin, Jeanne Sivertson, Vicki Skarie, Bill Sullivan, and Kelly Tonsmiere; I'm quite sure I would not have made it without you.

I'd like to acknowledge the wealth of knowledge and great skills with qualitative research, Atlas TI software, and good humor of Dr. Nick Woolf and the quality teaching and guidance in conducting focus groups as research and storytelling from Dr. Richard Krueger.

And to my parents living and above - this one's for you! Thanks for the nudges in curiosity for learning, persistence, and compassion.

And finally to our children - Aron and Robin. It seems every chapter in life has a different lesson to teach us...just getting to share lives and stories together with each other, I believe I have learned the most by listening to you. You are my life's greatest gift and joy. Thanks for being who you are!

Preface

This dissertation explores student perceptions of learning in one to one laptop programs in rural Alaska. A problem exists that what students do with the laptop computers do not always align with their schools expectations of them. Students are using the laptops for school work assigned by their teachers, they are abiding somewhat by the filters and boundaries set up by the schools, and they are using the laptops beyond the educators' knowledge and boundaries to create their own learning opportunities. The students are getting away with learning, and typically educators and even the students themselves do not fully know or appreciate how students are doing it. Through focus groups grounded in the students' own words (Morgan, 1993, 1998; Stewart & Shamdasani, 1990), this research offers some insights and new avenues for theory on literacy, learning, and implementation of one to one programs.

While looking for theories to help explain the trends in the focused codes, a powerful quote jumped out. Here, Vygotsky (1978) describes the research and theoretical orientations of Jean Piaget, and perfectly summarizes the aim of this research.

"The point of asking questions that are so far beyond the reach of the child's intellectual skills is to eliminate the influence of previous experience and knowledge. The experimenter seeks to obtain the tendencies of children's thinking in "pure" form entirely independent of learning." (p. 30)

If done properly the process and conclusions of this research are intended as a declaration of the sentiments of the above quote from two scholars who thought and wrote much about children's perceptions of learning.

Other cohort members (Appendix A) addressed research questions using the same population in rural Alaska and different methods. Figure 1 represents the different pieces of the puzzle we were asking regarding pedagogy, teacher/student use of technology, impact of bandwidth, and student perceptions of learning. Each dissertation represents a different look at learning and teaching in the one to one programs. Together the four dissertations represent an attempt to explore aspects of the one to one programs toward understanding their impact and improving their implementation in the future.

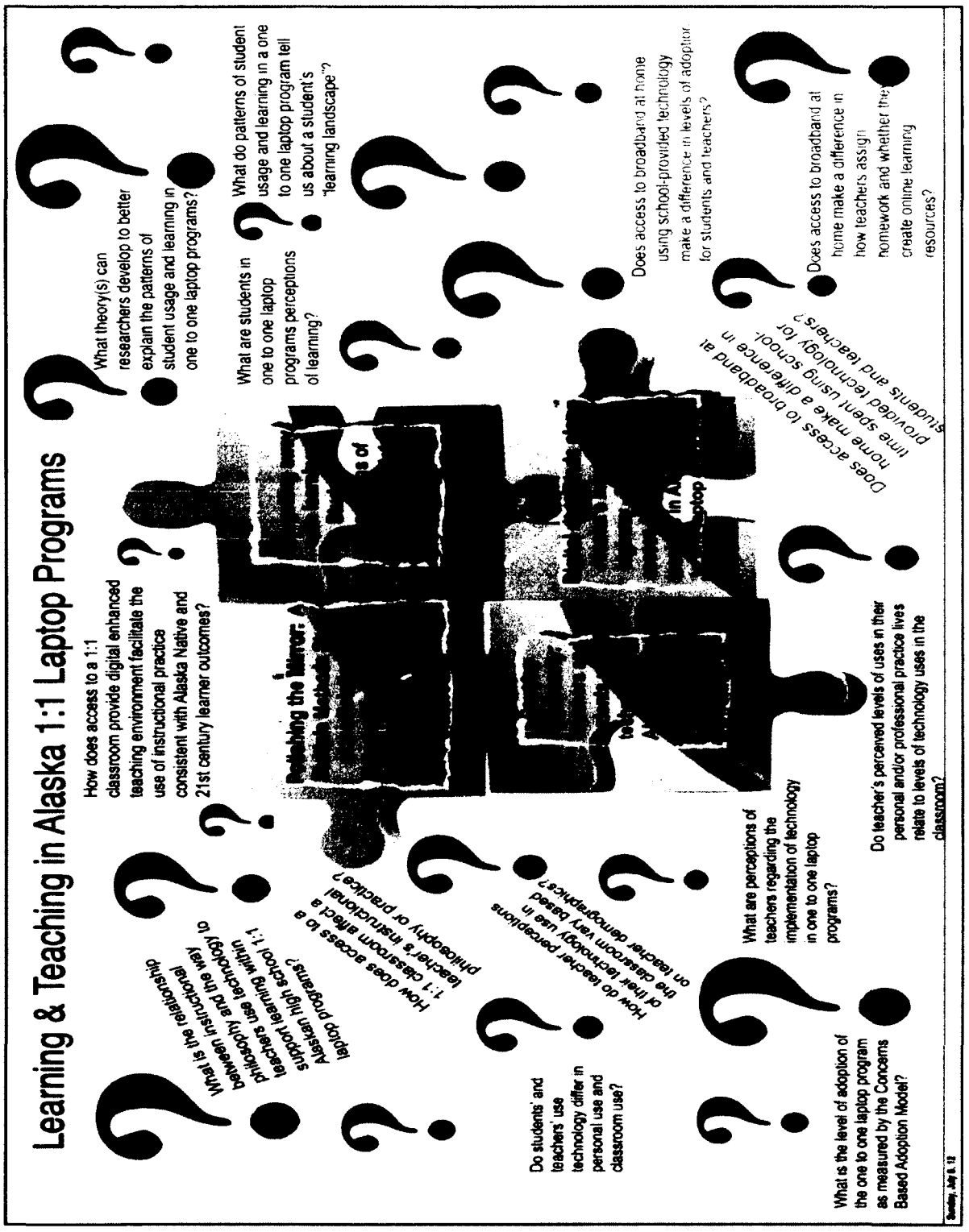


Figure 1. Research questions in tech cohort.

Chapter 1: Introduction

Across the U.S. and Alaska schools are adopting one-to-one laptop programs at an unprecedented rate. This rush to new technology is not necessarily new, but the impact of "digital learning" for students is something worth researching (Prensky, 2006). Students have access to these laptops throughout their day at both school and at home. As the Metiri Group (Lemke & Coughlin, 2006) defines it, "...1 to 1 learning involves one student, one computer, one interactive, personalized learning experience in a wireless environment with anytime access to the internet" (p. 3). This ubiquitous access means an extended learning day for students and the chance for researchers to look at student perceptions of their own learning in these one to one environments.

Schools have created or purchased curriculum for the students to formally engage in using the laptops. Teachers are being trained to enhance their pedagogy to help students take advantage of the laptops at school and at home (Whicker, 2012). Outcomes of this formal pedagogy and learning can be measured by teacher-created assessments, standards-based assessments, and student self-reports of their progress. But the nature of one to one laptop program environments also includes the informal or unintended learning that students acquire through their own interests, peers, social networking, and "goofing around" on the computer. This study researched student perceptions of learning with laptops through focus groups towards development of theory of student learning in one to one programs.

1.1 Theoretical framework

The theoretical framework for this qualitative research was the phenomenological approach using constructivism and grounded theory methods. Student access to one to one laptops is a relatively new occurrence in schools (Apple, n.d.; 2004a,b,c; 2005a,b; Greaves & Hayes, 2008; Lemke, Coughlin, Thadani, & Martin, 2000; Livingston, 2006; Texas Education Agency, 2002). The phenomena being explored were the patterns of learning students adopt and/or adapt to make use of these digital devices for formal (school oriented) and informal (more personal, social-oriented) tasks.

From an epistemological standpoint the goal of this qualitative research was to create a more complete picture of learning in one to one programs using grounded data through gathering, analyzing, and working directly with the students in these programs as "co-participants" (Charmaz, 2006) to learn from their perceptions of learning using laptops. The approach reflected the researcher's worldview of constructivism that students make their own meaning of their experiences with these devices working by themselves, with peers, and under the instruction of educators. Hearing directly from student experiences allowed the researcher to observe the processes they described and deductively interpret these patterns around learning in these programs. The core assumption behind this approach was the researcher neither knew nor experienced the student perceptions or reality of digital learning.

From a research standpoint the goal was to discover the student perceptions in these programs of laptops as a learning tool. The researcher used the words and phrases from the students to analyze how they adapted the laptops into their school and non-school behaviors to discover perceptions of learning. The student perceptions described patterns of learning that helped this researcher discover and offer concepts for new theory about student learning in one to one laptop environments.

The research designs considered for this work included mixed methods in concert with a Tech Cohort (Appendix A) as described in the Preface. There are a number of quantitative studies on laptop programs in other states (Gulek & Demirtas, 2005; Otto, Hannon, Mainzer, & Bautz, 2010; Penuel, 2006; Silvernail, 2007) examining specific numeric data regarding impact and achievement. The researchers tested theories using quantitative methods and numeric data to measure student achievement and engagement using laptops. From a theoretical basis that research assumed a positivistic approach for testing a hypothesis based on the relationship between use of laptops and variables such as school outcomes (Penuel, 2006).

Most of the quantitative data from the literature suggested few academic gains with laptops, yet many educators and parents reported there is "something" about laptops that motivates students (Penuel, 2006). While many critics claimed that technology does

not lead to increased achievement (Cuban, 2006a,b; Dunleavy & Heinecke, 2007), many other studies show specific gains in writing and technology skills. The patterns are elusive around which skills are impacted most (Harris, 2010).

New theories need to be developed to better understand the relationship between students, laptops and learning. Existing learning theory needs to be evaluated in light of this opportunity students have with nearly unbounded access to virtually unlimited amounts of information outside the bounds of school curriculum, adult control, and appropriate level of the student's cognitive development. Qualitative methods represent a new and useful approach to the new experience of student access to one to one laptops and digital information throughout their day (Denzin & Lincoln, 2008). Research using grounded theory methods creates new ways of examining that relationship from the direct experiences and words of the students (Charmaz, 2006).

There are few qualitative studies in the area of one to one laptop programs (Weston & Bain, 2010) and fewer still using mixed methods (Dalgarno, 2009; Lowther, Ross, & Morrison, 2003). These studies (Harris, 2010; Lowther, Strahl, Inan, & Bates, 2007; Penuel, 2006) seemed to get closer to the dynamic that something new is happening for students and learning that is not measured by quantitative methods (Prensky, 2006). The qualitative methods using grounded theory provided a tool to get a fresh view of these laptop programs that researchers were not getting from a strictly quantitative approach. This research also combined efforts with a Tech Cohort (Appendix A) to provide insights from mixed methods sampling from the same population of schools in thirteen Districts in rural Alaska. From a research design perspective it was more appropriate to study the research question of student perceptions of learning in one to one laptop programs from a constructivist, emerging approach.

1.2 Overview of methodology

This research adopted a qualitative approach to understand student perceptions of learning in one to one laptop programs in rural Alaska. Qualitative research is "...any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1998, p. 17). Qualitative methods

emphasize working in setting natural to the phenomenon being studied with the least intrusion and "...real world setting [where] the researcher does not attempt to manipulate the phenomenon of interest" (Patton, 2002, p. 39).

Methodology for this research used the grounded theory methods described by Strauss and Corbin (1998) and Charmaz (2006). These methods focus on analysis of data from co-participants experiencing a phenomenon (i.e. one to one laptops) and use of coding (open and focused) to analyze data, which in this research were the words and perceptions of the students in five different focus groups. Approaching gathering information from students in rural Alaska required consideration of methods through the questions and responses in focus groups. The need to develop new theory to help explain unexplored student perceptions of learning in one to one programs helped shape the choice of using grounded theory methods for this research.

Grounded theory allows the researcher to work directly with individuals who have experienced a phenomenon (in this case using a laptop computer and ubiquitous access to information) and to collect data through an interview process (i.e. focus groups) for the purpose of gathering and analyzing data to develop new theories. Furthermore it allows the researcher to use the constant comparative method of refining questions in the focus groups based on data from early groups to improve the vector of the questions toward openness and reporting by the students of their perceptions and experiences with learning on the laptops (Charmaz, 2006).

The advantage of the Tech Cohort was the use of mixed methods with a combination of qualitative and quantitative approaches. Specifically, the Tech Cohort used online surveys, interviews, and focus groups in rural districts in Alaska implementing one to one laptop programs under the auspices of the Consortium of Digital Learning (CDL) (Ohler, 2009). The characteristics of the CDL one to one program included:

"1) students and teachers having access to laptops anytime, anywhere, in and out of school, 2) access to a wireless infrastructure, 3) the use of the laptops included in the

curriculum as tools of learning, and 4) a professional development model including technology integration in the learning process." (Whicker, 2012, p.20)

Hence the choice of grounded theory for methods because students and teachers had first hand knowledge and insights through their experiences with using and learning with laptops.

This dissertation used qualitative research methods of conducting focus groups in five rural Alaska districts (Appendix F). The Tech Cohort involved in this research conducted online surveys in thirteen districts that included all but one district (Dillingham) where the focus groups were conducted. The Tech Cohort's research population overlapped in four districts (Cordova, Lower Kuskokwim, Northwest Arctic, and Petersburg) where online surveys, interviews, and focus groups were conducted. All districts in this research were chosen because of their participation in the CDL program from approximately 30 districts currently engaged in one to one laptop programs. The mixed methods approach provided the benefit of open and closed ended questions, multiple forms of data, text and statistical analysis, and multiple perspectives from the research co-participants in the one to one laptop programs (Creswell, 2009).

The data analysis plan described above was designed to listen, gather, transcribe, code (open and focused), process through careful analysis, and synthesize according to the students' concepts, the direct words and thoughts around their perceptions of learning using laptops in one to one programs. The reason for using qualitative methods such as grounded theory is not to prove but rather to discover new paths of inquiry and theory (Straus & Corbin, 1998) in a relatively new education situation of students have ubiquitous access to a laptops and information for school work and their own interests.

The key to using this method and data analysis was staying open minded and open eared to what students had to share about learning through one to one laptop programs. It appeared students attach little conscious thought or metacognition to the idea of learning while using their laptops. They also seem to differentiate between schoolwork ("little l") and pursuing their own interests ("big L"). Also, there is a lot of motivation, interest, and skill attached to social learning. The data analysis described above was the manner used

to ascertain the student perceptions and pursue new theory to explain their learning behaviors.

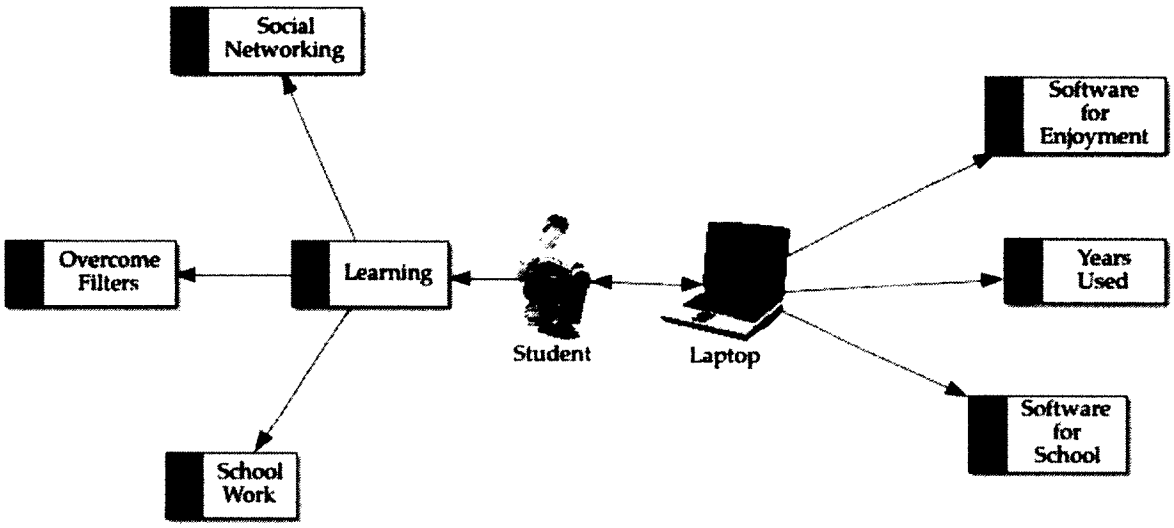


Figure 2. Student perceptions of learning.

1.3 Statement of the problem

With all the laptop programs in the United States, and in Alaska in particular, students have more extended access to digital technology, information and potential learning. Little is known about the learning strategies individual students are using to take advantage of this unprecedented access. Studies confirm laptops are motivating to students and that they are willing to spend more time using them for instructional and non-instructional purposes (Lowther et al., 2007; Penuel, 2006). The problem to be investigated is how they are adapting their individual learning strategies with the availability of the laptops.

These perceptions are "windows" into the thinking, motivations, and metacognition of the students. An assumption made in this research's constructivist approach was to hear and see the adaptive nature of a student's brain in digital environments. Researchers cannot readily see that adaptive nature or "thinking" through

other measures (Howe & Strauss, 2000). Therefore educators implementing one to one programs cannot always know or direct these programs into the most productive ways. This research aimed to bridge our understanding between one to one programs designs and the reality of how students actually respond in digital learning environments.

Typically goals of the laptop programs are to increase student achievement, enhance access to learning materials and online courses, improve student opportunities for jobs and entrepreneurial activities, and/or motivate the students to attend school and more fully participate in academic, digital curriculum (Muir, Knezek, & Christensen, 2004; Lemke & Martin, 2004; Lowther et al., 2007; Silvernail & Buffington, 2009). Despite increases in one to one programs and access to digital content, researchers may not know or understand student perceptions of learning in these one to one laptop programs. There is a lack of confirmed data in the relationship between the way students use the laptops and the way they perceive them as learning tools. There is also a lack of understanding between the way students perceive the use the laptops and various software as enjoyment (i.e. social networking) and for schoolwork. There is a question about the difference between how students perceive using the laptop and the real or implied goals of the school program. Finally there is a question about how students view the benefit(s) of one to one laptop programs.

The movement of education technology towards one to one laptop programs changes the nature of the relationship between students, digital devices and learning. Instead of access to a device being restricted to school or home, students in one to one programs have continual access to a laptop computer and a wider array of digital information to help in their learning. Schools are adapting their professional development, pedagogy, and policy to the new one to one programs. Student learning patterns and behaviors in these digital realms are new to researchers and practitioners (Bebell & O'Dwyer, 2010; Colvin, 2008; Penuel, 2006; Prensky, 2006; Tapscott, 1998).

1.4 Backdrop for study: description of the communities

This study was set in rural Alaskan schools that are participating in the Alaska Association of School Board's (AASB) Consortium for Digital Learning (CDL) one to

one Laptop Program over the past 10 years (Figure 3). Not all schools in this study participated in that program for that length of time, but all were currently operating according to Program's original parameters. More importantly, the schools and students had multi-years using the one to one laptops and represented a population of users ranging from one to six years of experience. This experience gave the students a base from which to describe their formal (schoolwork) and informal (personal) use of the devices and their perceptions of learning through that differentiated usage.

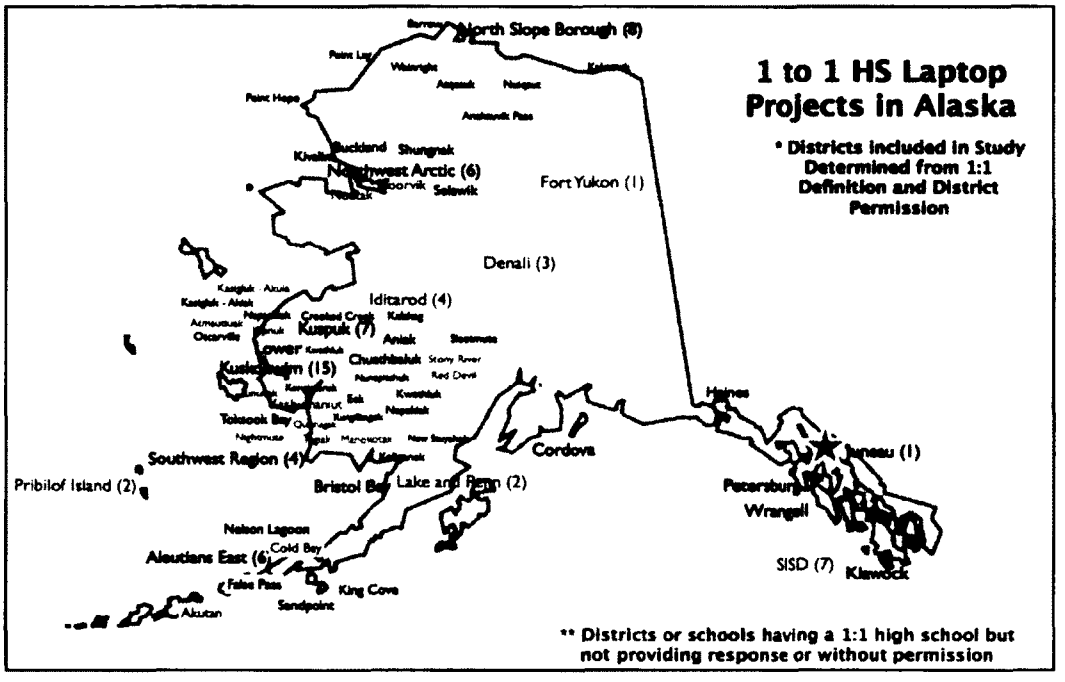


Figure 3. One to one high school laptop programs in Alaska.

The five high schools researched in this study are located in different parts of rural Alaska. All require air or water transportation to get to the larger communities of Anchorage or Juneau. The schools and communities range from predominately Alaska native or Caucasian to a mixture of races as reported by the school districts in their annual report cards and the Alaska Community Database Community Information Summary (Appendix F). They also range from traditional subsistence to fishing economies depending on their locations and cultural history. Despite their cultural,

economic, and geographic differences, all the schools in this study were part of the Consortium for Digital Learning (CDL) one to one laptop programs.

1.4.1 Cordova.

Cordova Middle/High School is a part of the Cordova City School District and located in the community of Cordova in Southcentral Alaska. Cordova is located at the southeastern end of Prince William Sound in the Gulf of Alaska. The community was built on Orca Inlet at the base of Eyak Mountain. It lies 52 air miles southeast of Valdez and 150 miles southeast of Anchorage. The area has historically been home to the Alutiiq and migrating Athabascan and Tlingit Natives who called themselves Eyaks, as well as Alaskan Natives of other descents. Alaskan Natives of other descents also settled in Cordova. Cordova hosts a large fishing fleet for Prince William Sound, as well as several fish processing plants. The average daily membership (ADM) for the District was 337.75 for the FY 11. The population of the community is 2,289 and during the 2010-2011 school year the population of the Cordova middle/high school was 117 students. Cordova City School is a single site school district. Cordova Middle/High School student population is made up of 16% of Alaska Native and American Indian students, 18% of Asian students, 57% of Caucasian students, and less than 2% each of African America, Hispanic and/or two or more races. For this same year the graduation rate was 94%. The percentage of economically disadvantaged students was 50% and the percentage of students with disabilities was 10% for this same school year. The school did meet Annual Yearly Progress (AYP) (Alaska Department of Commerce, Community and Economic Development, 2012)

1.4.2 Dillingham.

Dillingham Middle/High School is a part of the Dillingham City School District and located in the community of Dillingham in Southwest Alaska. Dillingham is located at the northern end of Nushagak Bay in northern Bristol Bay, at the confluence of the Wood and Nushagak Rivers. It lies 327 miles southwest of Anchorage. Traditionally a Yup'ik Eskimo area with Russian influences, Dillingham is now a highly mixed population of non-Natives and Natives. The excellent commercial fishing conditions in

the Bristol Bay area are at the center of the local culture. Dillingham is the economic, transportation, and public service center for western Bristol Bay. Commercial fishing, fish processing, cold storage, and hosting the fishing industry are the main activities. The average daily membership (ADM) for the District was 478.70 for the FY 11. The population of the community is 2,376 and during the 2010-2011 school year the population of the Dillingham middle and high school was 176 students. Dillingham City School is a single site school district and is a Title I school. Dillingham Middle/High School student population is made up of 82% of Alaska Native and American Indian students, 12% of Caucasian students, and less than 2% each of African American, Hispanic, Asian, and/or two or more races. For this same year the graduation rate was 73%. The percentage of economically disadvantaged students was 75% and the percentage of students with disabilities was 16% for this same school year. The school did not meet Annual Yearly Progress (AYP) and was at AYP Level 5 for the third year (Alaska Department of Commerce, Community and Economic Development, 2012).

1.4.3 Kwethluk.

Ket'acik/Aapalluk Memorial School is a part of the Lower KuskokwimSchool District and located in the village of Kwethluk in Western Alaska. Kwethluk is a Yup'ik community located 12 air miles east of Bethel on the Kwethluk River at the junction with the Kuskokuok Slough of the Kuskokwim River. It is the second largest community along the Lower Kuskokwim River. Kwethluk is an Yupik Eskimo community involved in traditional subsistence fishing and hunting. Residents haul water for household use. The average daily membership (ADM) for the District was 3995.15 for the FY 11. The population of the community was 741 and during the 2010-2011 school year the population of the Ket'acik/Aapalluk Memorial school (grades 3-10) was 142 students. Ket'acik/Aapalluk Memorial School is a part of a regional education attendance area (REAA) school district. Ket'acik/Aapalluk Memorial School student population is made up of 100% of Alaska Native and American Indian students. For this same year the graduation rate was 73%. The percentage of economically disadvantaged students was 18% and the percentage of students with disabilities was 11% for this same school year.

The school did not meet Annual Yearly Progress (AYP) and was at AYP Level 5 for the eighth year (Alaska Department of Commerce, Community and Economic Development, 2012).

1.4.4 Petersburg.

Petersburg High School is a part of the Petersburg City School District and located in the community of Petersburg in Southeast Alaska. Petersburg is located on the northwest end of Mitkof Island, where the Wrangell Narrows meet Frederick Sound. It lies midway between Juneau and Ketchikan, about 120 miles from either community. The community is known for its blend of Tlingit and Scandinavian history. It is known as "Little Norway." Petersburg hosts a fishing fleet for Southeast and the Bering Sea, as well as several fish processing plants that date back to the early 1900's. The average daily membership (ADM) for the District was 485.83 for the FY 11. The population of the community was 3,030 and during the 2010-2011 school year the population of the Petersburg High School was 93 students. Petersburg City School is a single site school district. Petersburg High School student population is made up of 14% of Alaska Native and American Indian students, 71% of Caucasian students, and less than 2% each of African American, Asian, and Hispanic races. For this same year the graduation rate was 80%. The percentage of economically disadvantaged students was 54% and the percentage of students with disabilities was 17% for this same school year. The school did meet Annual Yearly Progress (AYP) (Alaska Department of Commerce, Community and Economic Development, 2012).

1.4.5 Selawik.

Davis-Ramoth School is a part of the Northwest Arctic Borough School District and located in the village of Selawik in Northwest Alaska. Selawik is situated at the mouth of the Selawik River, where it flows into Selawik Lake, about 90 miles east of Kotzebue. It lies 670 miles northwest of Anchorage. The city is near the Selawik National Wildlife Refuge, an important breeding and habitat spot for migratory waterfowl. Selawik is an Inupiat Eskimo community involved in traditional subsistence fishing and hunting. The community is noteworthy for its extensive system of boardwalks for foot

traffic, ATV's, and snow-machines to get between households, school, and the three local stores. The average daily membership (ADM) for the District was 1776.08 for the FY 11. The population of the community was 868 and during the 2010-2011 school year the population of the Davis-Ramoth school (Grades 3-10) was 144 students. Davis-Ramoth School is a part of a regional education attendance area (REAA) school district and is a Title I school. Davis-Ramoth School student population is made up of 100% of Alaska Native and American Indian students. For this same year the graduation rate was 12%. The percentage of economically disadvantaged students was 89% and the percentage of students with disabilities was 18% for this same school year. The school did not meet Annual Yearly Progress (AYP) and was at AYP Level 5 for the eighth year (Alaska Department of Commerce, Community and Economic Development, 2012).

1.5 Significance of the study

The importance of this study was primarily with the focus on sussing out new theories of learning from the perceptions of students in one to one laptop programs. Millions of dollars have been invested in digital learning devices for students and schools (Silvernail, 2007) across this and other countries. The rush to have a one to one program is going to overtake the very real consideration of how to design the learning experiences of students to align with a) how students learn in digital environments, b) the issues with bandwidth and content filtering in and away from school, and c) effective pedagogy in 21st century schools.

This study sought to better inform researchers and practitioners regarding the design and implementation of one to one programs to accommodate the learning patterns of students, also referred to as "digital natives" with their characteristic ease in use, navigating and multi-tasking with technology. As Marc Prensky (2001a) defines this term:

"Digital Natives are those who grew up with digital technology from birth, whereas Digital Immigrants are those who were already socialized in pre-digital ways when digital technology arrived on the scene." (p. 28)

The other aim of this study was to develop new theory (Strauss & Corbin, 1998) to better explain the relationship between learning and the occurrence of ubiquitous learning environments. These one to one programs allow students to have more access to information for longer periods of time than ever before. How do researchers and educators explain or take positive advantage of the adaptive nature of student learning in these environments?

The other significance of this study was its attempt to shed light on the relationships between technology, learning, culture, pedagogy, and bandwidth access in rural Alaska. Alaskan schools are not newcomers to technology, but the 24 X 7 nature of one to one programs is something new. This mixed methods study in concert with the studies of the Tech Cohort (Appendix A) provided unequaled insights into the above topics. This research intends to help in informing practices in the implementation of one to one programs in Alaska.

1.6 Purpose of the study

This study sought to ascertain patterns of student learning in one to one programs to develop a theory that better explains and supports the implementation of these programs. This study researched how students learn in ubiquitous, digital environments in unique Alaska settings with the intention of improving one to one programs and contributing to the body of research on learning theory in this area overall. While many studies of one to one programs in other states (Lowther et al., 2007; O'Dwyer, Russell, Bebell, & Seeley, 2008; Silvernail, 2007) provide many insights into one to one programs there, none address issues of Alaska's education system, technology infrastructure, geography and cultural diversity.

The purpose of this research also included helping to design and implement one to one programs in practice and in policy by learning directly from students. The research used qualitative methods to gather the experiences and data from students through focus groups in five different schools around the state (Appendix H). This approach provided the advantage of listening directly to the students in focus groups as they adopt and adapt one to one laptops in their learning strategies. By gathering and analyzing this data using

grounded theory methods these focus groups were transcribed and analyzed to ascertain the students' experiences and perceptions about learning using laptops. This analysis aimed to develop new insight, implementation strategies and theory about ways student use laptops (software, social media, school work, etc.) for learning.

1.7 Research questions

Studying both formal and informal learning behaviors by students in one to one learning environments can help researchers develop new theory about the nature of student learning in digital environments. Researchers and educators do not fully comprehend nor do they have specific plans about leveraging student informal learning behaviors to achieve school goals or increase student achievement in traditional measurements and/or technology standards at a state or national level. Understanding both the formal and informal patterns of digital learning through questions provide researchers and educators new insights into how students function, respond to teacher expectations, think, network, and pursue their curiosity. As Strauss and Corbin (1998) note "Every type of inquiry rests on the asking of effective questions" (p.73). The research questions of student perceptions of learning pursued in this study were designed to explore new theory around how students learn in one to one laptop programs.

Research questions pursued in this study include:

1) What are students in one to one laptop programs perceptions of learning?
    a) What does their software usage (self-reported) tell us about student appropriation of one to one laptops for learning?
    b) How do they perceive the differences between laptop usage for school (formal) and non-school (informal) work?
    c) How do they perceive school laptops in one to one programs vs. their home computer(s)?
    d) What do they perceive as the benefits of laptops?
    e) How do they perceive their teachers' usage of technology in pedagogy?
    f) How do they perceive bandwidth issues at home and at school?

2) What theory(s) can researchers develop to better explain the patterns of student usage and learning in one to one laptop programs?
   a) What are the patterns of their laptop usage in schoolwork (formal) and non-school work (informal)?
   b) What does this tell us about a student's "learning landscape"?
      i) Relationship between formal/informal learning
      ii) Perceptions of access to information
         (1) control/filters
         (2) bandwidth
         (3) content
         (4) research/inquiry
         (5) pursuit of interests
      iii) interactions with others
      iv) use of tools (software, laptop, networks, etc.)

1.8 Limitations to the study

The study was limited to students in nine school districts in rural Alaska. There were several limits to the study based on time, logistics, resources, and research intent. The limits created certain boundaries for inquiry but also represented the chance to focus on the situation of native and non-native students engaged in to one to one laptop programs for multiple years in rural and smaller urban settings. Despite the challenges of expense and logistics, the research was conducted in rural school sites with the benefits of face to face interactions with the students. Overcoming these limitations provided a level of interaction in keeping with qualitative research methods of hearing directly from students as co-participants in this work.

The data gathering for this research was on site in five different schools over a three-month period in winter, 2011. Access to the school sites was by commercial jet and prop "bush" airlines and by taxi or ATV/snow-machines rides to the school buildings. The expense of flying to communities in "bush" Alaska to conduct the focus group was

high. The average airfare from Anchorage to regional hub communities is approximately $800. Three of the focus groups were in Dillingham, Petersburg, and Cordova. The two focus groups conducted in "bush" communities of Kwethluk and Selawik required further air travel from the regional hubs. Each of these airfares were approximately an additional $400. Accommodations included staying at the school or (when available) in a local motel. Due to the rural nature of the communities/schools, research logistics were relatively expensive and time consuming over the course of the data gathering process.

1.9 Summary

This dissertation explores rural Alaska student perceptions of learning in one to one laptop programs to develop new theories of student learning in ubiquitous digital environments. The organization of the research created a unique opportunity for our University of Alaska Fairbanks Tech Cohort (see Appendix A) to explore and examine in some detail the nature of one to one programs in Alaska locations. By using online surveys, interviews, and focus groups, this research triangulated collected data through mixed methods. The strength of this approach was to validate results and open up new paths of inquiry into theory of learning with technology in one to one programs. Given the ubiquity of these programs in Alaska, nationally, and globally, this joint research offers insights in designing and implementing more effective one to one programs.

Additionally, the mixed methods and cohort approach in this research as described in the Preface represented an attempt to develop new theory to better explain the relationships between ubiquitous, digital environments, pedagogy, learning, bandwidth, teacher professional development, and culture. Together the four interlinking studies represent a larger and more comprehensive glimpse of that same puzzle in light of the shared data, methods, research collaboration, and cooperation from the students, teachers, and administrators in this research. These research efforts contribute to the foundation of much needed new theory, design, and implementation strategies for creating effective digital learning for students.

Chapter 2: Review of the Literature

2.1 Introduction

The search for student perceptions of learning in one to one laptop programs entailed a review of the literature in the field of education technology and learning theory. The literature review of educational technology focused on one to one programs in Alaska and other states prior to the data collection process. This review helped frame the methodological and method approaches for this research, as well as the range of findings and calls for research described in the one to one literature. Initial exploration of literature on learning theory before collecting data expanded afterwards in the analysis phase and attempted to compare student responses in this research with extant theory on the process and perceptions of their learning using laptops.

The literature review in education technology and learning theory has provided ample evidence that this research topic and methodology have a larger group of researchers than just the Tech Cohort. The increasing numbers of one to one programs and research suggest this phenomenon is growing. The rising population in schools -

"From 2008-09 through 2020-21, public elementary and secondary school enrollment is projected to increase from 49.3 to 52.7 million students, but with differences across states." (Aud et al., 2011, p.22). Combined with the decreasing costs of technology per unit, it is probable that these one to one, as well as Bring Your Own Device (BYOD, Bring Your Own Network (BYON), and Bring Your Own Browser (BYOB) will increase (Lemke & Coughlin, 2006).

Another reality to consider is how much United States spends per student compared to other countries as measured by a comparison of national expenditures in education. "In 2007 the United States spent $10,768 per student on elementary and secondary education, which was 45 percent higher than the Organization for Economic Co-operation (OECD) average of $7, 401." (Aud et al., 2011, p. 106). The investment in education technology as a subset of this per capita spending reflects the growing availability and ubiquity of laptops and computing tablets for schools. The trends suggest a strong increase in the presence and availability for one to one computers for students

(Penuel, 2006). Hence, the importance of research to investigate the relation between this technology and student learning to measure, leverage, and improve the efficacy of these investments. The literature review was a point of discovery and departure for research. As Charmaz (2006) puts it, "The literature review and theoretical frameworks are ideological sites in which you claim, locate, evaluate, and defend your position." (p. 163)

As recommended by the grounded theory approach some of the literature review was conducted after the data collection in order to enter the data gathering and analysis without a burden of theoretical concepts through which to filter student responses. While extant learning theory was explored prior and after the data collection, the process lead to exploration of other theory in new literacy and digital media related to learning. The result of this process lead directly to the new literacy and 21st century learning research that was more closely aligned with the focused coding that resulted from this analysis in this study.

2.2 One to one laptop research

United States and Alaska schools are adopting one to one laptop programs at an unprecedented rate. This rush to new technology is not necessarily new, but the potential impact on "digital learning" for students is gaining a lot of attention in the literature (Oppenheimer, 1997, 2003). Students have access to these laptops throughout their day at school and at home. In Alaska one to one laptop programs exist in over 30 of 53 school districts over the past 5 years (Ohler, 2009). Limited research has been conducted to examine the impact of these infusions of technology into the learning environment (Silvernail, 2007; Texas Education Agency, 2002; Weston & Bain, 2010). This ubiquitous access means an extended learning day for students and the chance for researchers to look at the nature of student cognition in digital learning.

In most laptop programs students have increased access to more information and learning opportunities (Coughlin & Martin, 2004; Rockman, Chessler, & Walker, 1998). The results of increased access have been measured by researchers over the past twenty years with a variety of findings (Becker & Ravitz, 2001; Dwyer, Ringstaff, & Sandholtz, 1990; Embry, 2008; Hu, 2007; Penuel, 2006; Silvernail & Lane, 2004). These findings

suggest increased access to information through technology provides mixed benefits for student learning depending on the subject area (Bebell & Kay, 2010; Burns & Polman, 2006; Harris, 2010; Rockman et al., 1998, 2000), technology support (Warschauer, 2004), pedagogy by teachers (Dwyer et al., 1990; Swan, Van't Hooft, Kratcoski, & Unger, 2006) and student initiative (Harris, 2010; Rockman et al., 1998) among other factors. Other research details the costs and technical issues on the implementation of one to one laptop programs around the country (Lei & Zhao, 2006; Lemagie, 2010; Lowther et al., 2007). What is clear from this research literature is the difficulty of assigning specific benefits to student learning through traditional measures (Barth, 2001; Darling-Hammond, 1997; Jaillet, 2004; Marzano, 2003; Marzano, Pickering, & Pollock, 2001; Penuel, 2006; Rockman et al., 2000).

Less understood are the perceptions and learning strategies of students using one to one laptops. Research literature is less explicit regarding the learning strategies individual students are using within this unprecedented access (Bebell & O'Dwyer, 2010). Research finds laptops are motivating students; they are willing to spend more time using them for instructional and non-instructional purposes (Harris, 2010; Lowther et al., 2003), but this research needs to be tied to learning theory, which will be discussed later in section 2.3.

Across the spectrum of literature around one to one laptop programs, or what is also referred to as "ubiquitous technology environments," there are a variety of studies that focus on separate or individual studies (Borja, 2006; Lowther et al., 2007), others that compared case studies (Penuel, 2006), and others that were synthesis statements from the literature (Bebell & O'Dwyer, 2010). These articles develop an overall sense of the state of the union regarding laptop programs.

Current literature profiles key elements in one to one laptop programs across the country. Some are school or district specific (Lowther et al., 2003; O'Dwyer, Russell, Bebell, & Seeley, 2005), others covered the work in entire states (Bebell & Kay, 2010; Greaves, Hayes, Wilson, Gielniak, & Peterson, 2010; Ohler, 2009; Silvernail, 2007), and some were meta-analyses of many studies to explore broader perspectives (Penuel, 2006).

These articles described projects and data with implications for schools and policy. This research covered goals of the programs, technical details, pedagogical strategies, barriers to entry, ongoing successes and instances of insight regarding policy, and best practices.

Several insights came from this part of the literature review influencing the development of this research's conceptualization, topic, and methodology. First, few of these articles included research methodologies that actually engaged students in direct, open-ended questions about their perceptions of the laptop programs (Swan et al., 2006; Lei & Zhao, 2006). Students, being half of the equation of "one to one," had seldom been queried directly to describe their perceptions of learning.

Second, specific findings regarding the logistics of the implementations that contributed or took away from the overall program were also helpful (Lemagie, 2010; Lemke, 2009). It was clear that significant variables (i.e. technical support, professional development, etc. (Penuel, 2006) were critical to the success of the programs. Third, was the importance of moving from a teacher centered to student centered pedagogy and changes in pedagogy across a school or district. (Bain, 2004; Harris, 2010). The final insight from this part of the literature review was the commonality of quantitative evaluations centered through data correlated to student outcomes in core subjects (Bebell & Kay, 2010; Lowther et al., 2007) with emphasis on subjects like technology literacy, writing and editing papers (Lowther et al., 2007; Warschauer, 2004), math and humanities (Russell, O'Dwyer, Bebell, & Tucker-Seeley, 2004). Examining the relationship between students' mathematics test scores and computer use at home and at school, science (Burns & Polman, 2006; Garthwait & Weller, 2005; Rockman et al., 1998). All of these suggest the academic gains measured by traditional assessments fall short in answering questions about learning in other subjects, correlations to learning theory, and new insights through student perceptions.

The lack of qualitative approaches focused on the student perspectives and perceptions of the programs was evident (Land & Hannafin, 1997; Silvernail & Buffington, 2009). The representation of one to one assumes one student and one computer, yet one could not find compelling representations of the students' experiences

or voices in the literature (Swan et al., 2006; Harris, 2010). Notable exceptions included Swan (2006), Harris (2010), and Rockman et al (Rockman et al., 1998). In their research Rockman (Rockman et al., 1997) described the following results: When asked the open-ended question, "How would your schoolwork be different if you didn't use computers?" Both groups of students perceived benefits from computer use. These included greater productivity in their schoolwork (primarily in writing and research), the ability to create more professional products, an increase in creative opportunities, and increases in the skill set they feel they'll need in future employment. This type of research allowed insights into student perceptions of their experiences with digital learning, which will be discussed later in this chapter.

2.3 Literature on methods leading to grounded theory

What was not often represented in the literature cited above was the individual nature of student experiences with the technology: ubiquitous access to information, cognition, interaction with teachers, peers, and self, boundaries (digital/physical), and metacognition. Put another way, the research literature revealed a gap in the exploration of students' experiences directly related to their perceptions of learning and the field of one to one programs through their eyes.

The literature review of the research methodology provided strategies for approaching one to one programs based on theory and qualitative methods that explore student perceptions. Creswell (2007, 2009), Merriam (2002), and Kvale & Brinkmann (2009) provided the components and methodology relating to quantitative and qualitative strategies and mixed methods. Specific theory and methods of grounded theory, described in Chapter 3, provided further guidance (Charmaz, 2006; Denzin & Lincoln, 2008; Lincoln, 2008; Strauss & Corbin, 1998).

Another article that helped shape the development and conceptualization of this research topic and methodology was done by Kent State and Virginia Commonwealth University researchers (Swan et al., 2006) entitled, "Uses and Effects of Mobile Computing Devices in K-8 Classrooms." The theoretical lens of this research describes

an end point based on the premise that we can know the impact of one to one laptops on student learning by gathering experiences through qualitative methods.

2.4 Learning theory

The literature review for learning theory came after substantial data gathering and analysis had taken place in this research. This is consistent with grounded theory methods (Charmaz, 2006) as the comparative/contrast method allows the researcher to begin speculation on the importance or relevance between the data and substantial theory. This section will detail learning theory related to "pre-digital learning" environments, provide comments on the "digital learning" theories, and conclude with a review of the "new literacy" theories that seem to be more consistent with the analysis of this research data.

Student perceptions of learning in one to one programs represent a fundamental new opportunity to explore learning theory. As previously mentioned, one to one programs in which students have unprecedented access to information, data processing, and digital communication with others in their vicinity and around the world, are a new phenomenon in education. This research explored a variety of theories including Canfield (1988), Vygotsky (1978), Gardner (1983), Silverman and Casazza (2000), Van Eck (2006), and Dede (2004, 2005) to compare the results of the data grounded in the responses from students in this research with extant theory.

As described in Chapter 4, results from the open coding of focus group responses to questions suggested areas of perceptions grounded in the words and experiences of students. Students reported what they enjoyed and did not enjoy, what they felt they were learning, their perceptions, their comparisons, how they were applying skills and learning strategies, how they were overcoming internet filters, describing what they liked and did not like about their teachers' teaching styles, and more. Focused coding (Charmaz, 2006) provided more conceptual codes "...to synthesize and explain larger segments of data" (p.57). Acting on this focused coding required going back to the literature to explore learning theories that might help explain the nature of student perceptions in terms of cognition, learning processes, and new literacy. What follows are

the results of this "looking back" into theory to look forward (Chapter 5) to what student responses might tell researchers about how students learn in these programs.

2.4.1 Canfield.

One theory and tool worth exploring is the Canfield Learning Style Inventory (Canfield,1988), which has four scales. They include:

Learning conditions:

- affiliation (need for personal relationships),
- structure (need for detail and organization),
- achievement (desire to set goals and be independent),
- eminence (orientation towards authority and competition).

Learner preference content:

- numeric,
- qualitative,
- inanimate,
- people.

Learner preferred mode:

- listening,
- reading,
- conic,
- direct experience.

Learner expectation for a particular grade.

(in Silverman & Casazza, 2000, p.47).

Students in this research expressed similar themes and within the focused coding, areas of preference in content and conditions emerged. Comparisons with Canfield's Inventory are further detailed in Chapter 5.

2.4.2 Vygotsky.

Vygotsky (1978) credits interactions with others as key to human cognitive development. He maintains that social learning precedes development, and that "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological)." (Vygotsky,1978, p. 57). He describes the development of children as never following school learning the way a shadow follows the object that casts it (Vygostsky, 1978; Bruner, 1985). Rather, he asserts that "...there are highly

complex dynamic relations between developmental and learning processes that cannot be encompassed by an unchanging hypothetical formulation" (p. 91).

Human learning, in fact, "...presupposes a specific social nature and a process by which children grow into the intellectual life of those around them" (p. 88). Vygotsky's theory (1978) promotes learning contexts in which students play an active role in learning. Roles of the teacher and student shift, as teachers collaborate with students in order to help facilitate meaning construction in students. Growth occurs as the result of meaningful verbal interaction between novices and more knowledgeable interlocutors such as parents, peers, or teachers (Crawford, 1996; Vygotsky, 1978; Wertsch & Sohmer, 1995).

According to Vygotsky (1978), students are capable of performing at higher intellectual levels when asked to work in collaborative situations than when asked to work individually. Group diversity with respect to knowledge and experience contributes positively to the learning process. Perhaps collaborative work that is done digitally has the potential to harness those diversities, to bring together not only peers, but subject matter experts and adults in a particular field. When students in this research reported their strong interest in learning from Facebook, that interest may be explained in part by Vygotsky's theory.

2.4.3 Gardner.

In his 1983 book, Frames of Mind: The Theory of Multiple Intelligences, Howard Gardner identified seven intelligences or ways in which people understand and perceive the world. Gardner originally put the list together as a conceptual model about the nature of the mind, and not necessarily a practical way from which educators might address student individual differences. However, understanding a learner's strengths and weaknesses based upon different intelligences has helped educators embrace Gardner's work and adapt it to the classroom. This theory has important elements for student responses from this research in one to one programs and served to better frame coding categories in the analysis process.

Gardner (1999) defines an intelligence as "biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (pp. 33–34). Gardner claims that all people have all the intelligences, but that individuals are not alike. He lists the following types of intelligences:

- Linguistic. The ability to use spoken or written words.
- Logical-Mathematical. Inductive and deductive thinking and reasoning abilities, logic, as well as the use of numbers and abstract pattern recognition.
- Visual-Spatial. The ability to mentally visualize objects and spatial dimensions.
- Body-Kinesthetic. The wisdom of the body and the ability to control physical motion
- Musical-Rhythmic. The ability to master music as well as rhythms, tones and beats.
- Interpersonal. The ability to communicate effectively with other people and to be able to develop relationships.
- Intrapersonal. The ability to understand one's own emotions, motivations, inner states of being, and self-reflection.

According to Gardner, integration of multiple intelligences into the classroom involves changing ideas about teaching and learning. Technology provides the

circumstances to make learning possible in each intelligence area. Although there is no one way to integrate intelligences or technology into the classroom, one to one programs potentially allow more of a student's intelligences to become displayed. This theoretical framework not only helped frame parameters for the analysis of the focused coding, but also offered a way to think about responses.

2.4.4 Silverman and Casazza.

Approaching teaching and learning solely from the perspective of multiple intelligences may not cover all tenets of student learning. According to Silverman and Casazza (2000), differences in student backgrounds should also be a key consideration, as they have an impact on teaching practice and on questions related to the learning environment this creates: the interaction of individual learning styles, the effect on interpersonal relationships, and the effect on active, collaborative learning. Silverman and Casazza (2000) note that "different systems of communication seem to be at the heart of many of the cultural and ethnic differences that affect the learning environment" (p.42). Hence, teachers are challenged with the task of how best to integrate a range of cultural imperatives with theoretical perspectives on active learning, constructivism, and different ways of knowing. In one to one programs students seem to be expressing not only their individual learning styles and intelligences, but also cultural values as well through patterns of learning (Ledoux, 2012).

Questions for the teacher in one to one programs might be:

> 1) Is there a comfort zone that acknowledges and respects a wide range of needs and expectations while challenging learners to expand their meaning systems?
>
> 2) How is the balance between support and challenge created?
>
> 3) Do teachers' assumptions about learning and the environment match those of the students?"

These questions are important guides to connecting the students' cultural, individual, and learning styles in one to one programs.

2.4.5 Van Eck.

Digital Game Based theory is based on the assumption that digital games embody documented evidence of cognition and learning. Games are meaningful learning environments in part because the learning takes place within a particular context to the participant (Van Eck, 2006). What an individual must learn is contextually related to the game landscape; the learning is related, applied, and practiced within that environment. Feedback is instantaneous. As is the case with most formal instruction, research suggests that learning which occurs in pertinent and personalized contexts is more effective than learning that occurs outside of those contexts.

Recently theorists have recognized a natural affinity between situated cognition, new literacy, studies, and research (Gee, 2010). This connection was made by understanding that situated cognition maintains individuals learn through experiences (Anderson & Krathwohl, 2001). It could be stated that these experiences, and the mediators that affect attention during these experiences are affected by the tools, technologies and languages used by a socio-cultural group and the meanings given to these by the collective group. New literacies research examines the context and contingencies that language and tool use has on individuals. It also explores how literacy adapts as the internet and other communication technologies have an impact on learners. Consider the skills needed to effectively communicate with technologies as text messaging, email, Facebook, Google, YouTube, and Second Life. According to Leu (2006) students use of the internet is not a technology issue; it is a reading and writing issue.

Play is also a key. Researchers also suggest that play is an important socialization and learning device shared by all human and animal societies (Prensky, 2001b, 2006). Students learn through modeling and play. Digital games make use of the rules and concepts of play as a teaching device. Video games, when they are successful, are very good at stimulating and motivating players. They motivate players to persevere and simultaneously teach players how to play. (Gee, 2003) began his work in video games by identifying thirty-six learning principles that are present in, but not exclusive to, the

design of good video games. In applying these learning principles to classroom learning, he identifies the following:

1) Active Control,

2) Design Principle,

3) Semiotic Principle,

4) Semiotic Domain,

5) Meta-level Thinking,

6) Psychosocial Moratorium Principle,

7) Committed Learning Principle,

8) Identity Principle,

9) Self-knowledge Principle,

10) Amplification of Input Principle,

11) Achievement Principle,

12) Practice Principle,

13) Ongoing Learning Principle,

14) Regime of Competence Principle (Gee, 2003).

There are other theories that speak to the learning benefits of games. For example, Piaget's theories about children and learning include the concepts of assimilation and accommodation (Pulaski, 1971). Assimilation allows us to fit new information into established mental categories. An example of an adult assimilating information might be that when a person turns the light switch in a room and the light does not come on, and in the past this has been due to a power outage. He is now likely to identify the problem as a outside the home. Accommodation includes steps where we alter existing concepts of the universe to take in new data that does not fit into an existing category. This process is the result of holding two juxtaposing ideas. In the previous example, should the man replace the light switch and experience the same problem, he finds that the light not coming on both means and does not mean a power outage. This process is often referred to as cognitive disequilibrium.

Accordingly, our person in the dark must adjust his/her mental model to include other problems wiring, faulty codes, and/or bad light bulbs). Piaget believed that intellectual maturation over the lifespan of the individual depends on the cycle of assimilation and accommodation and that cognitive disequilibrium is the key to this process.

Games embody this same process. The extent to which games alter assumptions (create cognitive disequilibrium) without exceeding the capacity of the player to succeed largely determines whether they are engaging. Interacting with a game requires a constant cycle of hypothesis formulation, testing, and revision. This process happens rapidly and often while the game is played, with immediate feedback. Games that are too easily solved will not be engaging, so good games constantly require input from the learner and pro- vide feedback. Games thrive as teaching tools when they create a continuous cycle of cognitive disequilibrium and resolution (via assimilation or accommodation) while also allowing the player to be successful. There are numerous other areas of research that account for how and why games are effective learning tools, including anchored instruction, feedback, behaviorism, constructivism, narrative psychology, and a host of other cognitive psychology and educational theories and principles.

Learning is tied into video games. Repeated engagement is what facilitates the experience Professor Mihaly Csikszentmihalyi (1990) refers to as "flow" (1990). Flow occurs when people are involved in activities that cause us to lose track of time and the outside world when we are performing at an optimal level. Good games advance flow, and the any interruption to the game world alters it. One to one laptop experiences for students are described as engaging, motivating, and absorbing to summarize. Considering the disintermediation (Prensky, 2006) that video games and laptops provide for students getting at information, games, or media, Csikszentmihalyi's concept of flow might help explain why students and teachers both report the engaging and distracting effect (Rockman, 2003) laptops can have on students.

2.4.6 Dede.

Digital media creates optimal conditions for multitasking; today's teenagers seem content to do homework while at the same time reading, listening to music, texting, surfing the web, and simultaneously carrying on multiple electronic conversations with peers (Prensky, 2006). A variety of authors have discussed the influence of media such as the world wide web on student learning styles (Howe & Strauss, 2000; Oblinger, 2003; Tapscot, 1998). According to Harvard Professor Chris Dede (Dede, Whitehouse, & Brown-L'Bahy, 2002) forward steps in information technology are impacting the learning styles of many students. He believes that educational institutions, particularly higher education, can progress by using these new technologies to present instruction matched to the increasingly digital native learning styles of their students.

By its nature the internet rewards use of a wide variety of sources of information, individually incomplete and collectively inconsistent. This encourages learning based on looking, searching, and inquiry, rather than on assimilating a single secure source of knowledge as from books, television, or a teacher's lectures.

Digital media encourages people to engage in multiple tasks at the same time; today's teenagers often do homework, while at the same time read, listen to music, text, surf the web, and simultaneously carry on multiple electronic conversations with peers (Prensky, 2006). Whether multitasking results in a superficial, easily distracted style of gaining information or a sophisticated form of synthesizing new insights depends on the ways in which this learning strategy is used. Certainly, above some threshold, this strategy results in loss of effectiveness.

2.5 New literacies

Powerful technologies, such as the one to one laptop programs provide the ability for students to connect, communicate and collaborate globally. They also present opportunities for students to build 21st century learning skills, by engaging in new literacies. Leu (Leu et al., 2000) defines new literacies as:

> The new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the

> rapidly changing in- formation and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others." (p. 1572)

He contends student use of the internet is not a technology issue, but an issue related to reading and writing.

Mahiri (2006) maintains, "Traditional conceptions of print-based literacy do not apprehend the richness and complexity of actual literacy practices in people's lives enabled by new technologies that both magnify and simplify access to and creation of multimodal texts" (p.61).

New literacies are defined as the skills, strategies, and dispositions that allow individuals to use the Internet and other technologies effectively to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others (Leu, Kinzer, Coiro, Cammack, 2004).

One to one programs represent an environment where new literacies may be evident and evolving. This research is entitled "Kids Getting Away with Learning" but it could also read, "Kids Getting into New Literacies." Understanding these new literacies comes from comparing existing theory to the elements of new literacies. This entails an understanding of what new literacies have to offer to explain the type of responses from this research. Understanding what is meant by new literacies means taking into account a world where students have access to massive amounts of information and powerful technologies that can aid communication in real time with anyone around the world.

With respect to specifically defining what new literacies will be required for our students in the future, many researchers are beginning to define and shape theory (Prensky, 2006; Kajder, 2007; Baker, 2010; Leu, 2006). The literature describes a

difference between (upper case) New Literacy and (lower case) new literacy. "Their [new literacy researchers] important work enables to the broader and largely incomplete, theory of New Literacies to benefit from the richness and power of these multiple perspectives. Lower case theories often explore a specific area of new literacies such as semiotics, ...workplace literacy, ...struggling readers, ...teachers. They also explore the issue of alternative frameworks such as sociocultural perspectives of literacy and technology" (p.ix).

The research literature on learning theory and new literacy provides several useful theories and new directions in theory relevant to this research. Chapter 5 attempts to build that bridge between the results of open and focused coding of student responses to focus group questions in this research to existing theory and the work in new literacies. The overarching design in this research was to keep theory comparison and theory building from the data according to the methods of grounded theory.

The use of technological tools in the classroom, such as blogs, wikis, virtual worlds and gaming, are just a few examples of online spaces that represent alternatives to traditional notions of literacy (Prensky, 2006). Learning how to harness their power within structured learning environments is what many experts (Kajder, 2007) are suggesting schools need to do in order to best prepare our students for learning in the future.

Dr. Don Leu, Co-director of the New Literacies Research Lab at the University of Connecticut, (Leu, 2002) contends that when researchers talk about literacy in the 21st century, the dialogue needs to move beyond common constructs of reading and writing the majority of us grew up with. "Many graduates started their school career with the literacies of paper, pencil and book technologies, but will finish having encountered the literacies demanded by a wide variety of information and communication technologies" (p. 312). Leu (2004) cites that new literacies include using the Web and technologies to:

- Identify important questions
- Locate information
- Critically evaluate the usefulness of that information

- Synthesize information to answer those questions
- Communicate the answers to others

A question arises whether educators can expect students to acquire and master new literacies on their own. According to Dr. Kajder (2007), students need to be carefully guided and coached throughout the process of researching information and building community with outside resources. Not all students have the technological know-how or how to manage the skills and must be guided in both digital and non-digital literacies.

The research literature on learning theory and new literacy provides several useful theories and new directions in theory relevant to this research. Chapter 5 attempts to build that bridge between the results of open and focused coding of student responses to focus group questions in this research to existing theory and the work in new literacies. The overarching design in this research was to keep the theory comparison secondary to theory building from the data and according to the methods of grounded theory. As Strauss & Corbin (1998) put it:

> A researcher does not begin a project with a preconceived theory in mind (unless his or her purpose is to elaborate and extend existing theory). Rather, the researcher begins with an area of study and allows the theory to emerge from the data. Theory derived from data is more likely to resemble the "reality" than is theory derived by putting together a series of concepts based on experience or solely through speculations (how one thinks thing ought to work) Grounded theories, because they are drawn from data, are likely to offer insight, enhance understanding, and provide a meaningful guide to action. (p. 12)

The guide to action from this literature review was to compare the extant theory and new literacies themes emerging to the open and focused coding grounded in the student perceptions of learning.

Chapter 3: Methods

3.1 Research questions

The research questions focus around the student perceptions of learning in one to one laptop programs in rural Alaska. Using grounded theory methods, these questions are intended to discover student views on the central question (Creswell, 2009), as well as subquestions used in the focus groups to narrow the focus of the inquiry surrounding the student experiences with laptops at school and home.

The questions:

1) What are students' in one to one laptop programs perceptions of learning?
    a) What does their software usage (self-reported) tell us about student appropriation of one to one laptops for learning?
    b) How do they perceive the differences between laptop usage for school (formal) and non-school (informal) work?
    c) How do they perceive school laptops in one to one programs vs. their home computer(s)?
    d) What do they perceive as the benefits of laptops?
    e) How do they perceive their teachers' usage of technology in pedagogy?
    f) How do they perceive bandwidth issues at home and at school?
2) What theories can researchers develop to better explain the patterns of student usage and learning in one to one laptop programs?
    a) What are the patterns of their laptop usage in schoolwork (formal) and non-schoolwork (informal)?
    b) What does this tell us about a student's "learning landscape"?
        i) Relationship between formal/informal learning
        ii) Perceptions of access to information
            (1) control/filters
            (2) bandwidth
            (3) content

(4) research/inquiry

(5) pursuit of interests

iii) Interactions with others

iv) Use of tools (software, laptop, networks, etc.)

These questions reflect the research methodology of using grounded theory methods that aim "... to explore and not to interrogate" (Charmaz, 2006, p. 29) with the goal of developing new theory about the learning process from the perceptions of students in one to one laptop programs. The thematic coding of the student responses formed the basis for analysis as partial answers to these questions and the foundation for explanation in new theories.

3.2 Theoretical lens

The theoretical lens used in this research was social constructionism and phenomenology. The relationship that students have with technology and information in one to one laptop programs is something new. Constructivist paradigm subsumes a relativist ontology consistent with the view that not everyone experiences the same reality (Denzin & Lincoln, 2008). In regards to these students in one to one laptop programs in rural Alaska, we cannot fully know or appreciate what their reality is without making inquiry through the lens of constructivism and grounded theory methods.

The research questions focus around the phenomenon of whether student learning in one to one laptop programs is new, different, or tied to existing theory. Research suggests aspects of this relationship are motivating (Harris, 2010), and are tied to improvements in writing and technology skills (Harris, 2010; Penuel, 2006) and (when linked to using video games) possibly a new form of literacy (Gee, 2003; Prensky, 2006).

Grounded theory (Strauss & Corbin, 1998) emphasizes developing explanations that are more than a set of findings. As Hage (1972, p. 34) points out "however much we can describe [a] social phenomenon with a theoretical concept, we cannot use it to explain or predict. To explain or predict, we need a theoretical statement, a connection between two more concepts."

The two or more concepts that this research connected were the patterns through thematic coding from the statements of students directly involved with the one to one laptop programs. From their statements this research provides the patterns of perceptions of students adapting to learning in a new way often intended by the narrative description of "digital native." The theoretical lens is thematic coding grounded in student perceptions of their use of, participation in, and relationship with information access in one to one laptop programs.

3.3 Control for bias

In terms of this research project the two important sources of bias were the participants and the researcher. The principals of each of the participating high schools selected the students who participated in the five focus groups. The researcher's request to the principal was that students be picked randomly with the ability to respond to questions about their experiences with the one to one laptop program. The resulting focus groups were a blend of gender, ages, and years of experience in the one to one laptop programming within the context of the five Alaska schools and communities.

The researcher worked with site administrators at each school to select approximately six students from grades 7-12 for the focus group data collecting. Students were approached by the site administrator(s) or teacher(s) after they had secured parent (Appendix H) and student assent forms (Appendix I) per the IRB and school district policy process. Site administrators were requested not to consider student test data to create the most open sampling opportunity without regard to school achievement.

In qualitative research the researcher is considered to be the key agent of gathering data and inductively interpreting the information within the context of participant experiences within a phenomenon (Merriam, 2002). The researcher bias centered on believing that students are using laptops and other digital devices in ways educators do not fully know nor consider from a learning perspective. The title of this dissertation - "Kids Getting Away With Learning" reflects that researcher bias and includes the expectation that these focus groups would shed light on how students learn with laptops on their own, and possibly outside the awareness of their teachers.

The other researcher bias comes from 25+ years of working in education in rural and urban Alaska with students. Researcher expectations included hearing new perspectives on laptop usage from these students not expressed in the literature, student initial reluctance to share openly all the details of their usage in a group setting with an adult outside their community, and needing to reframe questions from time to time to help students understand the intent of the query.

3.4 Methodology choices

The methodological choices in this research were made in light of the paucity of evidence in the literature (Ohler, 2011; Penuel, 2006) and through inductive logic to build the data, analysis and theory from the ground up to answer the research questions. The procedures adopted were utilized to leverage the benefits of the Tech Cohort's collaboration through mixed methods and the belief that the phenomenon of ubiquitous student access to laptops and information represented something new in Alaska educational landscapes.

The research was conceptualized around gathering data grounded in the student experiences of adapting to new opportunities to interact with information and learning. Recognizing researcher bias, the intent was to use grounded theory and focus ground methods to create an opportunity for students to describe their perceptions of learning (Cooper, 1984). Their descriptions were collected and analyzed as "grounded data" through open and thematic coding. The methodological choice was to rely on the views and insights of the students within the context of one to one laptop programs that were part of the CDL's schools and communities.

3.5 Research design

The design for this research was created with the Tech Cohort for the purposes of developing a mixed methods study of both quantitative and qualitative methods to get at different aspects of one to one laptop programs in rural Alaska. A key part of this design was a clear focus to include qualitative methods to explore the students' reality in these programs, particularly their perceptions of learning with laptops.

According to Creswell (2009) research design is "... an intersection of philosophy, strategies of inquiry, and specific methods." (p. 5). As described above, the philosophical worldview in this research is a social construction consistent with the notion that research participants are creating their own meaning from their experiences of adapting digital devices to meet learning needs. The strategies of inquiry also referred to as research methodologies (Mertens, 1998) in this research specifically are qualitative within the context of the Tech Cohort's mixed methodology across the four researchers. From a design standpoint grounded theory methods involving questions in focus groups provided for the most effective strategies for data collection, analysis, and theory generation.

The purpose of this approach was to offer new theory about student learning in digital environments to help us better understand the relatively new phenomenon of ubiquitous access to hardware, software, and information. Then the question centered around the best way to collect and analyze this data for the purposes of generating new theory that honored with "...respect for our research participants..." the unexplored areas of a digital learning for students (Charmaz, 2006, p. 19) in rural Alaska and to inform practices within these schools in the future.

3.6 Parameters of research population

The research population consists of high school students from five rural Alaska communities. The schools were chosen based on their participation in the Association of Alaska School Board's (AASB) Consortium of Digital Learning (CDL) one to one laptop program. The one to one programs under the auspices of the CDL have been implemented in 28 of 53 school districts in various grade levels across Alaska (Ohler, 2011). These schools (Figure 4. Population data and list of school districts) were part of the Tech Cohort's research population in 39 communities in Alaska. This research was conducted in five different communities and in five different schools within the CDL's current population.

School principals selected the students for participation in the five schools where focus groups were conducted. Principals were asked to choose students at random with

the potential of any high school student in attendance being able to be part of the focus group. Principals were also requested to select students who reflected the experiences of any high school student in that school and district using a laptop in the program. Student populations are relatively small in these Districts with Average Daily Membership (ADM) in 2011 in K-12 grades ranging from 337.75 (Cordova School District) to 3995.15 (Lower Kuskokwim School District). Individual high school focus groups in this research consisted of sizes that ranged from four to eight students. Students were fairly split between genders, years of experience with laptops (one to six years), and grade status in school (freshmen to senior).

AEBSD	9-12	16	75			Yes
BBSD	9-12	6	65			Yes
Cordova	7-9	4	25			Yes
Craig	9-12	13	83		X	
Denali	6-10	10	35		X	
Dillingham	9-12	12	155		X	
Haines	9-12	7	109			Yes
Iditarod	8-12	8	31	No		
Juneau	9-12	31	172			Yes
Klawock	9-12	8	45			Yes
Kashunamiut	9-12	9	82	No		
Kuspuk	9-12	13	98			Yes
Lake and Pen	9-12	3	12	No		
LKSD	8-10, 9-12	83	424			Yes
NSBSD	1-12	50	403			Yes
NWABSD	9-12	30	252			Yes
Petersburg	3-12	12	178			Yes
Pribilof	9-12	4	17	No		
SEISD	6-12	12	62	No		
SWRSD	6-12	17	182			Yes
Wrangell	9-12	14	114			Yes
Yukon Flats	6-12	4	20	No		
	Total Population	366	2639			
	Total Sample Population	291	2142			

Figure 4. Population data and list of school districts.

3.7 Research methods

This study is a qualitative research method of conducting focus groups in five schools in separate districts in rural Alaska. The Tech Cohort conducted online surveys in nine districts in total. Altogether the Cohort research overlapped in four districts of the nine Districts (Cordova, Lower Kuskokwim, Northwest Arctic, and Petersburg). The districts were chosen for participation in the Alaska Association of School Board's Consortium for Digital Learning (CDL) program from over 30 districts currently engaged in one to one laptop programs. The mixed methods used included open and closed ended questions, multiple forms of data, text and statistical analysis, and multiple perspectives from our research co-participants (Creswell, 2009).

This research study used grounded theory methods (Charmaz, 2006) aimed at open-ended exploration of student perceptions of learning in one to one laptop programs. Grounded theory methods call for a researcher to set aside preconceived theory in mind, but instead "…. begins with an area of study and allows the theory to emerge from the data." (Strauss & Corbin, 1998, p. 2).

Below are the specific methods of participant selection within the overall research strategies of the Tech Cohort in Alaska, the data collection procedures in this research of conducting five focus groups, open and thematic coding of the transcripts of those focus groups, and triangulation with the data from other members of the Cohort. This method of data collection and reporting are consistent with grounded theory and strengthened by the collaborative mixed methods within the Cohort's shared population of research participants.

Grounded theory employs open, axial, and focused coding as described by Strauss and Corbin (1998) and Charmaz (2006). Grounded theory allows the researcher to work directly with individuals who have experienced a phenomenon (i.e. using a laptop computer in a one to one program) and to collect data through an interview process (i.e. focus group) for the purpose of collecting and analyzing data to develop new theory. This method employs a constant comparative method of refining questions in the focus

groups based on data from early groups to direct the vector of the questions toward getting at how the students construct meaning.

3.7.1 Focus group methods.

The focus group methods used in this research sought to create a consistent, open question forum with high school students in five communities. The goal was to create the opportunity for the students to share their stories and gather their perceptions of learning with the one to one laptops. The methods included gathering students in a quiet room in each school to hear their responses to approximately eight main questions (see Appendix G) and follow up questions on the subject of their one to one laptop usage. The result of the recorded conversations was gathered data for analysis using qualitative software, Atlas TI, for open/thematic coding and frequency tables.

The focus group questions were tested in a pilot study described further in this chapter. The impact of the pilot study on research methods was increasing the number and language of follow up questions, choosing to not have another adult/note taker in the focus groups, and choosing to use numbered cards as an efficient, anonymous way to record individual speakers. The pilot study also helped test out the method of asking school principals to randomly select students with experience in the one to one program from her/his high school population for participation in the groups.

The general benefit of the focus groups for gathering qualitative data included the multiple inputs from a variety of participants with experience of the phenomenon, the dynamic of focus groups (Krueger, 1994, 1998a) where one participant's comment sparks recall or insights from other participants, and a way of easing any cultural "shyness" of students in rural Alaska speaking with an adult outside of the community (Scollon & Scollon, 1980). Arguably, other methods (i.e. focused interviews, case study, journaling, etc.) could have yielded different quality of data less suited for the formation of theory around perceptions of learning.

3.7.2 Research process.

The research process used in this study is detailed in Figure 5 below. Starting with the Tech Cohort process of formulating different research questions and design, the group individually applied for IRB (section 3.8) approval before beginning our joint pilot study. The results of the pilot study led to refinements in the tools described below. Then this researcher sought permissions from five schools within the Districts to conduct a focus group in each school. The focus groups were conducted over a three month period and transcribed immediately following the event. The transcriptions were put into Atlas TI software for open coding and memoing. After the open coding process the transcripts and open codes were analyzed again to create focused codes. These focused codes brought up questions about tying the codes to existing theory. The focused codes were submitted to analysis for co-occurrences across all five focus groups. As the patterns of the co-occurrences emerged, more time was spent in the literature review examining learning theory leading to further exploration in the new literacy research. The results of the examination of co-occurrences, memoing, focused coding, and new literacy theory led to the narratives described in Chapter 4 by students' quotes and in Chapter 5 by the researcher including implications for further research.

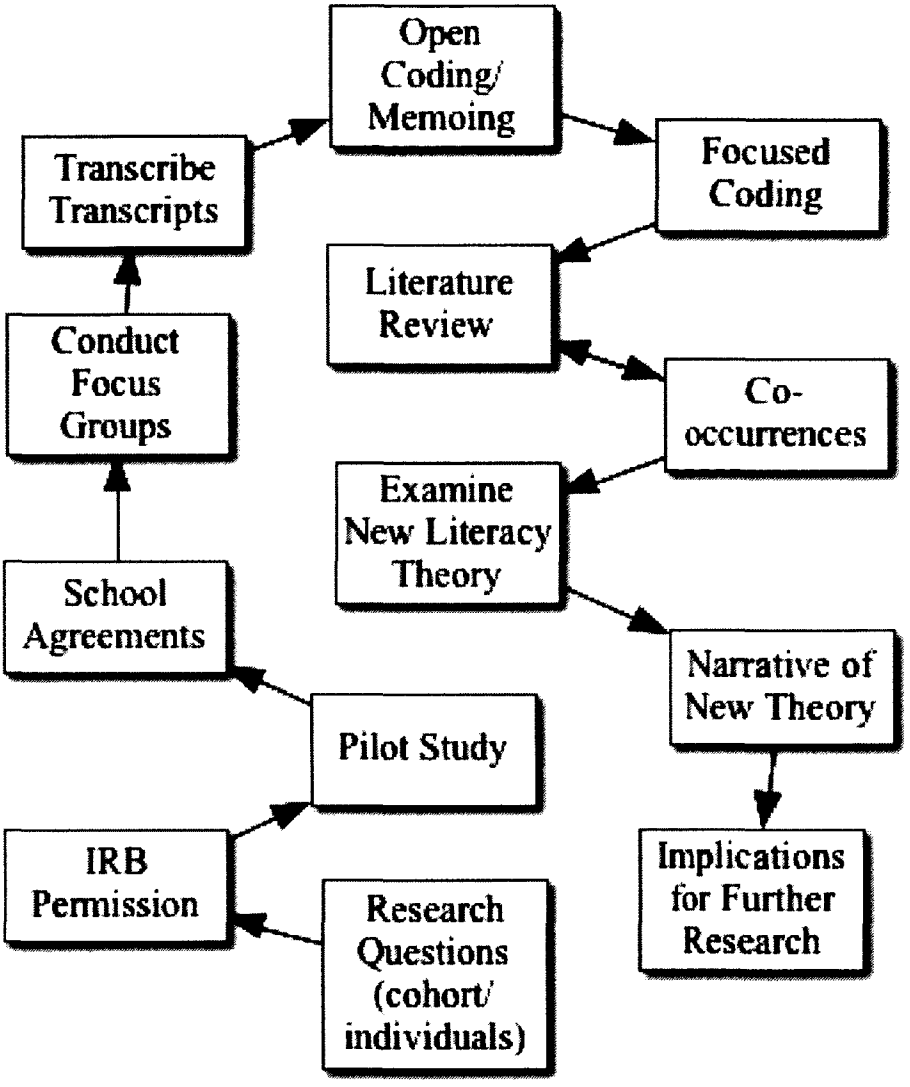


Figure 5. Research process.

3.8 IRB approval

The IRB approval for this research (Project Title: [174780-3] one to one Laptop Programs - The Students' Perspective) was received in December 2010 from the University of Alaska Fairbanks. This research involved direct contact with high school students in rural Alaska, and therefore had a different threshold for concern in human subject interactions, especially children. The IRB application addressed those concerns

and the requirement for permission forms from both the parents and students before the focus group could be conducted (Appendices E, H, and I).

3.9 Pilot study

The Tech Cohort (Appendix A) conducted a pilot study in the community of Kiana to evaluate research tools for examining student perspectives on learning in one to one laptop programs in rural Alaska. The pilot study was designed to evaluate the efficacy of focus groups questions (eight) that were put to high school students as an invitation for them to describe their learning landscape as part of one to one programs. One researcher on-site (Standley) conducted a pilot focus group and facilitated an online survey of teachers and students with the other Tech Cohort members, who were off-site.

Adjustments made to the research methods occurred as a result of this pilot study that the Cohort conducted in the village of Kiana in January 2011. Based on this pilot study, changes were made in questioning strategies, note taking process by outside observers, and recording methods in subsequent focus groups. The pilot study tested the practical nature of constructing grounded theory as a method for getting student perspectives of learning in one to one laptop programs in rural Alaska for future researchers. The researcher had been to Kiana four times over the last twenty-eight years, so he had some knowledge of the school and village.

The pilot focus group was conducted between 2:00 - 3:00 PM on Friday afternoon, January 21, 2011 in the school library. Five high school students (three boys, two females) gathered around a square table for the focus group. An adult outside observer, NWABSD Distant Education teacher for Inupiaq studies, also joined at the table to take notes and make observations about the focus group process for the pilot study. The researcher was careful to observe and adhere to cultural sensitivities and rural Alaska language patterns. Students were given the opportunity to share without Kiana staff members present. The outside observer has many years experience in the District and several of these students were taking his Inupiaq Studies course online, so they were familiar and appeared comfortable with his presence.

After receiving IRB approval, the researcher contacted both the NW Arctic Borough School District superintendent and the principal at Kiana School to get permission to conduct the pilot study. Five students and one district staff member (distance teacher of Inupiaq studies as non-school based observer) were gathered in the school library. The focus group students were chosen by the assistant principal. The researcher requested the assistant principal to select students who had direct experiences with the one to one laptop program. The students had been at Kiana school, had participated in the one to one program during the current school year, and were willing to answer questions as a small group about those experiences. On this day the total high school student population was less than 20. Part of the pilot study work was to test the efficacy of having the administrator in charge pick the focus group students.

The students, outside observer, and researcher settled around a library table and the setting quiet and began with the focus group process. The researcher read the introduction statement, and then asked if students had any questions about the process, and finally began with the questions. The primary researcher recorded the process with a digital recorder and took notes mostly with the idea of creating follow up questions as the students responded to the original questions. The outside observer also took notes based on the student responses and observations about the focus group communication process.

The pilot study sampling was recorded for age, years of experience using laptop, and grade level. The student names were not collected to protect their privacy. In subsequent focus groups, the only information requested and documented about the students was the amount of years of experience using their laptops.

The focus group interview consisted of eight questions asking students to describe their behaviors, software usage, and perceptions when using laptop computers at school and away from school. Alternative questions were prepared for each question in order to provide the students with other words or phrases to consider their experiences. Questions were asked in a sequential and systematic order unless the flow of information and discussion from the students led to rearrange the order. In later focus groups these

questions were used as a starting point with follow up questions to provide alternative language to get the students talking about key concepts or area of learning.

3.10 Instrumentation

Instrumentation for this study was typical of qualitative methods conducting interviews and/or focus groups. The primary goal was to accurately record the words of the students in the focus groups through an audio and note taking process. The primary concern was the quality of the recording environment and the sound levels of the students' voices in a potentially noisy school building. Several steps were taken to increase the chances of audio quality, ensure the accuracy of the recordings and transcripts, and faithfully report the students' words and key concepts.

The recording environments for the five focus groups included three school libraries, one home economics room, and one spare meeting room. Signs were placed outside these rooms when conducting the focus groups to limit traffic or noise in the locations used. The school principals were also very helpful by keeping human traffic out of the focus group spaces. Each of these rooms were relatively quiet during the focus group process, so there was little difficulty in transcribing the digital audio tapes, which were stored in a secure location in the principal investigators office per I.R.B. requirements.

Based on techniques described by Krueger (1994, 1998b), numbered card tents were placed in front of each student to maintain accuracy of the recording and anonymity of the students. Students were asked to refer to their number prior to speaking a response to focus group questions. Alaska native patterns of softer talking were taken into account, so attention was paid to the student audio levels by occasionally sampling the audio through listening to ear phones in the digital recorder. Some students were more responsive than others on saying their numbers, but the researcher said their number during the recording process softly and into the recorder to minimize disruption to their response. Between the student calling out their number and the interviewer supplementing, the recordings tracked nearly all student responses.

Transcripts reflect a minimum of dropped words due to group or room noise interference. This process and recording technology provided accurate records and transcription of the individual student responses to focus group questions. Conversations were recorded using a Zoom (H4n) digital recorder. The following steps were taken to put those recorded words into software for coding and analysis:

1. Transcribe the words into word processing files,
2. Convert the transcript files to an .rtf or .pdf format as primary documents (PD),
3. Upload the PD into Hermeneutical Units (HU) in Atlas TI,
4. Open code s (units of data) and add comments/memos in one HU,
5. Report out the HU's codes, clusters of codes and network design of key concepts in concept maps.

The digital recorder inputs worked well along with getting quiet rooms and the audible cooperation from the students. The software work described above was done using an Apple Mac PowerBook, Parallels software (emulating Windows), Atlas TI software (Windows-based), and the secure data (SD) card from the Zoom digital recorder.

Instrumentation in this research worked well given the various potential gear/luggage problems of traveling by small planes for working in the five small schools in remote Alaska villages. The battery-operated Zoom recorder functioned in one focus group session despite a power outage. The focus group transcripts and coded quotations are a record of the words and details of the student responses, which are important to the accuracy of the results of this grounded theory method and research.

3.11 Analysis of qualitative data

The data analysis plan included open coding on the transcripts of the five focus groups using Atlas TI software. The process within the software was to create an .rtf (rich text format) file of the transcripts, which is the most compatible format for this software dealing with text files. The software creates an HU (hermeneutical unit) by using the five transcripts known as PD (primary documents). The quotations (or text from the focus

group transcript) were used as data to be coded. The quotations can be a word, phrase, sentence or several sentences from one or more focus group participants from the transcript or PD.

Other important tools within the software include memos and comments, which are used for annotating the codes and the quotations in these primary documents. Finally the relations between the codes act as "power" links to connect pairs of codes or quotations. Atlas TI software allows the researcher to build relationships between words from the transcript to look for details and patterns. Those words and patterns become the main focus of the data analysis plan.

The data analysis plan entailed three levels of complexity during the entire process. The first step was open coding, which includes the open-minded examination of the words or phrases from the focus group transcript. The open coding of the five primary documents generated 483 codes in a total of nearly ten categories. These results are discussed further in Chapter 4. The researcher was looking for commonalities, verbs (gerunds) that describe behaviors, and/or patterns of perceptions described by the focus group participants. This research included verbatim recordings of student words in one to one laptop programs describing their software/hardware usage, learning experiences, strategies using the laptops and other perceptions.

The next level of complexity was the axial coding using focused coding, and themes. This level of analysis was more intuitive based on the researcher's observation of initial codes (n=483). The research refined open codes into specialized coding and/or graphical networks within the Atlas TI software. The final level of complexity was using the more advanced co-occurrence, table of coding frequency, and hyperlinking quotations within Atlas TI. These tools allowed for higher levels of analysis in pattern/concept recognition from the quotations within all of the PD's in the five focus groups. The researcher looked across the focus group data to find patterns to build new ideas and possibly theories.

The data analysis plan described above was designed to listen, gather, code, and process through careful analysis and intuition, and then synthesize according to their own

content and concept the words and thoughts of students around their perceptions of learning to use laptops in one to one programs. Using qualitative methods such as grounded theory is not intended to prove as much as to discover new paths of inquiry and theory in a relatively new education phenomenon of students having ubiquitous access to a laptop computer for schoolwork and their own interests. The key to using this method and data analysis was staying open minded and open eared to what the students had to share about their world and this new phenomenon in their world.

Chapter Four presents the results of the data analysis expressed through frequency tables, student quotations to report verbatim their responses to questions, and focused codes base on co-occurrence of codes. The bubbles in the focus coding were created from the open coding; the codes each becoming a piece of the concept map reflecting the words, perceptions, and/or actions of the students. During the initial coding the researcher kept notes and comments called "memoing" by Charmaz (2006) to maintain running written observations through the Atlas TI software. These memos represent insights and questions that occur while doing the opening coding. These become the paths to the focused coding as final steps in the process of this data analysis to offer new perspectives to research questions and theory around student perceptions of learning.

3.12 Triangulation of data

Triangulation is defined to be "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell & Miller, 2000, p. 126). This research combines the efforts and analysis of four researchers in the Tech Cohort examining the relationship and realities of one to one laptop programs in rural Alaska. The research combines the work done by the Tech Cohort using online surveys and the qualitative work done in this research using interviews and focus groups. Each research project stands on its own data and analysis, yet is designed to share questions, populations, pilot studies, and comparative results.

The triangulation includes the quantitative and qualitative data collected by all members of the Tech Cohort as part of this research project and shared population. There

are several views of issues such as bandwidth access, student perceptions of teaching methods, benefits of the laptop programs, and cultural questions of learning style that are addressed in Chapter 5 of this dissertation and the dissertations of the Cohorts (Ledoux, 2012; Lloyd, 2012; Whicker, 2012).

3.13 Summary

This research seeks to develop new theories and/or paths of inquiry to help further research and bridge the gaps between what educators know and do currently and how students are adapting their learning patterns to the opportunities afforded them in the one to one laptop programs.

The methods and methodology described in this chapter are intended to explore student perceptions of learning in one to one laptop programs in rural Alaska. The specific methods in this research are constructing grounded theory by conducting five focus groups in rural high schools to gather and analyze data from the students themselves to let their words and experiences shape a new theory about how they learn with these laptop programs. This research was part of a larger collaboration with the Tech Cohort to conduct mixed methods research using the same population and triangulation of the different data sources to create a more complete picture of the research topics and participants.

Chapter 4: Results

4.1 Research questions and data

The results of this research are presented here in the form of open and focused codes from all the student responses to questions during the five focus groups. Open codes are the beginning concepts developed from reading the text. These open codes are clustered into a higher level, reduced set of concepts referred to as focused codes. The results also include the co-occurrences of multiple focused codes associated with the responses from the students. This data shows patterns of responses from the students that are represented by the frequency of the co-occurrences.

The results of a grounded theory approach are the data, codes, and analysis from the co-participants/students in the research questions of their perceptions of learning in one to one laptop programs. As Charmaz (2006) notes, "grounded theory places ideas and analytical frameworks on center stage"(p. 151). What follows in this chapter are putting the layers of data gathering and analysis as the foci that accompanies the constant comparative method of "generating successively more abstract concepts through inductive processes of comparing data with data, data with category"(Charmaz, 2006, p. 187). The research results presented here and the task of making postulates against learning or new theory are presented in Chapter 5.

The transcripts from student responses in five separate focus groups were coded using the Atlas TI software program. A total of 483 open codes (Appendix C) were generated from the student responses (words, phrases, sentences) to focus group questions (Appendix J), follow up questions or exchanges recorded as part of the focus group. The open codes were placed in themes according the researcher's interpretation of the phrase, topic, or response centered around a theme (i.e. "work," "learning," "enjoying," "perceiving," etc.). Focused coding of these open codes delineated relationships and dimensions of this theme. What follows are descriptions of the open codes, the focused codes, and the co-occurrences, as well as the responses from the students from which these inductions are generated.

The 483 open codes (Appendix C) reflect direct responses or in vivo codes from student responses to focus group questions. The codes fell under themes of (a) applying, (b) working, (c) perceiving, (d) enjoying, (e) not enjoying, (f) communicating, (g) comparing, (h) learning, (i) rating, (j) location, (k) bandwidth.

4.2 Description of open code themes

When transcribing and analyzing student responses to the focus group questions and follow up questions, the following themes of codes emerged (Figure 6). Below is the researcher inductive criteria and working definition for including student responses in a particular theme:

Descriptions:

- *Applying*: participant described instances of using, doing, or otherwise acting in a manner described in the open code.
- *Working*: participant's description of the type or theme of software used when asked "what type of software do you use to get your schoolwork done?"
- *Perceiving:* participant making an observation, a particular point of view, or an opinion about characteristics, events, or conditions in their learning environment or relations with others.
- *Enjoying*: participant response to the question "what do you enjoy the most about the one to one laptop program?" indicating pleasure, a positive attitude, or agreement with some aspect of their experiences with laptops or other people.
- *Not enjoying*: participant response to the question "what do you enjoy the least about the one to one laptop program?" indicating pleasure, a positive attitude, or agreement with some aspect of their experiences with laptops or other people.
- *Communicating*: participant description of verbal or written interactions with others.

- *Comparing*: participant considering differences or similarities of software, hardware, experiences, perceptions, relationships, and/or insights in one to one laptop usage.
- *Learning*: participant response to the question "describe a situation at school or home where you felt like you were learning something?" In some instances something specific like a software program or in factual content areas and in other instances some insight or act of transferring in the processing of information from experience.
- *Rating*: the participant's evaluation of their "bandwidth" or relative internet speed at their home. Used as a secondary code to "bandwidth" in referring to student's perception of act of internet speed at home.
- *Location*: when possible to discern this refers to the physical place where the usage or experience was described by the participant.
- *Bandwidth*: participant's evaluation of their "bandwidth" or relative internet speed at their home

The open codes' themes were expressed in gerund form when possible as a tool for "detecting processes and stick[ing] to the data" (Charmaz, 2006; p. 49; Glaser, 1978). This process was helpful to consistently discern the student's action (real or intended) and follow their experiences with laptops. These open codes were like spokes to a bicycle wheel representing underlying pathways, supports, and fluidity of their perceptions of learning.

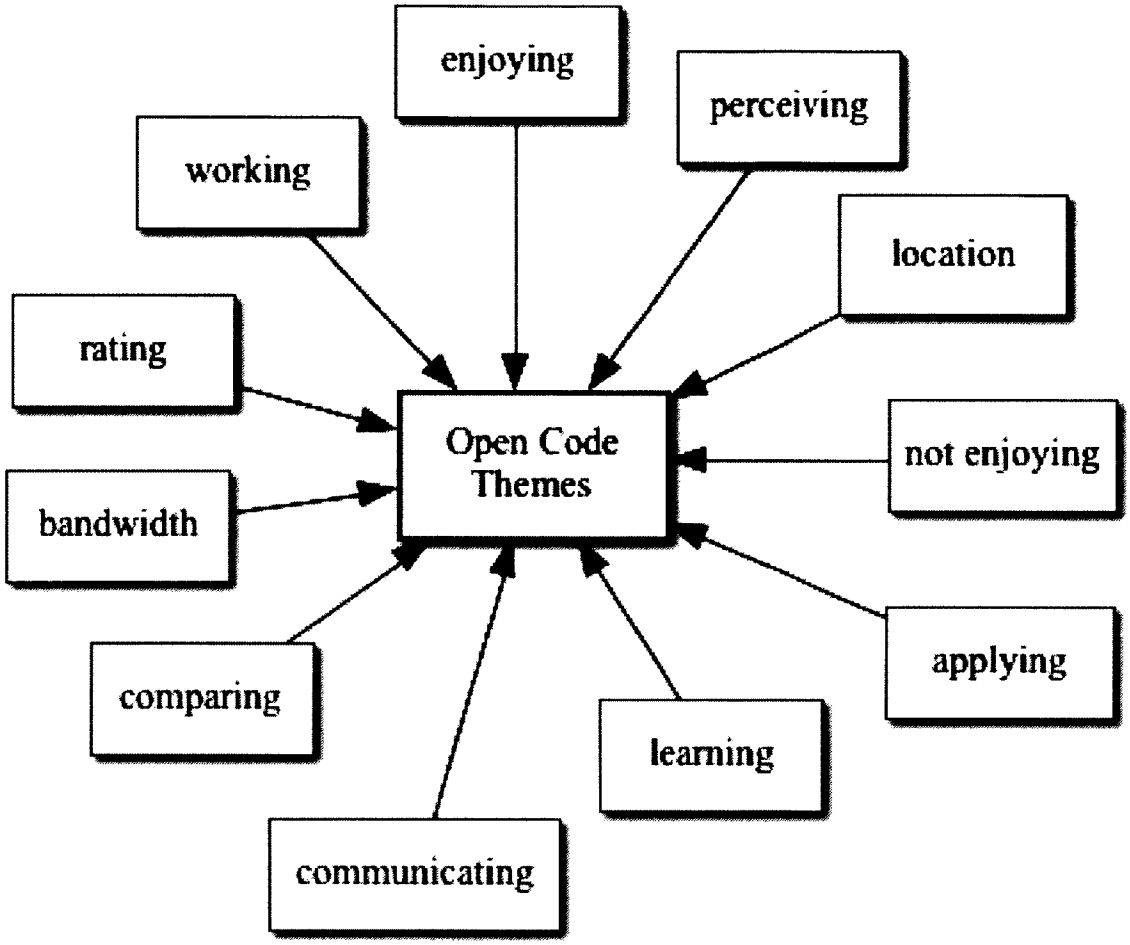


Figure 6. Open code themes.

4.3 Focused coding

Open coding generated 483 codes from student responses. These open codes were further evaluated and reduced a secondary reading of the responses and the memos created by the researcher to further detail or delineated the information provided by the students. The memos were comments written by the researcher detailing insights or questions about student responses from the researcher's perspective. When a response could not easily be analyzed into a focused code created by the researcher, the response was placed in the "other" focused code theme.

The process of focused coding not only further delineated the information in the student response, but acted as a kind of secondary check by the researcher on the initial open code. In only one or two instances were open codes themes changed in the focused coding process. In doing so, the researcher was more confident about the internal consistency and representation of student responses into the codes. Therefore, these focused codes in Figure 7 represent a complete snapshot of student responses to questions and are the beginnings of a codebook for further research in student perceptions of learning in one to one laptop programs.

Consistent with grounded theory there are no claims here of proving a hypothesis or making conclusions about the applicability of these focused codes to other student populations. The results here represent the coding and focused coding process of all student responses in the current sample across all five focus groups in this research. The representation includes student descriptions of their behaviors, perceptions, opinions, observations, communications, and musings about using laptops. The focused codes (Figure 6) and co-occurrences suggest that students apply multiple strategies in any given situation motivated by different things. Further comparisons of the focused codes to learning theory and especially "new literacies" are made in Chapter 5.

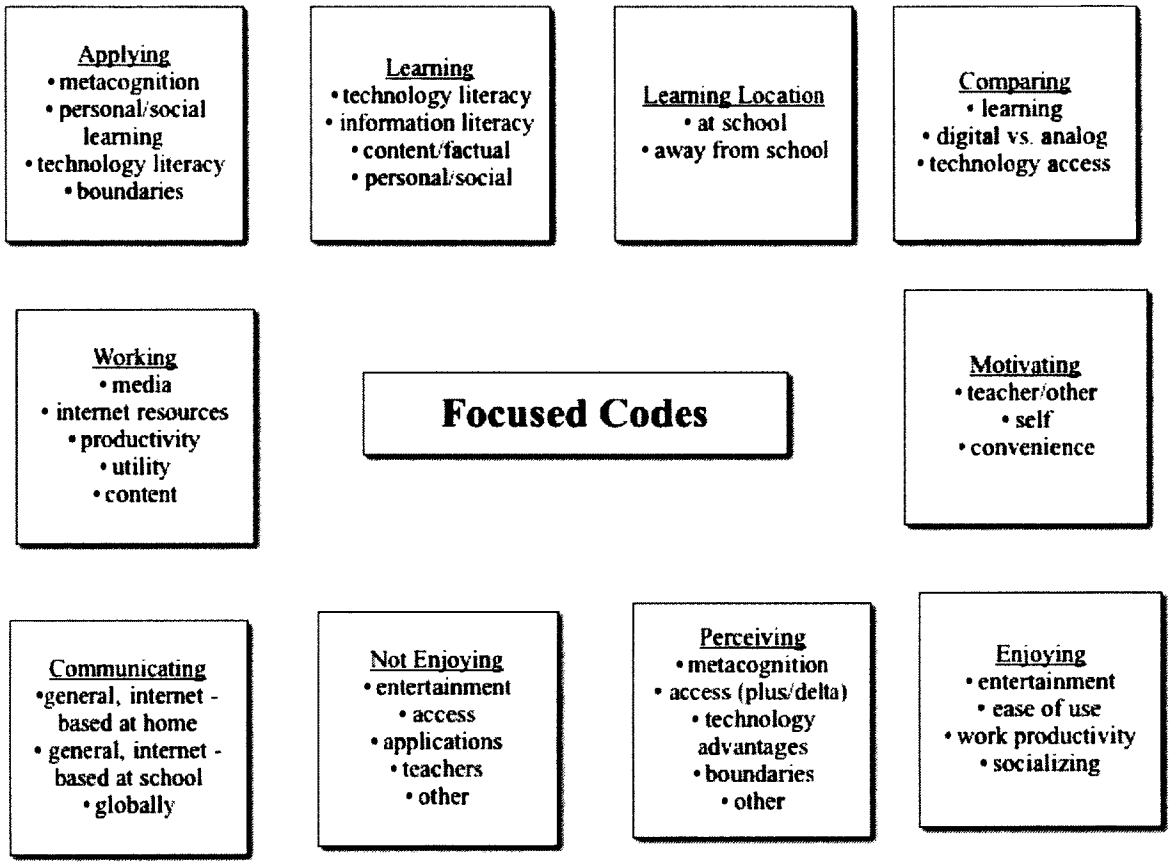


Figure 7. Focused codes.

As above with open coding themes, what follows are the further delineation of the open code themes into focused codes. Each open code theme was further analyzed for content and assigned to a focused code. Below are the criteria for a quotation and open code theme being assigned to a focused code.

4.3.1 Applying.

- Metacognition: student applying consideration to some aspect of thinking about their own or others' thinking, processing information, and/or considering the learning process.
- Personal, Social Learning: students referring to applying some aspect of the one to one laptop usage to learning within relationship to themselves or others.

• Technology Literacy: students referring to applying some aspect of computer hardware, software, or learning about technology.

• Boundaries: students referring to physical, digital, or human separations whether real or perceived.

4.3.2 Working.

• Media: software used in pictures, sound, movies, or other aspects of non-text based information.

• Internet Resources: software or tools associated with accessing, downloading, uploading, viewing, or manipulating information on the internet.

• Productivity: software related to word processing, spreadsheets, and/or databases.

• Utility: software related to the functioning of a computer or other digital devices for programming, manipulating or altering computing functions.

• Content: software related to actual information on a particular curriculum subject, general information, and/or learning processes.

4.3.3 Communicating.

• General, internet (based at home): interactions with others from student's home.

• General, internet (based at school): interactions with others from student's school.

• Globally: less specific to location, but interactions with others on a broader basis.

4.3.4 Not enjoying.

• Entertainment: student referring to games, music, movies, etc. and/or other activities.

• Access (plus/delta) - the ability to connect to internet or other networks to get to information (positive or negative experiences).

• Applications – software programs on the computer.

• Teachers – student referring to some aspect of their perceptions of teacher's attitudes, behaviors, pedagogy, or personality.

• Other – other items liked least by students not categorized in above four codes.

4.3.5 Perceiving.

• Metacognition (types of learning): student applying consideration to some aspect of thinking about their own or others' thinking, processing information, and/or considering the learning process.

• Access (plus/delta): the ability to connect to internet or other networks to get to information (positive or negative experiences).

• Technology advantages: student's expressed view or opinion of aspects of the laptop hardware, software, and/or online resources they see as favorable.

• Boundaries: student sense of a separation between their personal space, technology, or identity and other people.

• Other: anything else regarding student view of things not listed above.

4.3.6 Enjoying.

• Entertainment: software programs that students appreciate such as games, video, music, programming, etc. they enjoy doing.

• Ease of Use: the relative comfort students find with accessing and using laptops, software, and online resources.

• Work Productivity – student expression of satisfaction or agreement with getting schoolwork done.

• Socializing – students interacting with other students and adults online and/or face to face.

4.3.7 Motivating.

- Teacher/other – wanting to do a task or activity due to the request or inspiration of a teacher or another adult/student.
- Self – wanting to do a task or activity due to personal interests or responsibility.
- Convenience – wanting to do a task because of the ease of accessing and using laptops or other resources.

4.3.8 Comparing.

- Learning – students considering and/or expressing similarities or differences in various aspects of taking in, thinking about and using information.
- Digital vs. Analog – student considering the similarities or differences between physical versus computer-based assets.
- Technology Access – students considering similarities and differences between aspects of using their laptops, software, and related resources.

4.3.9 Learning.

- Technology Literacy – gaining skills, knowledge, and/or understanding about hardware, software, media, peripheral hardware, and/or internet resources.
- Information Literacy – gaining skills, knowledge, and/or understanding about searching for, inquiry, accessing, using, evaluating, and sharing information.
- Content/Factual – dealing with subject content or factual information.
- Personal/Social – dealing with personal, emotional, and/or other people interactions.

4.3.10 Learning location.

- At school – taking place at the school site.
- Away from school - taking place away from the school site.

4.4 Frequency of co-occurrence results

The frequency of co-occurrences among focused codes (Table 1) was measured by summarizing the number of co-occurrences between each pair of focused codes. When student responses referred to only one open code theme, then only one was assigned. Any responses coded to more than one open code in which the open codes fell under focused codes, would produce a co-occurrence between those two focused codes. The Atlas TI software output the frequency of these co-occurrences of focused codes. This was helpful to see which aspects of each theme were discussed concurrently with which aspects of which other themes throughout all the focus groups, and to thereby focus on those relationships among the various themes that were most prevalent.

Table 1

Summary of Co-occurrences.

	Theme totals								
	Learning	Enjoying	Perceiving	Applying	Comparing	Work	Not Enjoying	Motivating	Communicating
Total codings:	363	210	173	138	105	102	59	45	20
Applying-Boundaries	47	15	17	65	19	2	1	8	1
Applying-Metacognition	48	23	12	60	17	2		7	2
Applying-Personal, Social Learning	42	18	11	52	16	2		6	2
Applying-Technology Literacy	17	9	6	23	6		1	5	
Communicating-General, internet - based at home	29	9	5	2	5		1	1	3
Communicating-General, internet - based at school	7	1	2	3	1				2
Communicating-Globally	4	1	1				1		1
Comparing-Digital vs. Analog	10	4		3	1				2
Comparing-Learning	34	22	33	46	4		5	12	4
Comparing-Technology Access	12	17	10	9	5	1		2	
Enjoying-Ease of Use	20	12	10	11	8	1		4	
Enjoying-Entertainment	9	22	9	12	9	4	3	1	
Enjoying-Socializing	60	24	16	24	14	4	5	5	10
Enjoying-Work Productivity	38	30	19	18	12		5	9	1
Learning-Content/Factual	131	20	12	23	7	5	3	4	10
Learning-Information Literacy	135	29	21	47	12	3	3	10	9
Learning-Personal/Social	154	39	23	38	17	13	4	11	12
Learning-Technology Literacy	156	39	24	46	20	17	5	7	9
Motivating-Convenience		2							
Motivating-Self	18	9	3	16	5		3	3	1
Motivating-Teacher/other	14	8	11	10	9	3	7	3	
Not Enjoying-Access	7	3	12		2		4	2	
Not Enjoying-Applications						3			
Not Enjoying-Entertainment		1							
Not Enjoying-Other									
Not Enjoying-Teachers	8	9	8	2	3	4	4	8	2
Perceiving-Access plus/delta	10	11	4	5	5	2		2	
Perceiving-Boundaries	23	14	4	23	18		16	2	6
Perceiving-Metacognition types of learning	40	17	6	16	10	5	3	5	2
Perceiving-Other			2		2		1	4	
Perceiving-Technology Advantages	7	12	2	2	8	1		1	
Work-Content	3					2			
Work-Internet Resources	8	3	2			22	2	2	
Work-Media	8		2		1	21	2		
Work-Productivity	13	4	2	3		23	2		
Work-Utility	6	2	2	3		6	1	1	

4.5 Co-occurrence tables and responses

The co-occurrences provided glimpses into patterns of student perceptions of learning and interactions with information, technology and other people. Using the focused codes (Figure 4.2) over 1215 co-occurrences were observed in all of the five focus groups. These co-occurrences are the researcher's interpretation of student responses and not 1215 unique responses. These co-occurrences provide a tool to observe and analyze the student words and perceptions. What follows are co-occurrence tables followed by selected quotes the researcher uses to further highlight the focused codes and the co-occurrence. For this analysis co-occurrences were included with a frequency over 20 codes. Other co-occurrences with less than 20 and/or deemed by the researcher to be relevant to research questions and some instructive insights by students were also included.

4.5.1 Learning.

Learning was the largest theme for co-occurrences with 363 codings. Table 2 includes labels 1-4 and A-J to capture co-occurrences number over 20. One co-occurrence less than 20, "Not enjoying – teachers" was selected for this focus code.

Table 2

Co-occurrences in Learning Code.

		Learning				
		1	2	3	4	
		Technology Literacy	Personal /Social	Content /Factual	Information Literacy	Total cooccuring codings
Total codings:		124	103	68	68	363
Enjoying-Socializing	A	16	17	12	15	60
Applying-Metacognition	B	13	12	7	16	48
Applying-Boundaries	C	16	11	7	13	47
Applying-Personal, Social Learning	D	9	12	6	15	42
Perceiving-Metacognition types of learning	E	11	13	6	10	40
Enjoying-Work Productivity	F	12	14	4	8	38
Comparing-Learning	G	9	10	5	10	34
Communicating-General, internet - based at home	H	6	9	8	6	29
Perceiving-Boundaries	I	9	5	4	5	23
Enjoying-Ease of Use	J	9	4	2	5	20
Motivating-Self		4	7	2	5	18
Applying-Technology Literacy		8	3	3	3	17
Motivating-Teacher/other		3	4	2	5	14
Work-Productivity		5	4	3	1	13
Comparing-Technology Access		6	4	1	1	12
Comparing-Digital vs. Analog		5	3	1	1	10
Perceiving-Access plus/delta		2	3	1	4	10
Enjoying-Entertainment		2	4	2	1	9
Not Enjoying-Teachers	K	2	2	2	2	8
Work-Internet Resources		2	4	2		8
Work-Media		5	3			8
Communicating-General, internet - based at school		2	2	1	2	7
Not Enjoying-Access		3	2	1	1	7
Perceiving-Technology Advantages		2	2	1	2	7
Work-Utility		4	1		1	6
Communicating-Globally		1	1	1	1	4
Work-Content		1	1		1	3

4.5.1.1 Selected student quotes from co-occurrences learning codes.

a. Quotes from Learning - Enjoying-Socializing and Technology Literacy (1-A):
"I've been involved through Science Club with actually in a partnership with UAF with a Scientific Study here and ah we use Facebook, we can't use Facebook here but going on it at home, I use Facebook and email just to connect with people from UAF and people from here and other partners that are on the other side of the world and that's actually really, really helped us to do stuff."

b. Student Quote from Learning - Applying- Metacognition and Technology Literacy (1-B):
"Like I guess with some stuff that you learn in school you incorporate it in your personal life, like you said fact checking, maybe you learn it from there, maybe not. Maybe you learned it the other way from Facebook, I guess. So you kind of use what you learn from school in your own kind of personal things I guess."

c. Student Quote from Learning- Applying-Boundaries and Technology Literacy (1-C):
"Oh, I was just going to say that yah, Facebook can be a distraction and stuff but at the same time, sometimes it can be helpful...like if you're getting on and then see that someone else is also got a way around it and got on Facebook during the day then they're on there and you send them like a track thing and then you talk to them about maybe, I've used it before in like having projects due the next day, so I was like "Did you get your homework done for this? Am I going to have to hurry up and pick up your slack right now so we don't get an "F"? And so it can be good for some things like that even if it once in a while can be distracting."

4.5.2 Enjoying.

This theme contained a total of 210 co-occurrences from the five focus groups (Table 3). Most of these responses came from the focus group question: "During that time can you describe what you like most and least about having a laptop?" (Appendix J).

Table 3.

Co-occurrences in Enjoying Code.

		Enjoying				
		1	2	3	4	
		Work Productivity	Socializing	Entertainment	Ease of Use	Total cooccuring codings
Total codings:		85	52	38	35	210
Learning-Personal/Social	A	14	17	4	4	39
Learning-Technology Literacy	B	12	16	2	9	39
Learning-Information Literacy	C	8	15	1	5	29
Applying-Metacognition	D	7	8	4	4	23
Comparing-Learning	E	6	10	4	2	22
Learning-Content/Factual	F	4	12	2	2	20
Applying-Personal, Social Learning		6	6	4	2	18
Comparing-Technology Access		6	2	4	5	17
Perceiving-Metacognition types of learning	G	6	7	3	1	17
Applying-Boundaries		2	6	3	4	15
Perceiving-Boundaries		7	5	2		14
Perceiving-Technology Advantages		3	2	3	4	12
Perceiving-Access plus/delta		3	2	1	5	11
Applying-Technology Literacy		3	4	1	1	9
Communicating-General, internet - based at home		1	8			9
Motivating-Self		5	3		1	9
Not Enjoying-Teachers		3	4	2		9
Motivating-Teacher/other		3	2	1	2	8
Comparing-Digital vs. Analog			2	1	1	4
Work-Productivity			2	2		4
Not Enjoying-Access		2	1			3
Work-Internet Resources			1	1	1	3
Motivating-Convenience		1			1	2
Work-Utility			1	1		2
Communicating-General, internet - based at school			1			1
Communicating-Globally			1			1
Not Enjoying-Entertainment				1		1

4.5.2.1 Selected student quotes from co-occurrences in enjoying code.

a. Quotes from Enjoying-Applying Metacognition and Socializing (2-D)

"I don't just use Facebook for social connecting with my friends, I use it because I like artists that I like and I can learn about new songs that they have coming out or I like a company and learn about a new product or program that they are making. It just gets you connected to like the whole world pretty much instead of just like one local group of friends or a group of friends in a certain area."

b. Quotes from Learning – Technology Literacy and Enjoying (1-B)

"Sometimes I like to get on Google and look up random things and I just learn about new gadgets and toys because it takes me to Popular Science or something. I learn on that."

c. Student Quotes from Learning -Information Literacy and Enjoying (1-C)
"I'm pretty sure that having a laptop allows us to learn a lot more because it's just automatic access to I mean as long as you have internet, it is automatic access to all that information that is out there. Whereas especially in elementary school if you wanted to learn something you had to go to the library. And also say you're cruising the web at night you just have a question about owls or something you can go look it up. Whereas if you had a question then you'd have to wait until the next day and go to the library and then you'd have to find the book and find the exact part that you're talking about or that you want to know about and you have to look through the pages and find it."

4.5.3 Perceiving.

This theme contained a total of 173 co-occurrences from the five focus groups (Table 4) Most of these responses came from focus group questions that caused the students to share an opinion, a view, or a way of viewing a topic. The issues of boundaries came up the most in this focused code as student had strong feelings or "perceptions" that others were invading their digital space (i.e. laptop) or they were being blocked from useful and fun resources.

Table 4

Co-occurrences in Perceiving Code.

		Perceiving					
		1	2	3	4	5	
		Boundaries	Meta- cognition	Technology Advantages	Access (plus/delta)	Other	Total cooccuring codings
Total codings:		82	48	21	18	4	173
Comparing-Learning	A	17	9	3	2	2	33
Learning-Technology Literacy	B	9	11	2	2		24
Learning-Personal/Social	C	5	13	2	3		23
Learning-Information Literacy	D	5	10	2	4		21
Enjoying-Work Productivity		7	6	3	3		19
Applying-Boundaries		9	5	1	2		17
Enjoying-Socializing		5	7	2	2		16
Applying-Metacognition	E	6	6				12
Learning-Content/Factual		4	6	1	1		12
Not Enjoying-Access		11	1				12
Applying-Personal, Social Learning		7	4				11
Motivating-Teacher/other	F	1	4	1	1	4	11
Comparing-Technology Access		1	1	5	3		10
Enjoying-Ease of Use			1	4	5		10
Enjoying-Entertainment		2	3	3	1		9
Not Enjoying-Teachers	G	5	2			1	8
Applying-Technology Literacy		1	1	1	3		6
Communicating-General, internet - based at home		4	1				5
Motivating-Self		1	1		1		3
Communicating-General, internet - based at school		1	1				2
Work-Internet Resources			1		1		2
Work-Media			1		1		2
Work-Productivity			2				2
Work-Utility			1	1			2
Communicating-Globally		1					1

4.5.3.1 Selected student quotes co-occurrences in perceiving codes.

a. Quotes from Perceiving: Applying Metacognition and Socializing (2-D)
"I don't just use Facebook for social connecting with my friends, I use it because I like artists that I like and I can learn about new songs that they have coming out or I like a company and learn about a new product or program that they are making. It just gets you connected to like the whole world pretty much instead of just like one local group of friends or a group of friends in a certain area."

b. Quotes from Perceiving: Technology Literacy and Enjoying (1-B)
"Sometimes I like to get on Google and look up random things and I just learn about new gadgets and toys because it takes me to Popular Science or something. I learn on that."

c. Student Quotes from Perceiving: Information Literacy and Enjoying (1-C)
"I'm pretty sure that having a laptop allows us to learn a lot more because it's just automatic access to I mean as long as you have internet, it is automatic access to all that information that is out there. Whereas especially in elementary school if you wanted to learn something you had to go to the library. And also say you're cruising the web at night you just have a question about owls or something you can go look it up. Whereas if you had a question then you'd have to wait until the next day and go to the library and then you'd have to find the book and find the exact part that you're talking about or that you want to know about and you have to look through the pages and find it."

4.5.4 Applying.

This theme contained a total of 138 co-occurrences from the five focus groups (Table 5). Most of these came from focus group responses in which they described actively doing, creating, or working on aspects of learning with their laptops or relationships

Table 5

Co-occurrences in Applying Code.

		Applying				
		1	2	3	4	
		Boundaries	Metacognition	Personal/Social Learning	Technology Literacy	Total cooccuring codings
Total codings:		46	39	30	23	138
Learning-Information Literacy	A	13	16	15	3	47
Comparing-Learning	B	14	15	14	3	46
Learning-Technology Literacy	C	16	13	9	8	46
Learning-Personal/Social	D	11	12	12	3	38
Enjoying-Socializing	E	6	8	6	4	24
Learning-Content/Factual	F	7	7	6	3	23
Perceiving-Boundaries	G	9	6	7	1	23
Enjoying-Work Productivity		2	7	6	3	18
Motivating-Self		5	4	4	3	16
Perceiving-Metacognition types of learning	H	5	6	4	1	16
Enjoying-Entertainment		3	4	4	1	12
Enjoying-Ease of Use		4	4	2	1	11
Motivating-Teacher/other	I	3	3	2	2	10
Comparing-Technology Access		4	1	1	3	9
Perceiving-Access plus/delta		2			3	5
Communicating-General, internet - based at school		1	1	1		3
Comparing-Digital vs. Analog		1	1	1		3
Work-Productivity		1	1	1		3
Work-Utility		1	1	1		3
Communicating-General, internet - based at home			1	1		2
Not Enjoying-Teachers	J	1			1	2
Perceiving-Technology Advantages		1			1	2

4.5.4.1 Selected student quotes co-occurrences in applying codes.

a. Quotes from Applying: Boundaries and Learning-Information Literacy (1-A)
"I'll be researching something for a project or an essay and the teacher assigns that one but I could also be researching a topic just for my personal enjoyment or I want to learn more about it so I'm researching it. I think the only difference for me with these laptops is whether I have an assignment attached to whatever I'm looking at."

b. Quotes from Applying: Boundaries and Comparing-Learning (1-B)
"I don't really use my school computer for home a whole lot unless it's for work because maybe a lot of the applications maybe that I'd like to use or I'd like to understand to use are blocked and so you can't do everything on."

c. Student Quotes from Applying: Boundaries and Learning-Content/Factual (1-F)
"Oh, I was just going to say that yah Facebook can be a distraction and stuff but at the same time, sometimes it can be helpful like if you're getting on and then see that someone else is also got a way around it and got on Facebook during the day then they're on there and you send them like a track thing and then you talk to them about maybe, I've used it before in like having projects due the next day so I was like "Did you get your homework done for this? Am I going to have to hurry up and pick up your slack right now so we don't get an "F"? And so it can be good for some things like that even if it once in a while can be distracting."

4.5.5 Comparing.

This theme contained a total of 105 co-occurrences from the five focus groups (Table 6). Most of these responses came from focus groups in which the students were directly or indirectly comparing things (i.e. home vs. school computer, etc.).

Table 6

Co-occurrences of Comparing Code.

		Comparing			
		1	2	3	
		Learning	Technology Access	Digital vs. Analog	Total cooccuring codings
Total codings:		69	26	10	105
Learning-Technology Literacy	A	9	6	5	20
Applying-Boundaries		14	4	1	19
Perceiving-Boundaries		17	1		18
Applying-Metacognition	B	15	1	1	17
Learning-Personal/Social		10	4	3	17
Applying-Personal, Social Learning		14	1	1	16
Enjoying-Socializing		10	2	2	14
Enjoying-Work Productivity		6	6		12
Learning-Information Literacy		10	1	1	12
Perceiving-Metacognition types of learning	C	9	1		10
Enjoying-Entertainment		4	4	1	9
Motivating-Teacher/other	D	8	1		9
Enjoying-Ease of Use		2	5	1	8
Perceiving-Technology Advantages		3	5		8
Learning-Content/Factual		5	1	1	7
Applying-Technology Literacy		3	3		6
Communicating-General, internet - based at home		3		2	5
Motivating-Self		4	1		5
Perceiving-Access plus/delta		2	3		5
Not Enjoying-Teachers	E	3			3
Not Enjoying-Access		2			2
Perceiving-Other		2			2
Communicating-General, internet - based at school		1			1
Work-Media			1		1

4.5.5.1 Selected student quotes co-occurrences in comparing codes.

a. Quotes from Comparing – Learning and Metacognition: Types of Learning (1-C)
"I also use Facebook to learn, I like, um, the two colleges that I was deciding between Western Washington and Stanford, I "like" both pages and so as they update their pages I could see what was going on in each school and so it kind of helped me stay connected I guess to what each school was doing."

b. Quotes from Comparing – Applying Metacognition and Digital vs. Analog (3-B)
"On sort of a different note, I would say just the whole process of going through how to learn, er learn, how to use all the things that are available to you as just a big learning process, like figuring out how to set up columns or tables on the Word document and how to make a graph in Excel or how to get your podcast to work right things like that. With the VHS animation class I'm taking, it's all about learning how to use Adobe Flash IV all aspects of that program. So just how to use everything on your computer is a learning experience. It's a good to have."

c. Student Quotes from Comparing – Perceiving-Metacognition and Types of Access (2-C)
" I guess some people I know are kind of like Number Four said that they prefer maybe the window's system or the XP over the Mac so when they do want that time to just do something fun or it's easier for them to operate. My sister she used a Mac the whole four years of high school but she just decided to invest in a Dell because she like XP better. And I find that actually I like Mac's better because Garage Band. And another thing in my spare time is usually for Garage Band at school or I'll make a Podcast for something or some sort of audio report but at home I'll make music with Garage Band and I have this keyboard that I can hook up to it and play the piano and it inputs as data. So I find that the difference a lot between school and home is I have more creative outlets when I'm using my computer at home. And more logical at school."

4.5.6 Working.

This theme contained a total of 102 co-occurrences from the five focus groups (Table 7). Most of these responses came from focus group questions or comments when asked about which software they used for completing school work. This theme also accounts for many characteristics of formal learning as used in this research.

Table 7

Co-occurrences of Working Code.

		Work					
		1	2	3	4	5	
		Internet Resources	Productivity	Media	Utility	Content	Total cooccuring codings
Total codings:		28	27	20	18	9	102
Learning-Technology Literacy		2	5	5	4	1	17
Learning-Personal/Social		4	4	3	1	1	13
Learning-Content/Factual		2	3				5
Perceiving-Metacognition types of learning	A	1	2	1	1		5
Enjoying-Entertainment		1	2		1		4
Enjoying-Socializing		1	2		1		4
Not Enjoying-Teachers	B	1	1	1	1		4
Learning-Information Literacy			1		1	1	3
Motivating-Teacher/other	C	2			1		3
Not Enjoying-Applications		1	1	1			3
Applying-Boundaries			1		1		2
Applying-Metacognition	D		1		1		2
Applying-Personal, Social Learning			1		1		2
Perceiving-Access plus/delta		1		1			2
Comparing-Technology Access				1			1
Enjoying-Ease of Use		1					1
Perceiving-Technology Advantages					1		1

4.5.6.1 Selected student quotes co-occurrences in working codes.

a. Quotes from Working: Internet Resources and Metacognition: Types of Learning (1-A)
"On sort of a different note, I would say just the whole process of going through how to learn, er learn, how to use all the things that are available to you as just a big learning process, like figuring out how to set up columns or tables on the Word document and how to make a graph in Excel or how to get your podcast to work right things like that. With the VHS animation class I'm taking, it's all about learning how to use Adobe Flash IV all aspects of that program. So just how to use everything on your computer is a learning experience. It's a good to have."

b. Quotes from Working: Technology Literacy and Enjoying (1-B)
"A lot of times when I'm out of school I feel like I'll kind of use my computer to get away from all the homework and research and just find a way to relax and have fun. It's not usually through social networking, cause it kind of stresses me out but I'll do stuff like look up u-tube videos or download new music, find pictures of my favorite bands or even the way I learn sometimes too about more things that are not school related but things I enjoy like my favorite rock bands or history of Japan. I'm kind of into that, so that's something that is fun for me. Or I can read books online too. MS: Hmm read books online? What, now tell me about that. Student 2: I can either look up free versions of PDF files or chapters or there's comic books online too, like Japanese Manga. Either that or there's Kindle where you can download it on the computer and read it that way."

c. Student Quotes from Working: Internet Resources and Motivating - Teachers/other (1-C)
"It is also easier for traveling, being here in the southeast we do a lot of traveling with school activities and school sports and other things like that going around to the different schools and sometimes your school travel might be for a whole week or sometimes it might be for three days. You never really know. And so having your laptop you are able to continue doing your schoolwork while you're gone. And if you have internet while you're in the town then you can still get on and see what your class has been doing. Like for chemistry it's awesome to just have the laptop and get onto Noodle because our Chemistry Teacher records himself during the classes and so we can get on there and download the podcast of the class that we missed and be able to be on the ferry and be just able to listen to the class so we didn't really miss it. And we can understand what he's talking about when we get back."

4.5.7 Not enjoying.

This theme contained a total of 59 co-occurrences from the five focus groups (Table 8). Most of these responses came from focus group question about what the student enjoyed least about being part of a one to one program. Other responses to questions or discussion among the group also solicited things students did not enjoy about some aspect of the program.

Table 8

Co-occurrences of Not Enjoying Code.

		Not enjoying					
		1	2	3	4	5	
		Access	Applications	Entertainment	Other	Teachers	Total cooccuring codings
Total codings:		24	4	3	2	26	59
Perceiving-Boundaries		11				5	16
Motivating-Teacher/other		1				6	7
Comparing-Learning		2				3	5
Learning-Technology Literacy		3				2	5
Learning-Personal/Social		2				2	4
Learning-Content/Factual		1				2	3
Learning-Information Literacy		1				2	3
Motivating-Self		1				2	3
Perceiving-Metacognition types of learning	A	1				2	3
Work-Internet Resources			1			1	2
Work-Media			1			1	2
Work-Productivity			1			1	2
Applying-Boundaries						1	1
Applying-Technology Literacy						1	1
Communicating-General, internet - based at home						1	1
Communicating-Globally						1	1
Perceiving-Other						1	1
Work-Utility						1	1

4.5.7.1 Selected student quotes co-occurrences in not enjoying codes.

a. Student Quotes from Not Enjoying: Access and Perceiving-Boundaries (1-A) "It is a big distraction when you can get onto Facebook and when you're trying to do your homework because you find all these entertaining things to do on Facebook or you just want to talk to your friends and times just goes by and you still have your homework to do and it becomes like 11:00 at night and now you're tired and you don't really want to finish your homework so you wait until the morning and then it's too late. So, but we can get on Facebook at school too. Like I think most of us know a way to get around the website being blocked so it's not just a distraction at home it's a distraction at school."

b. Student Quotes from Not Enjoying: Teachers and Perceiving-Boundaries (5-A)
"I don't know if I can say for many others but I know that my class where my teacher will just download everything off line and expects us to read it when it's just key words and we're learning something that we've never even heard, it's hard to understand and be motivated to want to learn it when you feel like they're not putting as much effort into teaching us, even if it is a new class and she's still trying to figure out how to teach it, but I mean, you know she just can't expect us to know what we're learning and just vaguely tell us this or that and expect us to know it all because we don't and so the motivation gets lost because well my teacher's just using a PowerPoint that she didn't even make off line and taking assignments off line and giving it to us for us to learn but you know we still want our teacher to teach us and so I guess that's a way of my motivation being lost when there's no motivation there at all."

c. Student Quotes from Not Enjoying: Teachers and Perceiving-Boundaries (5-A)
"When I'm doing school work at home I'm usually pretty reluctant to do it cause I honestly just don't like homework in general. And so when I am sitting down to do it I feel really reluctant, like there are so many better things that I could be doing right now and I really just don't want to be doing this. But then when I'm doing more pleasure stuff like surfing the web and stuff like that and okay time passes pretty quickly and you just kind of sit there and look it up and my mood gets a little better. And I mainly when I'm at home, I don't use that many networking sites. I check Facebook to get in touch with old relatives from down south. But I like writing and so I have a couple web sites that I go to mainly for my writings. And so I can get on there and talk to people about specific things like that. And it just improves my mood whereas doing schoolwork I'm just like "Am I done yet? Am I done yet?" sometimes taking forever."

4.5.8 Motivating.

This theme contained a total of 45 co-occurrences from the five focus groups (Table 9). Even though it was not a direct question, student responses were clear in describing aspects of learning, technology, teachers, boundaries that either engaged and motivated them, or the opposite. Sometimes the sources of their motivation were evident as described by the students.

Table 9

Co-occurrences of Motivating Code.

		Motivating			
		1	2	3	
		Self	Teacher/other	Convenience	Total cooccuring codings
Total codings:		22	22	1	45
Comparing-Learning		4	8		12
Learning-Personal/Social		7	4		11
Learning-Information Literacy		5	5		10
Enjoying-Work Productivity		5	3	1	9
Applying-Boundaries		5	3		8
Not Enjoying-Teachers	A	2	6		8
Applying-Metacognition	B	4	3		7
Learning-Technology Literacy		4	3		7
Applying-Personal, Social Learning		4	2		6
Applying-Technology Literacy		3	2		5
Enjoying-Socializing		3	2		5
Perceiving-Metacognition types of learning	C	1	4		5
Enjoying-Ease of Use		1	2	1	4
Learning-Content/Factual		2	2		4
Perceiving-Other			4		4
Comparing-Technology Access		1	1		2
Not Enjoying-Access		1	1		2
Perceiving-Access plus/delta		1	1		2
Perceiving-Boundaries		1	1		2
Work-Internet Resources			2		2
Communicating-General, internet - based at home		1			1
Enjoying-Entertainment			1		1
Perceiving-Technology Advantages			1		1
Work-Utility			1		1

4.5.8.1 Selected student quotes co-occurrences in motivating codes.

a. Student Quote from Motivating: Self and Not Enjoying - Teachers (1-A)
"Sometimes I feel too constricted when the teacher says you know Make a PowerPoint, it has to be PowerPoint or make a movie and it has to be on anything... it just has to be an application for making a specific type of movie and I'd really rather they said, Make a presentation so that I could do a podcast or make a movie and choose how I make the movie. And that motivates a lot more because I can do what I want to be doing while presenting the same information rather than doing just what everyone else is doing."

b. Student Quote from Motivating: Teacher/other and Not Enjoying -Teachers (2-A)
"Going along kind of with what Number Six said, like picking college for this Fall because I'm a Senior has, because I'm using Facebook, has made it a little bit easier because it is available to be able to reach out and look at people specifically going to the colleges that I'm looking at. And maybe send one of them a message or be like hey this person graduated from Petersburg like two years ago and they're going to a college that I'm looking at so I can ask them to be my friend or if they are already my friend then be able to talk to them about it and find out what college I do want to go to. And you get some new perspective that way."

Interviewer: "Un-huh, which would be hard to do almost any other way?"

Student 3: "Un-huh...any other way, than to just be looking at the brochures and the college and just kind of guessing like, 'Oh well this one seems okay.'"

Interviewer: "So that is another way of learning?"

Student 3: "Un-huh."

c. Student Quote from Motivating: Teaching/other and Perceiving - Metacognition - Types of Learning (2-C)
"Well, it depends on the teacher. Some teachers are really good about incorporating technology within their lessons and still teaching you about it. Um, like maybe using a clip or two of u-tube here or there or going to a web site that is an interactive website so that you, they tell you, "stay here for about fifteen minutes and look through it and see what you can find and then we'll talk about it. And then depending on the teacher, like I said, there are some teachers more of just pulling a bunch of stuff off of line and then

> showing them to you and telling you to do it. And you don't really have a basis for it, like you don't really understand it as much because there isn't that explanation there, it's just a PowerPoint and look through it but it doesn't really have too much to do to pertaining to the class. So it depends on the teacher and how well they are about in just incorporating it and still making it relatable to the students."

4.5.9 Communicating.

This theme contained a total of 20 co-occurrences from the five focus groups (Table 10). The theme came up many times across discussions about schoolwork, social networking and enjoying the laptops. Using this theme was an attempt to observe the location of their communicating to ascertain some pattern of their interactions. No such strong pattern was observed, however, the co-occurrences helped paint a better picture regarding content and location of student communication.

Table 10

Co-occurrences of Communicating Code.

		Communicating			
		1	2	3	
		Based at home	Based at school	Globally	Total cooccuring codings
Total codings:		14	5	1	20
Learning-Personal/Social		9	2	1	12
Enjoying-Socializing		8	1	1	10
Learning-Content/Factual		8	1	1	10
Learning-Information Literacy		6	2	1	9
Learning-Technology Literacy		6	2	1	9
Perceiving-Boundaries		4	1	1	6
Comparing-Learning		3	1		4
Applying-Metacognition	A	1	1		2
Applying-Personal, Social Learning		1	1		2
Comparing-Digital vs. Analog		2			2
Not Enjoying-Teachers	B	1		1	2
Perceiving-Metacognition types of learning	C	1	1		2
Applying-Boundaries			1		1
Enjoying-Work Productivity		1			1
Motivating-Self		1			1

4.5.9.1 Selected student quotes co-occurrences in communicating codes.

a. Student Quote from Communicating: Based at Home and Perceiving-Metacognition – Types of Learning (1-C)
"I use it on a fairly consistent basis only to check mail and type in a few things to say to friends but most of the time I get annoyed with all the little requests and there are so many people that you end up, they're you're friends but you don't really know them and it can sometimes get really confusing because you have another life on the internet. So sometimes I just have to take a break because I get really annoyed with it."

4.6 Summary

The results of this grounded theory approach through five focus groups have yielded a great deal of open code, focused codes, and co-occurrences from data gathered directly from students in one to one laptop programs in rural Alaska. The process of coding the responses from students twice – once for open coding, and second for focused coding, provided a stronger analysis. The process of analyzing the focused codes for co-occurrences provided a richer platform to explore new theory especially in light of a systemic approach to the focused codes as a kind of codebook for further research. These results, as, any grounded theory research, should be viewed through the process described and portrayed in this chapter, more than the researchers interpretation of possible links to student perceptions of learning provided in Chapter 5.

Chapter 5: Discussion

Student perceptions of learning in one to one laptop programs as gathered in this research provides some insights into learning theory as expressed historically and in new literacy theory that is emerging (Baker, 2010). This research compares some of the extant learning theory and helps ground new literacy theories through the focused codes and student words. While no research claims are made here about supporting or proving theory, it is useful to compare this research with the claims made in the literature for either "21st Century learners" (Lemke & Coughlin, 2006), "new literacy theory" (Baker, 2010), and/or "digital natives" (Prensky, 2012, 2006). As an evolving basis for theory, discussion, and practice (Silverman & Cazassa, 2000), this research provides some grounded data through the focused coding from which to further test hypotheses and further develop theory around digital learning and the "new literacy." Keeping in mind: "Qualitative research demands that the researcher avoid trying to prove something" (Janesick, 2004, p. 117).

5.1 Findings for research questions

The following are responses to the research questions based on the findings and the analysis of the student descriptions in the focus groups.

5.1.1 What are students in one to one laptop programs perceptions of learning?

From their responses it seems that students do not have a strong association between learning and their laptop computer. When the question was posed to the students it seemed to be an odd or out of reference question. Once the conversation during the focus group continued around the specifics of the usage and the question returned to learning, the students were more explicit about the connection with learning in the way they described software usage, assignments for school, ways they used social networking and game software, and ways they interacted with their teachers. It is likely that their initial perception of learning and laptop is not at the foremost of their thoughts; more of

an automatic behavior with the perception of learning coming upon being asked or given a chance to reflect on their interactions with the laptop.

5.1.1.1 What does their software usage (self-reported) tell us about student appropriation of one to one laptops for learning?

Students reported appropriating a variety of software for school and for personal usage. Open coding of their responses detailed every mention of a software program or web tool (i.e. Facebook, online math, etc.). Focused coding provided more insights by categorizing the software mentioned by students into either productivity, utility, media, internet resources, and/or content. Productivity included word processing or spreadsheets.

5.1.1.2 How do they perceive the differences between laptop usage for school (formal) and the non-school (informal) work?

Students seem to have an internal sense of boundary between several areas of laptop usage and their relationships with adults. The other piece of their perception is the quality and importance they attach to being able to pursue their own interests using the laptops. They expressed the feeling of being "intelligent" when getting to do their own research on topics they care about. One of our exchanges brought up the idea of schoolwork being little "l" for school learning and big "L" for pursuing their own curiosities. They seem to attach great freedom from the boundaries of adult supervision, directed learning, and filtered overlook to a more guided approach from adults plus the combination of their own freedom to inquire.

From the focus group discussions it appears students separate formal learning as directed, adult initiated, and rote compared to the intellectual and emotional freedom of informal learning. Their descriptions of learning from social networks, overcoming school filters, causal interactions with adults and other students as a richer learning experience than formal learning. Again, it's important emphasize their relative lack of conscious thought of any learning in either formal or informal experiences with the laptop. For instance their strong interest in gaming and music are enjoyment free from learning, yet when asked they acknowledged that skills and some form of "learning"

occurs during these informal activities. The biggest difference between formal and informal is the degrees of freedom, the lack of boundary, and the real sense they are engaged in big "L" learning in informal experiences with the laptop.

5.1.1.3 How do they perceive school laptops in one to one programs vs. their home computer(s)?

Students express a deep sense of gratitude and responsibility for the school laptops. They seem to enjoy the opportunity, freedom, responsibility and resources the laptops bring to them in both school and personal situations. A clear description of their enjoyment is expressed in the all the open codes in the "enjoying" category. Because they experience this gratitude and freedom, they are sensitive to that freedom being curtailed by filters and adult supervision mostly expressed in the "not enjoying" category. They are aware of how easily they can be distracted from formal work in school and home settings. Some prefer to keep their "play" and unfiltered activities on their home computer just for this reason. Most, however, prefer to use their school laptop for both schoolwork and informal activities because of the convenience of being able to take the laptop between school and home. Most of the students have a home computer, so the laptop represented a more mobile, school locker free opportunity to keep digital schoolwork and personal items in one computer.

5.1.1.4 What do they perceive as the benefits of laptops?

Students perceive laptops as powerful devices for completing schoolwork and the opportunity to explore their interests on their own and with others. They appreciated learning technology skills, the improvement in their writing clarity and word processing skills, and the ability to keep all their work in one mobile place that moved with them. They enjoyed the freedom to create and be productive.

5.1.1.5 How do they perceive their teachers' usage of technology in pedagogy?

Students had very specific perceptions about their teachers' usage of technology that seem to fall within three categories. First, they did not enjoy when their teachers overused the technology in a pedantic fashion to simply project lecture notes being

digitally didactic. Students felt the teachers were using the technology just because they could without being more aware and leveraging all the technology afforded. Second the students did not enjoy teachers who were not using the technology. They were aware the teachers were just sort of hiding out and escaping the opportunities the technologies afforded. Third, the students were very appreciative of teachers who integrated the technology within teaching and inquiry. They enjoyed this "just right" mixture of modeling, guided practice, and integration that gave them a chance to learn without power pointless or simply no technology-based instruction. Mostly student perceptions of teachers' technology usage were of being aware, being observant, and being critical when it is underused, overused, and/or integrated it in a way that encouraged student usage for small group and individual discovery, inquiry, and responsibility.

5.1.1.6 How do they perceive bandwidth issues at home and at school?

At first, students did not seem to completely understand the word "bandwidth." For each group the word was briefly described around "speed" of the internet access especially at home. The most notable results of this discussion were the variety of student perceptions. Students rated their bandwidth between one and ten with ten being considered "wicked fast." Some students had no internet, some dial-up (slow), and the rest rated bandwidth between .1 and 10. Since this research did not endeavor to technically measure student home access, these results are entirely based on their perceptions. Their perceptions suggest that students are aware and sensitive to bandwidth as a tangible component of their laptop experience. Some were very pleased with the speed and tended to rate it above seven. Others were disappointed and rated it below three. One student made the point of their frustration by rating his/her home bandwidth at .1. The rest of the students felt their bandwidth ranged within the rate of three to eight.

The home bandwidth was not perceived evenly across all of the focus group schools. The all Alaska native student focus group in Selawik reported no internet, dial up, and/or the slowest speeds. The four other focus groups spoke of acceptable levels of bandwidth/speed at their home locations (although most wanted more). The following is

the transcript of the exchange with the Selawik focus group. It is included here to highlight what may become an equity issue for students in rural Alaska (Lloyd, 2012):

"Interviewer: Gotcha, okay I get it Number 2.... no wait. So new question now, very similar, and let me start with Number 1. If you have internet at home, how would you rate the bandwidth of at home on a scale of 1 to 10 with 10 being wicked fast and 0 being nothing. Number 1 how would you rate the bandwidth, the speed of...?

Student 1: We don't have internet at home.

Interviewer: So, okay zero. Is that fair?

Student 2: zero, we don't have internet.

Interviewer: No internet at home, okay thank you.

Student 3: Are you asking about how fast the home internet is?

Interviewer: Yes.

Student 3: ...just about .1. It is really slow.

Student 4: zero

Interviewer: ...because you don't have it.

Student 4: yah.

Interviewer: Okay but just a follow-up question, when you're at home how do you get internet for your school laptop?

Student 1: We don't.

Student 4: We can't.

Interviewer: You don't; don't; don't... but you have internet; you have internet; but even on the school laptop it's slow?

Student 3: It's dial up

Interviewer: Oh, dial up wow, you weren't kidding, it wasn't 1 it was .1. I get it. Let me start again I just have to go around the table, Number 4 What's the best reason, what is the best reason for having a one-to-one laptop program at your school?

Student 4: Faster internet

Interviewer: Faster internet?

Student 4: Yes and we can like research other things."

Selawik Transcript (Line 253-272)

This discussion highlights the potential inequity for students in some communities to lose the benefit of taking their laptop home for research and other schoolwork.

Even though it was the next question not related to bandwidth, when asked about the benefits of the laptop program at school, the first response was "faster internet." All of the other focus groups (all native, mixed native/non-native, and all non-native) reported having bandwidth at home. Students report and have been observed by this researcher sitting on the school steps on cold Alaskan evenings using the school internet in contrast to other Alaska students who have access in the comfort and safety of their own home.

5.1.2 What theory(s) can researchers develop to better explain the patterns of student usage and learning in one to one laptop programs?

The theories that researchers (see Chapter 2) have developed provide many foundational pieces for explaining patterns of learning and cognition across the education spectrum (Silverman & Casazza, 2000). These theories need to be updated within the digital landscape to account for differences in time and space that technology affords learners (Baker, 2010). The new literacy theories go much further to account for the digital conditions students encounter in the one to one programs. The new literacy theories build from work in behavioral, semiotic, cognitive, sociocultural, critical and feminist paradigms (Baker, 2010; Bransford, Brown, & Cocking, 2000; Kalantzis, Cope, & Cloonan, 2010).

The implications for new theory from this research lies within the concept of the dynamic relationship between multi-literacies as experienced and performed by digital learners in one to one laptop programs. The image that this grounded theory method depicts are the explicit literacies from learning theory being like spokes on a bike wheel and the wheel being the sum expression of the new literacy. The wheel enjoys the strength and distribution of the spokes to create a fluid, forward moving, dynamic wheel. The metaphor also suggests that if students are deficit in traditional literacies (i.e.

reading), then their adaptation to new literacies will be slowed. On the contrary when teachers present only the traditional literacy skills, students "ride circles around them" using the fluid, dynamics of time, space, and new literacies to fly past traditional pedagogy.

5.1.2.1 What are the patterns of their laptop usage in schoolwork (formal) and non-school work (informal)?

The patterns of learning are best represented by the open and focused codes in the areas of work, enjoying, learning, and motivating. Certainly students are motivated by their curiosity and freedom to access different sources of information on the internet and especially associated with social networking (i.e. Facebook). The patterns are seen in the co-occurrences of the focused codes in Tables 1-10 and the selected quotes in Chapter 4. Even though it does not seem to be on the front of their minds, students always seem to learn something in both formal and informal work situations. They are eager to access new information and are often frustrated when access is filtered or slow. There seems to be a fair bit of transfer between learning strategies in both spheres. Future research could pursue more of the mechanics and mechanisms students use between the two or what are highly characteristic of descriptions in new literacy and the literature in digital media and learning.

5.1.2.2 What does this tell us about a student's "learning landscape?"

Students have a unique perspective as individuals and as groups regarding the experiences, insights, successes, failures, and metacognition around their own learning. The patterns described by students and analyzed through the open and focused coding process in this research suggest a landscape (Brady, Marshall, Prencipe, & Tell, 2002) in one to one programs of opportunistic information access, social learning, and students surpassing school expectations and limits to "get away with learning."

This landscape includes traditional and new literacies that include formal and informal learning strategies. It also includes the opportunistic fashion students pursue information at school and home using school and home computers. Another part of this

landscape is student respect and tolerance of a variety of teachers who either overdo or underdo the technology integration. Last, but not least, this landscape includes students eager to use and learn from social networking sites like Facebook despite school filters to the contrary. This evidence points to a landscape where student report surpassing their schools' awareness and knowledge (in most cases) of what these digital natives (Prensky, 2012) are fully capable of doing with their laptops.

5.1.2.2.1 Relationship between formal/informal learning.

While quite a bit of the literature and discussion among professionals speaks about the degree of engagement that happens for students in one to one programs (Dede, 2004), it shows up most when describing the difference between formal and informal learning. Formal learning is the curriculum, school expectations, and pedagogy of school. Informal learning is student driven interest in non-school curriculum such as social media, games, media, and other areas. The relationship for the students has a lot to do with motivation. Students indicated when they are motivated by teacher expectations and style, as well as when they are motivated by their own interests. The co-occurrence tables suggest students are more motivated by themselves when it comes to learning and applying. There seems to be a strong connection between being self-motivated, applying and learning within both the formal and informal settings.

5.1.2.2.2 Perceptions of access to information.

Student perceptions of access to information seem to start with their awareness of bandwidth, resources, motivations, boundaries, and opportunity to pursue their own interests and social networking.

5.1.2.2.2.1 Control/filters.

Students prefer more bandwidth and in all but one community have bandwidth they consider "acceptable" at both school and home. They compare speeds at school and home adjusting as they need to be where bandwidth is the best. For most students that can be in either location, but for the more rural students school was the choice as mentioned above. In these communities school access after hours could mean sitting

outside on school steps in the cold, dark nights. This scenario in addition to the student words, underscores how motivated students are to access internet-based resources.

5.1.2.2.2.2 Bandwidth.

The other scenario that underscores student motivation to access resources was their description of breaking through school filters. All of the five focus groups acknowledged that they bypassed school filters to access sites such as YouTube and Facebook at school. In an odd twist and discovered through follow up conversations with school officials, the researcher learned that they knew the students were bypassing the filters. In at least one school the students knew that the school officials knew that students bypassed filters. This culture of collusion could be part of the student perceptions of learning and deserves further research to understand the impact (if any) on students learning.

5.1.2.2.2.3 Content.

Student perceptions of content seem to revolve around three main axises when using their laptops. Aside from the content they receive from their teachers and textbooks, students interact with content/factual information a bit differently on their laptops. First, they are aware and focused on the content of online resources, online classes, and communication from their teachers about content. Most of their comments about online content were positive. Second, they were often aware that more up-to-date content existed online than they were receiving from their textbooks and teacher-led classes. One group described using the laptop for fact checking teacher lectures secretly in real time to compare accuracy and breadth of what the teacher was saying. Third, the students describe learning content from many sources as a result of the laptops beyond the textbooks. They are aware of the richness of the internet for content in traditional forms (i.e. wikipedia, google searches, etc.) and in other forms of research (i.e. social networking, YouTube, etc.). None of the students described situations in class where they were being taught to check for the accuracy of information, but the students did communicate a sense that all content and facts were not the same.

5.1.2.2.2.4 Research/inquiry.

The students really enjoyed researching things they were interested in using their laptops. Given their awareness of the wide range of content and facts, they communicated strong interest in personal inquiry into subjects that included and went beyond formal learning. None of the students described classroom lessons focused to online research skills. The research did not ascertain where they have learned to do their own inquiry and search strategies. It is also clear students enjoyed researching through social networking using websites such as Facebook. They viewed Facebook as a kind of database for social information, connections to resources in social networks, and a strong way to stay current on organizational and extra-curricular activities. One student described their enjoyment of staying connected to a University of Alaska Science Club through Facebook to learn new science, stay current with friends in the club, and as a way to be in a college atomsphere while still attending school in a rural community. It should also be pointed out that this student/school did not officially have access to Facebook during the time(s) he/she was gathering with this club.

The origin of student online research skills were not evident from their discussions. Given the number of times they referred to applying things and strategies they had learned in school to real life, it seems likely they were applying non-internet research skills and curiosity to their searches. But this research can make no claims other than noting that student research inquiry skills come from a self-motivation to seek out information. One of the strongest areas of interest and practicality of this research for future exploration is recommending guided practice to schools to be a regular part of the curriculum and pedagogy for one to one laptop programs.

5.1.2.2.2.5 Pursuit of interests.

Guided practice would leverage the student's personal interest they expressed around content, factual learning, social information, and extracurricular learning. Most of what the students were researching for personal interests were outside of the school filters (i.e. Facebook and YouTube). They were reporting going outside the school filters during school to research things related and unrelated to school while pursuing personal

interests. Students described their enjoyment with teachers who encouraged personal research in academic areas in what resembled guided practice, although this research was able to pursue this line of inquiry with teachers. Future research in the efficacy of guided practice in one to one programs would shed further light on the relationship between personal interests, guided practice, and learning outcomes. One guesses that the combination gets at the heart of suggestions for new literacy for the students from a learning perspective and for teachers for new pedagogy in a digital learning landscape (Baker, 2010; Brown, Collins, & Duguid, 1989).

5.1.2.2.3 Interactions with others.

One to one laptop programs seem to increase the interactions students have with other humans throughout their day and especially outside of their school and community. No data was gathered for this research to measure such differences, but students had various and rich descriptions of how the laptops opened them up to interactions with others. As a result of the speed and availability of online communication, students described interacting and learning from other students in their school, community, and region, as well as from other organizations (i.e. Universities). From a social/cultural perspective the laptops opened up the possibilities of interactions for the students, yet no student described any direct instruction in school for moderating these interactions from a safety or learning standpoint. One focus group described learning etiquette on Facebook by reading the cues of the online interactions with people they knew and did not know. This seems to represent another opportunity for schools to increase their curriculum for digital learning to include personal and social learning skills into this landscape. It also reflects what the new literacies suggest for social and cultural learning to expand into digital forums (Baker, 2010).

5.1.2.2.4 Use of tools (software, laptop, networks, etc.).

Students seem to be facile with the use of laptop tools in the one to one programs. The co-occurrence tables in Chapter 4 suggest these skills come from multiple skills applied over time and over different situations in the one to one programs related to

learning. The tables suggest that student use of tools occurs over a spectrum of literacies and/or skills that are known but poorly understood. The Metiri Group (Lemke & Coughlin, 2006) summarizes it this way:

> All learning is highly personal. A laptop in the hands of each student builds on that concept. High-tech tools serve as an extension of the student thoughts and learning process. They provide a place to explore ideas, research questions, test hypotheses, compose thoughts, and come to conclusions—in other words, to learn. Along the way, these tools serve as vehicles for social networking and authenticity, two highly effective accelerators to learning. Social networking via technology can connect students to a broad range of interactivity that sharpens and extends thinking and piques intellectual curiosity. 1 to 1 learning adds authenticity into the mix, enabling students to explore rigorous academic concepts in the context of the world around them. The result? A sense of power and confidence unleashed in students and educators through 1 to 1 learning (p. 3).

The student use of tools (i.e. software, laptops, networks, etc.) reflects that "extension of the student thoughts and learning process" (p. 3). The inter-connectedness of the skills and new literacies expressed by students regarding use of tools reflects a need to better understand the dynamics between each. In other words the student perceptions and use of tools in one to one programs need to be seen more as holistic given the nature of the digital learning.

5.2 Limitations

This research was conducted using qualitative methodology and grounded theory methods to ascertain student perceptions of learning in one to one programs. Five focus groups in rural Alaska shared experiences and insights through recorded sessions in available school rooms (e.g. school library, home economics room). Students were selected randomly by their principals based on the students' availabilty and willingness to participate. Given the Tech Cohorts' relationship (Appendix A) in a common research population and mixed methods, there a few limitations with the above conditions. However this was the first in depth study highly dependent on logistical concerns and

participant cooperation. Even though the research process was conducted according to plan, there are several limits that could be overcome in future research.

First, a wider range of schools would be selected from urban areas to broaden the sample. Do students in urban settings have the consistency of experiences and insights found across the five groups in this study? For this study urban groups were considered but did not meet the specific criteria for the Consortium of Digital Learning's (CDL) definition of one to one learning.

Second, the researcher used the compare and contrast method detailed by Charmaz (2006) in this research, but stayed within the established questions for the process of consistency and adherence to cohort goals of cross referencing information through online surveys and focus groups. There were several questions and lines of inquiry not pursued (i.e. students getting past filters with knowledge of school administrators) for the sake of time and goals mentioned above. More may be learned about the multiliteracy components of student learning had another line of questioning been pursued.

Finally, the researcher acknowledges the emerging field of new literacy and the relatively new onset of one to one programs. Each research produces new avenues of inquiry for future researchers. While no attempt is made here to prove a theory, one recognizes this line of inquiry is quickly hatching theories in new literacy. One limit of this study was a focus on the process and integrity of the data collecting and coding at the expense of theory making. Grounded theory methods have many strongly positive benefits when exploring new pheonomen, but give the researcher a sense of being in a dark room with a flashlight. Later research may benefit from this grounded data through new avenues producing brighter rooms to work in.

5.3 Implication for further study

This study sought to obviate student perceptions of learning in one to one programs in rural Alaska. The qualitative research processes used in this study provided new data grounded in the student words and experiences. The most powerful aspect of digital learning is the degree to which it allows students to extend their access to

information and the powerful tools with which to search and process content. This study points to a theoretical relationship with new literacy that builds upon theories built from non-digital learning environments (Hasselbring, 2010). The implications for further study have mostly to do with the spatical and temporal differences afforded students with laptops. Baker (2010) refers to "human cognition is higly situated and semiotic systems...have been limited to the here and now.... we have commonly referred to ... multitasking may be better conceptualized as multisituating. We may not be doing more tasks simultaneously, but, rather, old tasks in new places" (p. 299). Her call for more research in cognition and multisituatedness are echoed in the research implications of this study.

Students in one to one programs are using traditional literacies in the context of schooling. The one to one programs bump their learning opportunities through time and space as suggested by Baker (2010), but also by the skills and dispositions students display to pursue their interests. Further research is needed to understand how students navigate between traditional and new literacies through a multiliteracy perspective.

Related to this need is research to better understand how students themselves think about this systemic approach to learning. The metacognition codes used in this research specifically referred to when students spoke about their learning in some fashion. It seems clear that this concept is much more complex in light of multiliteracy skills. Research should explore how students navigate, think about, and make decisions on which information to pursue.

The final implication for further research is the issue of filtering. Given that culture of collusion described in Chapter 4 in which students know that principals know that students are bypassing school filters, it seems prudent to understand the impact on student ethical viewpoints and school culture.

5.4 Summary

The most appropriate summary to this research was to conclude that the process of grounded theory methods yielded new data regarding student percecptions of learning in one to one laptop programs in rural Alaska. The new data was the result of gathering

insights through student responses to focus group questions and analyzing the codes and co-occurrences of focused codes across all five groups of students. Combined with emerging theory on new literacy, this data supports the assertion that new literacy is best researched from a systems perspective of a dynamic relation between modes of learning. As Baker (2010) describes this approach:

> One way to think about the orchestration of systems is as qualitative research think about grounded theory. Specifically, qualitative researchers conduct studies with the following goals in mind: describe a relatively unknown phenomenon, provide conceptual ordering of emerging characteristics of a phenomenon, and generate grounded theory to explain the origins and possible directions of a phenomenon" (p.301).

From the perspective of this research it involved the conceptual ordering of the open codes from the student perceptions into the focused codes. These focused codes where examined through the lens of co-occurrences to generate a code book of the processes and perceptions of learning by the students in these programs. The code book is a more detailed map of a systems approach of understanding digital learning in one to one programs. In light of new literacy theory this map suggests specific themes and directions for further research.

Specifically there are strong implications for the co-occurrences between the categories of learning, technology literacy, information literacy, social/personal, and content/factual in one to one programs. The issues of boundary and applying learning through guided practice suggest new areas of new literacy theory for research. The relationship between these themes needs to be further researched to explain the emerging dynamic in applying multimodalities to the learning process in digital environments.

Appendix A: Cohort Experience

This dissertation is one of four inter-related studies focusing on the digital landscape in one-to-one laptop environments within classrooms in Alaska's public high schools. Each of the four doctoral students analyzed aspects of teaching and learning in one-to-one computing environments that exist within public schools in Alaska; each approaching their own individual study from their individual perspectives. The cohort model provided a professional atmosphere for social learning (Wesson, Holman, Holman, & Cox, 1996). Wesson et al., (1996) continue to write about the formal and informal social processing in a cohort promoting a learning environment rich in collaboration and cooperation. This has been very true for the model offered to the four cohort members over a three-year time-span.

The cohort structure and agreements within it helped to build common vision of the combined research effort and manage differences of opinion. Recommendations for a good working structure are to a) organize a cohort with similar levels of experience, b) attend to the personal dynamics of the group, c) create a culture where difference of opinion is respected, valued, and open, d) establish the expectation that feedback will be provided, and e) create opportunities for informal exchange (Creamer, 2004). Even before this research was known, the Tech Cohort followed these recommendations. In addition, the knowledge of and access to the network of associates each cohort member brought to the table enabled each individual to benefit from a much larger range of logistical support in the research of individual studies.

Positive cohort experiences have shown to produce higher rates of completion (Barnette & Muth, 2008). The four members making up the technology cohort exemplified this statement. There were many times the cohort did not give-up because of the consistent support of each of the members. In addition, the cohort shared common coursework, collected research data through common survey instruments using the same program population, as well as shared common committee members.

Having similarities in background and experience is beneficial for a cohort (Dorn, Papalewis, & Brown, 1995). All members of our cohort had backgrounds in Alaska

education, having taught many years in Alaska individually and were recognized as influencers in educational technology and Alaska education in general. Each of the four cohort members came to the research topic with previous experience and expertise, at a school, district and state levels for one-to-one laptop implementations. Each has experience working in school districts.

Larry LeDoux is the former Commissioner for the Alaska Department of Education and Early Development. During his 30 years in the Kodiak Island Borough School District, he has served as superintendent, principal, teacher, and technology director. Larry is currently retired and is working as a private education consultant.

Pam Lloyd served fifteen years in the Anchorage School District as both an administrator and a classroom-teacher. She held the position of K-12 Instructional Technology Coordinator for six years. Pam has held numerous board positions including President of the Alaska Society for Technology in Education, and President of Cook Inlet Literacy Council. She currently serves as President of the Alaska Academic Decathlon and is on the U.S. Academic Decathlon board of directors. She currently works for General Communications Incorporated (GCI). GCI is an Alaskan-based telecommunications company providing voice, video, and data communication services to residential, commercial, and government customers. Pam currently is the Director of GCI SchoolAccess, a division within GCI, providing Internet access and distance learning services for schools across Alaska, New Mexico, and Montana.

Mark Standley has served in the capacity of teacher, principal and assistant superintendent across several districts in Alaska, including the Anchorage School District. He was formerly co-chair of the State's Technology Standards group (1990-1991) and is President-elect of the Alaska Society for Technology in Education. He currently is the CEO for a non-profit, Education 4 Leadership, focused on one-to-one implementation and supervises/teaches education research to pre-service principals for the University of Alaska Southeast (UAS) Education Leadership Program.

Bob Whicker, a former teacher, principal, and superintendent, ended his K-12 career in the Denali Borough School District, one of Alaska's first one-to-one laptop

implementation districts. His journey led him to work for Apple, Inc. as a Development Executive, working with school districts in their implementation of one-to-one laptop programs across the western U.S. He currently is the Director for the Alaska Association of School Boards, Consortium for Digital Learning program, and serves on the Alaska Broadband Task Force.

Together, the members of this cohort have a plethora of knowledge, experience, and expertise in the field of technology and education. They have all known and worked with each other over the years in these various capacities, at the national, state and district levels.

Cohort groups in research bring a larger network of resources to benefit the group (Miller & Irby, 1999). Time and time again, the vast amount of experience of the Tech Cohort benefitted not only the group in its organization but each individual. The differences in perspective of cohort members enable each individual to test their theories against each other (Creamer, 2004). Just as the previous University of Alaska Fairbanks (UAF) cohort, (Atwater, 2008; Cope, 2008; Crumley, 2008; McCauley, 2008) this cohort shared the importance of the commitment to a common goal, making the research process a true community of practice through discourse, mixed methods and models. The cohort shared classes and met outside of class regularly to discuss the overarching topic of one-to-one laptops in the digital landscape of Alaska.

Each member of the cohort looked through a unique lens sharing interest in an overarching topic to research teaching and learning in the Alaskan digital landscape. The four cohort members and their dissertation topics were:

Larry LeDoux's research (Ledoux, 2012) is a mixed methods study, titled, "Polishing the mirror: a multiple methods study that examined the relationship between teaching style and the application of digital learning technologies in Alaska's one-to-one laptop programs". Larry researched the outcome of this relationship as a key determinant in the success of strategies to create learner environments that are consistent with both Alaska Native and 21st century practices and outcomes.

Pam Lloyd's research (Lloyd, 2012) is a mixed method study, titled, "Digital dead-ends along Alaska's information highway: home broadband access for teachers and students in Alaska's high school one-to-one laptop programs". Pam researched the Levels of Adoption (LoA) among three categories of bandwidth availability in the community for teachers and students.

Mark Standley's research is a qualitative study, titled, "Kids getting away with learning: student perceptions of a one-to-one laptop program". Mark listened to student views of learning in and outside of school structures by conducting focus groups with high school students in five schools.

Robert Whicker's research (Whicker, 2012) is a mixed study, titled "Framing complexity: teachers and students use of technology in Alaska one-to-one laptop high schools". Bob researched the perceptions of teachers and students in the implementation, levels of use, and concerns identified by teachers in Alaska's high school one-to-one laptop program

The relationship between each cohort members' research topic and questions related to the overarching theme is shown in Figure 1 (p. viii).

A 215-item questionnaire for teachers, with nine open-ended questions, and a 100-item questionnaire, with three open-ended questions for students were collaboratively created by three of the four cohort members. The cohort shared in the role for dissemination of the surveys to districts identified as having predefined criteria. This effort led to response rates of 40% for teachers (n=94), and 43% for students (n=725). This shared effort led to higher response rates and a much larger dataset then if the cohort had taken on the role of data gathering individually. The fourth cohort member created questions for qualitative focus groups using input from the three other members to gather student perceptions related to questions on the online survey.

The Tech Cohort also coordinated a pilot study in January 2011 in a remote village in Northwest Alaska to test out the online survey and focus group instruments. This required part of the cohort to be at the school and part to be online to test questions, timing, and technology involved with our research gathering instruments. This team

effort led to better online surveys and focus group questions, some contributed by each member of the cohort. This shared field-testing and pilot study gave the entire team more confidence and better tools for conducting the research.

The Tech cohort modeled many of the practices and roles to the cohort previous, in that this cohort developed a community of practice and a vision for shared leadership (Atwater, 2008; Cope, 2008; Crumley, 2008; McCauley, 2008). This cohort also functioned as a "knowledge mini-market" (Cope) as they reviewed literature, created meaning and shared knowledge (Cope, 2008).

For many doctoral students, the individualized, independent structure of a traditional doctoral program can lead to frustration and failure. This frustration has led 40% to 70% of the doctoral student population down the path of dropping out and feelings of failure (Gardner, 1993). For many traditional doctoral students, the transition from "consumers of knowledge to creators of knowledge" causes much isolation in the doctoral process (Gardner, 2008). The cohort model experience did not reflect feelings of isolation or frustration, but rather a feeling of belonging to a group with a common purpose and commitment to four members, sometimes driving simultaneously, and sometimes one at a time.

Researchers shared the idea that cohort models take on a collective personality. The cohort definitely came together with individual personality and voice. While there was not always agreement, there was support for each other throughout the process. The cohort shared a collegiality and trust to question for understanding that pushed each member into the next step of the process in becoming a more effective researcher. The benefits experienced by each cohort member in this model supported the research findings, and provided a successful learning community for each member of the cohort. The main reason for doctoral students in an Illinois university completing their programs was the support and encouragement of their cohort members (Brien, 1992).This was most certainly true for this cohort. There is no doubt that without the continued uplifting nature of our cohort members toward each other, we might be writing still. Due to the demands of the professional careers and the pressure of the demands of our doctoral programs

endured by each one of our cohort members, support and understanding of mutual challenges between cohort members was crucial.

The structure of each cohort takes on its own unique identity (Dorn & Papalewis, 1997). The identity of the Tech Cohort came to be one where, as we progressed through phases of the dissertation process. Individuals interacted with each other in roles of cheerleader, "got your back" voice of reason, devil's advocate, philosopher, connector, and practitioner. Through spirited discussions between cohort members, ideas were vetted and led research into areas supportive to each individual's research.

This cohort met regularly over a three-year period. Weekly Monday night classes common to all members, overlapping working schedules during educational conferences and in airport boardrooms, and regularly scheduled teleconferences reinforced the team support of each individual. The development of a team structure where each member was valued provided informal support and the encouragement needed to persist in this research. The experiences of this cohort support the findings of the researchers cited above that the benefits of the cohort model are indeed tangible and worth replicating in other doctoral programs.

Appendix B: Cohort Glossary

Analytic tools: Devices and techniques used by analysts to facilitate coding process (Strauss & Corbin, 1998, p. 87).

Axial coding: The process of relating categories to their subcategories, termed "axial" because the coding occurs around the axis of a category, linking categories at the level of properties and dimensions (Strauss & Corbin, 1998, p. 123).

Bandwidth Speed: The measure of available or consumed data communication resources expressed in bit/second or multiple bits/second as in kilobits per second or megabits per second. Bandwidth speed is also known as the throughput of the pipe in the data transmission.

Blog: A combination of the words web log where an author makes dated entries on a discussion or information site published to the World Wide Web (Blood, 2000).

Broadband: Refers to a telecommunication signal or device of greater bandwidth and is measured in speeds. The FCC has defined broadband speeds as 786 Kbps Download to the customer by 200 Kbps upload to the Internet.

Categories: Concepts that stand for phenomena (Strauss & Corbin, 1998, p. 101).

Classroom Use of Technology: The use of technology in the classroom with students in learning activities.

Coding: The analytic processes through which data are fractured, conceptualized, and integrated to form theory (Strauss & Corbin, 1998, p. 3).

Concepts: The building blocks of theory (Strauss & Corbin, 1998, p. 101).

Concurrent Embedded Design: A mixed method design where the priority between quantitative and qualitative data "is usually unequal and given to one of the two forms of data—either to the quantitative or qualitative data. The nested, or embedded, forms of data are, in these designs, usually given less priority" (Hanson, Creswell, Plano-Clark, Petska, & Creswell, 2005, p. 229)

Culture: "The forms of traditional behavior which are characteristics of a given society, or of a group of societies, or of a certain race, or of a certain area, or of a certain period of time" (Mead, 1937, p. 17).

Culture-Based Education: An education process that uses "the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum (Sobel, 2004, p. 7).

Digital Divide: Refers to any inequalities between groups, broadly construed, in terms of access to, use of, or knowledge of information and communication technologies (Wikipedia, 2011).

Digital Learning Technology: Digital applications that "encompasses a wide spectrum of tools and practice, including using online and formative assessment, increasing focus and quality of teaching resources and time, online content and courses, applications of technology in the classroom and school building, adaptive software for students with special needs, learning platforms, participating in professional communities of practice, providing access to high level and challenging content and instruction, and many other advancements that technology provides to teaching and learning" (Schwartzbeck, 2012, p. 1).

First Order Change: "Incremental change that fine-tunes the system through a series of small steps that do not depart radically from the past" (Marzano, Waters, & McNulty, 2005, p. 66).

Grounded Theory: "A method of conducting qualitative research that focuses on creating conceptual frameworks or theories through building inductive analysis from the data" (Charmaz, 2006, p. 187).

High Order Skills: Those skills necessary to "analyze, synthesize and apply evidence"... critical thinking, communication, problem-solving, collaboration and reasoning (Chun, 2010).

Learning Style: "A composite of the cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment" (Keefe, 1979).

Methodology: A way of thinking about and studying social reality (Strauss & Corbin, 1998, p. 3).

Methods: A set of procedures and techniques for gathering and analyzing data (Strauss & Corbin, 1998, p. 3).

Mixed Method Design: A mixed-methods evaluation is one that "establishes in advance a design that explicitly lays out a thoughtful, strategic integration of qualitative and quantitative methods to accomplish a critical purpose that either qualitative or quantitative methods alone could not" (Gargani, 2012, p. 1).

One to one: The ratio of computing device per end user, a tool per learner and teacher.

One-to-One Classrooms: Technology rich classrooms that provide students with ubiquitous access to a laptop computers, teachers with necessary professional development and classrooms with sufficient access to the hardware, software, bandwidth and technical support to integrate technology into learning and instruction.

One to one laptop program definition for study: 1) students and teachers having access to laptops anytime, anywhere, in and out of school, 2) access to a wireless infrastructure, 3) the use of the laptops included in the curriculum as tools of learning, 4) a professional development model including technology integration in the learning process, and 5) a policy of at-home use of a school issued laptop at some time during the program.

Open coding: The analytic process through which concepts are identified and their properties and dimensions are discovered in data (Strauss & Corbin, 1998, p. 101).

Personal Use: The use of technology in personal life daily functions.

Phenomena: Central ideas in the data represented as concepts (Strauss & Corbin, 1998, p. 101).

Photosharing: The publishing or transfer of a user's digital photos online to share publicly or privately with individuals

Placed-Based Education: "Learning that is rooted in what is local—the unique history, environment, culture, economy, literature, and art of a particular place" (Smith & Sobel, 2010, p. 23).

Professional Practice: The use of technology in the professional arena of teaching to include aspects of preparation, planning, administration, organization, assessment and professional development.

Second Order Change: "Deep changes that alter the system in fundamental ways, offering a dramatic shift in direction and requiring new ways of thinking and acting" (Marzano et al., 2005, p. 66).

Satellite Communications: Refers to a satellite stationed in space for the purpose of telecommunications. Communication satellites used for Alaska telecommunications use geostationary orbit satellites. Two-way satellite Internet service involves both sending and receiving data from the remote Earth Station or Very Small Aperture Terminal (VSAT) usually located on premise of home or school, which relays the data via the terrestrial Internet.

Social bookmarking: The use of a web site to mark resources found on the Internet by URL by adding metadata tags and sharing those bookmarks with others (LeFever, 2012).

Student-Centric Instruction: An approach to learning that places an emphasis on "changes in students' learning and on what students do to achieve this rather than on what the teacher does" (Harden & Crosby, 2000, p. 338) by giving "students greater autonomy and control over choice of subject matter, learning methods and pace of study" (Sparrow, Sparrow, & Swan, 2000, p. 1). Used synonymously with constructivist instruction in study.

Teacher-Centric Instruction: Focuses "on the teacher as a transmitter of information, with information passing from the expert teacher to the novice" (Harden & Crosby, 2000, p. 338).

Teaching Philosophies: "Written statements of why teachers do what they do—their beliefs and theories about teaching, about students and about learning, all of which underpin what and how they teach" (Fitzmaurice & Coughlin, 2007, p. 3). Used synonymously with beliefs in study.

Teaching Style: Represent the practices and behaviors that a teacher uses to facilitate learning.

Technology Integration: The application technology "to introduce, reinforce, extend, enrich, assess, and remediate student mastery of curricular targets" (Hamilton, 2007, p. 20).

Terrestrial Communications: Refers to telecommunications that does not involve satellite transmission of any kind. Terrestrial connectivity is provided with data transmission on the earth using fiber, copper, Ethernet, and microwave. There is no latency with terrestrial connectivity.

Theory: A set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena (Strauss & Corbin, 1998, p. 15).

Traditional Knowledge and Alaska Native Ways of Knowing: "Traditional knowledge (TK) is the information that people in a given community, based on experience and adaptation to a local culture and environment, have developed over time, and continue to develop" (Hansen & VanFleet, 2003, p. 1).

Twenty-First Century Skills: "The skills, knowledge and expertise students should master to succeed in work and life in the 21stcentury: core subjects and 21st century themes; learning and innovation skills; Information, media and technology skills and life and career skills" (Partnership for 21st Century Skills, 2011).

Videosharing: The publishing or transfer of a user's videos online to share publicly or privately with individuals.

Wiki: A website which allows its users to add, modify, or delete its content via a web browser using a simplified markup language or a rich-text editor (Encyclopedia Britannica, 2007)

Worldview: " A means of conceptualizing the principles and beliefs - including the epistemological and ontological underpinnings of those beliefs - which people have acquired to make sense of the world around them" (Kawagley, Norris-Tull, & Norris-Tull, 1998, p. 133).

Appendix C: Open Codes

Open Codes with Focused Code Numeric Indicators (refer to Appendix D)

HU: Kids Getting Away with Learning 5-27-12

File: [\\psf\Home\Desktop\rtf transcripts\Kids Getting Away with Learning 5-27-12.hpr6]

Date/Time: 2012-05-28 18:22:28

- applying-1- computer resources to non-computer games
- applying-1,2- learning into personal life
- applying-1,2,4- personal life into school work
- applying-1,2,4- separating work/personal life
- applying-1,3- easy to get at info/ knowledge/"cheats" postponed
- applying-1,3- transfer from local knowledge to global
- applying-1,4- not doing homework at home
- applying-1,4- school life to career
- applying-1,8- paying more attention in class
- applying-2- Facebook to encourage other students
- applying-2,4- personal safety in social networking
- applying-3- compatibility of software(s) to save effort
- applying-3- depends on internet from school laptop
- applying-3- online classes for credit recovery/electives
- applying-3,4- acting independently
- applying-3,4- doing homework on two computers at same time
- applying-3,4- dual use of school laptop/home computer
- applying-4-not taking laptop home

1 year

2 years

3 years

4 years

5 years

6 years

location-1,9 - at home

location-1,9 - internet access at home

location-2,8- school

location-3- school and home

rating-1,9- internet at home - disconnected

rating-1,9- internet at home "slow"

rating-1,9- no internet at home

rating-2,9- internet at home - below 5

rating-3,9- internet at home - 5 and above

rating-4,9- bandwidth at home depends on wired vs wireless

rating-4,9- download times - midnight to 8 AM

% work-1- Adobe Flash CS4

% work-1- Flash MX

% work-1- Garage Band

% work-1- iMovie

% work-1- InDesign

% work-1- iPhoto

% work-1- iTunes

% work-1- Keynote

% work-1- Photo booth

% work-1- Photoshop

% work-1- Preview

% work-1- Quicktime

% work-1- Show Time

% work-2- APEX (online courses)

% work-2- Ask.com

% work-2- Firefox

% work-2- Goggle

% work-2- Moodle

% work-2- podcast

% work-2- Safari

% work-2- virtual high school

% work-2- Wikipedia

% work-2 - internet

% work-3- Comic Life

% work-3- Excel

% work-3- Microsoft Word

% work-3- Notebook

% work-3- Notetaker

% work-3- Pages

% work-3- PDF files

% work-3- PowerPoint

% work-3- Works

% work-4- Apple Script

% work-4- Bluetooth

% work-4- calculator

% work-4- calendar

% work-4- Dashboard

% work-4- Dictionary

% work-4- iPhone/iPod App Remote

% work-4- Kindle application

% work-4- Mac Terminal

% work-4- Note Pad (sticky notes)

% work-4- shared folder

% work-4,8- Smart Boards

% work-5- Carnegie Math (Cognitive Tutor

% work-5- Grapher

& communicating-2- with University (registration/updates)

& communicating-3- globally

& communicating at home-1,9- Facebook

& communicating at home-1,9- Messenger

& communicating at home-1,9- Skype

& communicating at school-2,8- Mail

(not enjoying-1- chess/game novelty wears off

(not enjoying-1- lack of games on laptops

(not enjoying-1- laptop doesn't have good games

(not enjoying-2- angry over blocked application

(not enjoying-2- downloading documents slow/freeze

(not enjoying-2- laptop battery not lasting long

(not enjoying-2- OS slow at times

(not enjoying-2- separate computer for enjoyment

(not enjoying-2- separate computers for school work

(not enjoying-2- students goofing off w/laptop

(not enjoying-2- students off task because of computer

(not enjoying-2- temptations of multi-tasking

(not enjoying-2- web browsers not working/OS

(not enjoying-2,8- no use in classroom

(not enjoying-2,9- can't take them home during summer

(not enjoying-2,9- no internet/school work while traveling

(not enjoying-3- applications (due to not knowing them)

(not enjoying-3- iMovie (movie editing software)

(not enjoying-3- Photo booth

(not enjoying-3- the garbage thingy

(not enjoying-4- homework in general

(not enjoying-4- teachers not willing to change

(not enjoying-4- unclear teacher expectations/guidelines

(not enjoying-4,8- perception teachers are not trained

(not enjoying-4,8- teacher learning on students' time

(not enjoying-4,8- teacher overusing technology

(not enjoying-4,8- teacher unclear handwriting on Smart Board

(not enjoying-4,8- teachers can look at our screens in school

(not enjoying-4,8- teachers not using tech to potential

(not enjoying-5- all the useless things

(not enjoying-5- not sure what liked least

) perceiving-1- "look up" knowledge easy to get good grades on

) perceiving-1- always something to know

) perceiving-1- community of learning through laptops

) perceiving-1- difference between learning and games

) perceiving-1- difference between school learning and "learning"

) perceiving-1- Facebook as distraction

) perceiving-1- Facebook as learning

) perceiving-1- Facebook as socializing

) perceiving-1- Facebook posts as learning

) perceiving-1- games as learning

) perceiving-1- kinda of learning thru enjoyment

) perceiving-1- listening to music depends on individuals

) perceiving-1- no difference between learning/enjoyment

) perceiving-1- no relationship between games and learning

) perceiving-1- our intelligence not part of school learning

) perceiving-1- quality of student schoolwork better

) perceiving-1- school learning getting "supposed to" things done

) perceiving-1- school work as learning

) perceiving-1- students more savvy about computers

) perceiving-1- time passes quickly when enjoying laptop

) perceiving-1- University quality based on changes on Facebook page

) perceiving-1- work can be fun sometimes

) perceiving-1,3,4- needs to learn laptop for future work

) perceiving-1,4- social networking as stressful

) perceiving-1,4- sometimes need to take a break from internet

) perceiving-1,4,9- laptop usage - more creative uses at home

) perceiving-1,4,9- laptop usage - more logical at school

) perceiving-1,5- stopped using apps when friends stopped

) perceiving-1,8- instruction must relate to students

) perceiving-1,8- students off task being incomplete in schoolwork

) perceiving-1,8- teachers are slow and annoying

) perceiving-1,8- teachers depends on laptops for pedagogy

) perceiving-1,8- teachers methods affect student learning

) perceiving-1,8 - school work is boring

) perceiving-2- Facebook as "connected to everything"

) perceiving-2- home internet faster than school

) perceiving-2- school laptop a privilege

) perceiving-2,4- school laptop/home computer one and same

) perceiving-2,8- online classes help schedule conflicts

) perceiving-2,9- continuing do to school work on trips

) perceiving-2,9- internet speed varies between two homes

) perceiving-2,9- internet speeds (home) vary (Flash)

) perceiving-3- bad handwriting solved by typing skills

) perceiving-3- better grades because of laptops

) perceiving-3- games slower on school laptop (Mac)

) perceiving-3- Internet, Word, PowerPoint "essentials"

) perceiving-3- laptop battery lasting less over time

) perceiving-3- laptops can be slow and annoying

) perceiving-3- laptops freezing due to battery

) perceiving-3- laptops freezing when on too long

) perceiving-3- most assignments are computer based

) perceiving-3- PC's have more viruses than Mac's

) perceiving-3- PowerPoint on laptop important

) perceiving-3- school laptop (Mac) easier to use than PC

) perceiving-3- school laptop (Mac) has more apps that home(PC)

) perceiving-3- school laptop more updated

) perceiving-3- ways of presenting (w/software) same

) perceiving-3- Word on laptop important

) perceiving-3,8- inheriting older school laptop; always break down

) perceiving-3,8 - Smart Boards add to clarity of instruction

) perceiving-3,9- home (PC) better for typing than Mac

) perceiving-4- another life on the internet

) perceiving-4- being "locked out" even though work is done

) perceiving-4- blocked

) perceiving-4- blocked applications as useful

) perceiving-4- blocked site wastes students time

) perceiving-4- blocking iTunes

) perceiving-4- blocking out noise to concentrate

) perceiving-4- categories of people on social networks

) perceiving-4- consequences for no laptop privilege

) perceiving-4- drama w/friends on Facebook

) perceiving-4- Facebook as stress break from school

) perceiving-4- games as laden "pleasure"

) perceiving-4- many unblocked websites are good

) perceiving-4- must follow rules to keep computers

) perceiving-4- other people access contents of school laptop

) perceiving-4- same filters at school and home

) perceiving-4- unblocked

) perceiving-4,8- adults/tech guys as "blockers"

) perceiving-4,8- dishonest student lost teacher trust for all

) perceiving-4,8- feeling bad "off-task in school

) perceiving-4,8- have a right to play when school work done

) perceiving-4,8- have to hide to get around filters

) perceiving-4,8- school laptop for school work only

) perceiving-4,8- teachers bypassing filters too

) perceiving-4,8- teachers lock screen if student off task

) perceiving-4,8- teachers not enforcing filters

) perceiving-4,8- teachers reluctant to unblock sites

) perceiving-4,9- business world uses PC OS

) perceiving-4,9- colleges leaning towards Mac OS

) perceiving-4,9- home computer for personal stuff only

) perceiving-4,9- home computer more confidential

) perceiving-4,9- taking laptop home only with permission

) perceiving-5,8 - not all teachers equal in using tech

) perceivng-2- internet on laptop important

) perceving-1,4- tech new to teachers; old to students

* enjoying-1- Chess

* enjoying-1- Chess (on Firefox)

* enjoying-1- Dashboard games
* enjoying-1- DVD Player
* enjoying-1- DVD player (on laptop)
* enjoying-1- games
* enjoying-1- Garage Band
* enjoying-1- iDVD
* enjoying-1- internet games
* enjoying-1- movies
* enjoying-1- music
* enjoying-1- playing on laptop when nothing to do
* enjoying-1,9- entertainment purposes of home computer
* enjoying-2- access everything home/school on one laptop
* enjoying-2- all stuff saved on laptop
* enjoying-2- convenience
* enjoying-2- depending on the school laptop
* enjoying-2- just having a computer
* enjoying-2- speed of editing in word processing
* enjoying-2- time to think on writing essays
* enjoying-2- using digital vs. paper based resources
* enjoying-2- working at own pace in online classes
* enjoying-2,8- not using school locker for school stuff
* enjoying-2,9- accessibility of personal stuff on home computer
* enjoying-2,9- take it home
* enjoying-2,9- taking it on school trips
* enjoying-3- access to the internet
* enjoying-3- Apple Script
* enjoying-3- Bluetooth
* enjoying-3- Carnegie Math
* enjoying-3- choosing presentation media for school work

* enjoying-3- dictionary on the laptop
* enjoying-3- digital textbooks on laptop
* enjoying-3- doing homework
* enjoying-3- downloading pictures for assignments
* enjoying-3- e-books
* enjoying-3- email
* enjoying-3- Firefox
* enjoying-3- Google
* enjoying-3- iChat
* enjoying-3- iMovie
* enjoying-3- internet browsers
* enjoying-3- iPhoto
* enjoying-3- iTunes
* enjoying-3- iTunes U
* enjoying-3- listening to music when doing school work
* enjoying-3- messing around with applications
* enjoying-3- Moodle
* enjoying-3- MySpace
* enjoying-3- news and stuff
* enjoying-3- Note Pad
* enjoying-3- online activities
* enjoying-3- online classes
* enjoying-3- online classes - electives
* enjoying-3- online videos
* enjoying-3- Pages
* enjoying-3- Photo Booth
* enjoying-3- Photoshop
* enjoying-3- PowerPoint
* enjoying-3- programming/Terminal

* enjoying-3- publishing own documents
* enjoying-3- research other than encyclopedia books
* enjoying-3- researching
* enjoying-3- Safari
* enjoying-3- school laptop newer/faster than home computer
* enjoying-3- SETI (application)
* enjoying-3- shopping online
* enjoying-3- Sky Online
* enjoying-3- surfing the web
* enjoying-3- teachers uploading class notes to web
* enjoying-3- Twitter
* enjoying-3- uploading personal news off internet
* enjoying-3- Wikipedia
* enjoying-3- Word
* enjoying-3,9- using keyboard for making music
* enjoying-4- email/talking to friends on Facebook
* enjoying-4- Facebook
* enjoying-4- figuring "things" (school work) out
* enjoying-4- likes the privilege
* enjoying-4- online teacher better than a real teacher
* enjoying-4- other students have a laptop too
* enjoying-4- social networking
* enjoying-4- useful info from coach on Facebook
* enjoying-4- writing on online writing forums
* enjoying-4- YouTube
* enjoying-4,8- some teacher guidance
* enjoying-4,8- teachers using technology in inquiry
* enjoying-4,8- teachers willing/changing strategies
* enjoying-5- East Bend

? motivating-1- "look up" knowledge/ cheating decreases motivation

? motivating-1- doing it for teacher

? motivating-1,2- getting the work done

? motivating-1,8- frustrated by teacher misuse of tools

? motivating-1,8- frustrated when teacher expect "net gen"

? motivating-1,8- teacher putting thought into instruction

? motivating-1,8- tech knowledgeable teacher

? motivating-1,8- visual clarity of instruction

? motivating-2- doing it for fun

? motivating-2- getting to choose presentation apps

? motivating-2- interest in that subject

? motivating-2- listening to music while doing schoolwork

? motivating-3- assignments mostly online

? motivation-1- depends on the people

^ comparing-1- "look up" knowledge vs. "figure out" knowledge

^ comparing-1- "newbie" vs. experienced online editors

^ comparing-1- changes in Facebook pages over time

^ comparing-1- effectiveness(Facebook vs. school announcements)

^ comparing-1- learning vs. not learning

^ comparing-1- legal vs. non legal content on laptop

^ comparing-1- motivating vs. not motivating

^ comparing-1- relevancy

^ comparing-1- school work/enjoyment -

^ comparing-1- sources of learning (school vs. personal life)

^ comparing-1- student vs. teacher tech skills

^ comparing-1- technical vs. social knowledge

^ comparing-1- ways of presenting (w/software)

^ comparing-1,8- home/school usage - school more assigned work

^ comparing-1,9- home/school usage - home more personal

^ comparing-2- academic aides & laptop tools

^ comparing-2- laptop helps with organization

^ comparing-2- research on laptop vs. books - faster on laptop

^ comparing-2- written/non-written communication via laptop

^ comparing-3- availability of school laptop vs. home computer

^ comparing-3- doing assignments easier with laptop

^ comparing-3- due dates easier to meet with laptop

^ comparing-3- ease and availability of printing

^ comparing-3- handwriting vs. keyboarding

^ comparing-3- home/school usage-no computer at home

^ comparing-3- OS's (Mac) on school/home laptops

^ comparing-3- use of PC/Mac at home/school

^ comparing-3- versions of blocked/unblocked software

^ comparing-3,9- home computer has more viruses

+ learning-3- about using a computer

+ learning-3- broadcasting project info via social networking

+ learning-3- computer programming

+ learning-3- creating/commenting on blogs

+ learning-3- efficiency with computer skills

+ learning-3- Facebook as media broadcast tool

+ learning-3- Facebook as organizing events

+ learning-3- Facebook as profile

+ learning-3- figuring out proxy for website

+ learning-3- file exchanging w/ Bluetooth

+ learning-3- Firefox

+ learning-3- Google

+ learning-3- how to use query tool (ask.com)
+ learning-3- internet
+ learning-3- iPhone/iPod Remote App
+ learning-3- laptop storage skills
+ learning-3- Mac OS
+ learning-3- maintain privacy of personal files
+ learning-3- more computer literate
+ learning-3- movie editing
+ learning-3- organization (files, etc.) skills
+ learning-3- programming skills to mechanic computer/privileges
+ learning-3- teacher online activities
+ learning-3- Terminal
+ learning-3- through pictures on internet
+ learning-3- through school website
+ learning-3- through surfing the web
+ learning-3- through teacher blogs
+ learning-3- to use two different computers at a time
+ learning-3- transfer songs to cell phone/ipods
+ learning-3- troubleshooting computer
+ learning-3- typing/keyboarding
+ learning-3- using email
+ learning-3- using Facebook as webpage
+ learning-3- using forums/blogs/wikis for research
+ learning-3- using temples in word processor (Pages)
+ learning-3- whole computer experience
+ learning-3- word processing
+ learning-3,4- taking care of a laptop
+ learning-3,4,5- Facebook
+ learning-3,4,5- YouTube

+ learning-3,4,5,6- Facebook
+ learning-3,4,5,9- coach using blocked Facebook w/students
+ learning-3,4,6- social networking
+ learning-3,4,6- staying connected to organization over time
+ learning-3,4,6- staying focused through music
+ learning-3,4,6,9- student government through social networking
+ learning-3,4,8- ease of cheating using school servers
+ learning-3,5- Sketch Pad (math)
+ learning-3,5- Wikipedia
+ learning-3,5- write essays on laptop
+ learning-3,5,6- getting writing critiqued in online forums
+ learning-3,5,6- science club at UAF
+ learning-3,6- being persuasive through media
+ learning-3,6- from digital resources vs. paper-based
+ learning-3,6- games techniques
+ learning-3,6- guided practice
+ learning-3,6- messing around with applications
+ learning-3,6- reading books online
+ learning-3,6- reading on computer
+ learning-3,6,8- presenting a presentation
+ learning-3,6,8- real time, different perspectives in class on internet
+ learning-3,6,8- taking notes
+ learning-3,8- best download times at home
+ learning-3,8- getting past school filters
+ learning-3,9- transferring school laptop files to home computer
+ learning-4- about other people
+ learning-4- earning privilege to take school laptop home
+ learning-4- etiquette
+ learning-4- how to help each other

+ learning-4- how to interact with other people
+ learning-4- respect through social networking
+ learning-4- responsibility
+ learning-4- settle disagreements
+ learning-4- socially
+ learning-4- to be sneaky/hide to get pass filters
+ learning-4- viewing photos of friends
+ learning-4- watching others on Facebook
+ learning-4,5- writing essays
+ learning-4,6- better quality school work
+ learning-4,6- no relevance
+ learning-4,6- personal inquiry
+ learning-4,8- time management w/ laptop at school
+ learning-5- "facts and stuff"
+ learning-5- about universities
+ learning-5- APEX
+ learning-5- assignments
+ learning-5- Carnegie Math
+ learning-5- CNN (news)
+ learning-5- college classes
+ learning-5- dictionary
+ learning-5- essays
+ learning-5- grammar
+ learning-5- Grapher (math)
+ learning-5- math
+ learning-5- new product information
+ learning-5- Quiz Lit
+ learning-5- readiness for college
+ learning-5- watching the news

+ learning-5- what's happening in the world
+ learning-5,6- about universities from former students
+ learning-5,6- accuracy of information
+ learning-5,6- homework
+ learning-5,6- review games from teachers
+ learning-6- communication skills/methods
+ learning-6- every time using laptop/applications
+ learning-6- following curiosity to learn new things
+ learning-6- from user generated content
+ learning-6- looking at different sources for accuracy
+ learning-6- looking up/reading others work as examples
+ learning-6- multi-tasking skills
+ learning-6- non-written, persuasive communication
+ learning-6- reading
+ learning-6- reading other people's resumes
+ learning-6- researching
+ learning-6- social vs. academic
+ learning-6- to ask questions when suspicious on social networks
+ learning-6- to help adults/community with computers
+ learning-6- to use multiple sources of information
+ learning-6- transferring non-internet research skills to internet
+ learning-6- user generated content can be not true
+ learning-6- verifying info by talking to other people
+ learning-6,9- communicating locally in community
+ learning-6,9- communicating regionally/state

> bandwidth-1,9- dial up
> bandwidth-1,9- no internet at home
> bandwidth-1,9- rating (1-3)

> bandwidth-1,9- rating < 1

> bandwidth-2,9- rating (4-7)

> bandwidth-3,9- rating (8-10)

Appendix D: Focused Codes

(5/29/12)

Applying

1) Metacognition

2) Personal, Social Learning

3) Technology Literacy

4) Boundaries

Bandwidth Speed/Location

1) None

2) 0-5

3) 5 +

4) Other

Working

1) Media

2) Internet Resources

3) Productivity

4) Utility

5) Content

Communicating

1) General, internet – based at home

2) General, internet – based at school

3) Globally

Not Enjoying

1) Entertainment

2) Access

3) Applications

4) Teachers

5) Other

Perceiving

1) Metacognition (types of learning)

2) Access (plus/delta)

3) Technology Advantages

4) Boundaries

5) Other

Enjoying

1) Entertainment

2) Ease of Use

3) Work Productivity

4) Socializing

Motivating

1) Teacher/other

2) Self

3) Convenience

Comparing

1) Learning

2) Digital vs. Analog

3) Technology Access

Learning

3) Technology Literacy

4) Information Literacy

5) Content/Factual

6) Personal/Social

Learning Location

8) At school

9) Away from school

Appendix E: IRB Approval Letter

(907) 474-7800
(907) 474-5444 fax
fyirb@uaf.edu
www.uaf.edu/irb

Institutional Review Board

909 N Koyukuk Dr. Suite 212, P.O. Box 757270, Fairbanks, Alaska 99775-7270

December 14, 2011

To: John Monahan, PhD
Principal Investigator

From: University of Alaska Fairbanks IRB

Re: [174780-3] 1:1 Laptop Programs - The Students' Perspective

Thank you for submitting the Continuing Review/Progress Report referenced below. The submission was handled by Expedited Review under the requirements of 45 CFR 46.110, which identifies the categories of research eligible for expedited review.

Title:	1:1 Laptop Programs - The Students' Perspective
Received:	December 14, 2011
Expedited Category:	7
Action:	APPROVED
Effective Date:	December 14, 2011
Expiration Date:	December 14, 2012

This action is included on the December 15, 2011 IRB Agenda.

No changes may be made to this project without the prior review and approval of the IRB. This includes, but is not limited to, changes in research scope, research tools, consent documents, personnel, or record storage location.

Appendix F: Community Profile References

Cordova

Alaska Community Database Information Summaries (CIS)

http://www.dced.state.ak.us/dca/commdb/CIS.cfm

U.S. Census Fact Finder

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

School District

Cordova City School

District P.O. Box 140

Cordova, AK 99574-0140

Phone: 907-424-3265

Fax: 907-424-3271

Web: http://www.cordovasd.org

Dillingham

Alaska Community Database Information Summaries (CIS)

http://www.dced.state.ak.us/dca/commdb/CIS.cfm

U.S. Census Fact Finder

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

School District

Dillingham City School District

P.O. Box 170

Dillingham, AK 99576

Phone: 907-842-5223

Fax: 907-842-5634

Web: www.dlgsd.org

Kwethluk

Alaska Community Database Information Summaries (CIS)

http://www.dced.state.ak.us/dca/commdb/CIS.cfm

U.S. Census Fact Finder

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

School District

Lower Kuskokwim School District

P.O. Box 305

Bethel, AK 99559-0305

Phone: 907-543-4810

Fax: 907-543-4904

Web: http://www.lksd.org

Petersburg

Alaska Community Database Information Summaries (CIS)

http://www.dced.state.ak.us/dca/commdb/CIS.cfm

U.S. Census Fact Finder

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

School District

Petersburg City School District

P.O. Box 289

Petersburg, AK 99833-0289

Phone: 907-772-4271

Fax: 907-772-4719

Web: http://www.psgsd.k12.ak.us

Selawik

Alaska Community Database Information Summaries (CIS)

http://www.dced.state.ak.us/dca/commdb/CIS.cfm

U.S. Census Fact Finder

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

School District

Northwest Arctic Borough School District

P.O. Box 51

Kotzebue, AK 99752

Phone: 907-442-3472

Fax: 907-442-2246

Web: http://www.nwarctic.org

Appendix G: Focus Group Questions

Researcher: Mark Standley

Introduction:

Good morning/afternoon! Thanks for joining me today to talk about your use of laptop computers. We are doing some research at the University of Alaska Fairbanks on student and teacher use of these computers at school and at home. I'd like to ask you some simple questions. We'll be recording what you say and I'll be taking some notes so I can remember your words and thoughts.

Mostly I'd ask that you help me understand how you use these laptops for school work and for enjoyment at school and at home. Your teachers and principal will not hear our discussion or see my notes, so feel free to openly share your thoughts and experiences. I'd really curious to learn how you use your laptop across the entire day.

Any questions? Ready to get started?

Focus Group Questions

1) How long have you had your laptop?
2) During that time can you describe what you like most AND least about having a laptop?
3) What software(s) do you do use on your laptop when getting work done for your teacher or school work?
4) What software(s) do you do on your laptop for your own enjoyment at school and home?
5) Can you describe a situation at school or home using your laptop where you felt you were learning?
6) What is the difference for you between the way you use your laptop for "work" and your laptop for "enjoyment"?
7) What part(s) of your entire laptop experience(s) would you consider "learning?"

8) How is your use of your school laptop different than how you use your home computer?

9) Is there anything else you'd like me to know about how you learn using your laptop?

Cohort Questions:

* Ledoux: How does a teacher's use of technology affect your motivation as a learner?

* Lloyd: If you have Internet at home, How would you rate your bandwidth at home on a scale of 1-10? Why?

* Whicker: What is the best reason for having a one to one laptop program in your school?

That's all the questions for our focus group. Thank you very much for your time and answers. Once we get our research done we want to share it with you and your principals and teachers. Good luck this school year!

Appendix H: Parent Assent Form

1:1 Laptop Programs: the Students' Perspective
IRB#: 174780-2
Date Approved: January 2011
Description of the Study:
I am doing a study that examines the ways students use technology when a 1:1 laptop program is available to them. The goal of this study is to learn what ways students and teachers are using laptops in the learning and teaching. From the results we should get better ideas of how to make a 1:1 laptop program work better in a school. I am asking your child to be part of the study because your student in one of the 1:1 laptop program in Alaska and have valuable knowledge to share. Your principal and
Asst. Superintendent has said that if your child wants to be part of the study it is ok.

Please read this form and ask any questions you may have before you decide.
I will be doing a focus group with 6-8 students at your school. We will talk for about 1 hour depending on their answers to my questions (~8 questions). We'll talk at the school in a quiet location. I'll record their answers to understand how they learn using their laptop at school and at home. Risks and Benefits of Being in the Study:
• This study does not have anything that should make your child feel bad. If anything makes them upset or feel bad they can stop at anytime. Nothing bad will happen to them if they stop being in the study.
• There will be no direct benefit to your child to take the survey but when the report is written, it will give school leaders some ideas on how to make your 1:1 laptop program better. Confidentiality: Since there is no way to identify your child's answers; their answers will be completely confidential. When we tell other people about our study we will not tell them that your child was in the study or what their answers were.

Voluntary Nature of the Study:
You get to choose whether or not your child is to be in the study. Even though your principal said it was ok, your child doesn't have to be part of the study.

Contacts and Questions:
If you have questions now, feel free to ask me now. The Cohort Email address is akstandley@mac.com. For information specific to each research project, please follow the respective links. If you have any further questions about the study, please contact:

Mark Standley or Dr. John Monahan, PhD
Primary Researcher Principal Investigator
University of Alaska Fairbanks University of Alaska Fairbanks
(907)694-3756 (907) 590-0376.

If you have questions or concerns about your rights as a research participant, you can contact the UAF Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 (toll-free outside the Fairbanks area) or fyirb@uaf.edu.

Statement of Assent:
I know what this study is about and my questions have been answered. I want my child to be part of this study.

Parent's Printed Name _____

_____
Signature of Parent (if age appropriate) & Date

Appendix I: Student Assent Form

Student Assent Form

IRB#: 174780-2 Date Approved: 1/20/2011

Description of the Study:

My name is Mark Standley. I am a student at University of Alaska Fairbanks. I am doing a study that looks at the ways students use technology when a 1:1 laptop program is available to them. The goal of this study is to learn how students are using laptops in the learning and teaching. From the results we should get better ideas of how to make a 1:1 laptop program work better in a school. I am asking you to be part of the study because you are a student in one of the 1:1 laptop program in Alaska and have valuable knowledge to share. Your parent/guardian has said that if you want to be part of the study it is "ok". Please read this form and ask any questions you may have before you decide.

If you decide to be part of this study you will be with Mr. Standley for about 1 hour answering questions about your use and thoughts on using your laptop for learning and enjoyment. There is no right answer to the questions, so feel free to share your experiences with your laptop and learning.

Risks and Benefits of Being in the Study:

This study does not have anything that should make you feel bad. If anything makes you upset or feel bad you can stop at anytime. Nothing bad will happen to you if you stop being in the study. If you want to stop, just ask to be excused from the focus group. No worries.

There will be no direct benefit to you to take the survey but when the report is written, it will give school leaders some ideas on how to make your 1:1 laptop program better.

Confidentiality: Student answers will be completely confidential. When we tell other people about our study we will not tell them that you were in the study or what your answers were..

Voluntary Nature of the Study:

You get to choose whether or not to be in the study. Even though your parent/guardian said it was "ok", you don't have to be part of the study. Even if you decide you want to be in the study you can still change your mind later. If you want to stop being part of the study just stop. If you decide to stop we will not use any of your answers and they will be discarded.

Contacts and Questions: If you have questions now, feel free to ask me now. The Cohort Email address is TechCohortStudy@gci.net. For information specific to each research project, please follow the respective links. If you have any further questions about the study, please contact:

Mark Standley	or	Dr. John Monahan, PhD
Primary Researcher		Principal Investigator
University of Alaska Fairbanks		University of Alaska Fairbanks
907-694-3756		(907) 590-0376.

If you have questions or concerns about your rights as a research participant, you can contact the UAF Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 or fyirb@uaf.edu.

Statement of Assent (from student):

I know what this study is about and my questions have been answered. I want to be part of this study.

Child's Printed Name	Signature	Date	School

References

Alaska Department of Commerce, Community and Economic Development, (2012). Alaska community database information summaries (CIS). Retrieved from http://www.dced.state.ak.us/dca/commdb/CIS.cfm.

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives. New York, NY: Longman.

Apple Computer. (n.d.). Apple classroom of tomorrow. Retrieved from http://www.apple.com/education/k12/leadership/acot/history.html.

Apple Computer. (2004a). McAuliffe Heights Program at Irving Elementary School. Retrieved from http://www.apple.com/education/profi les/Irvine.

Apple Computer. (2004b). Indianapolis public schools: Inner city builds 1 to 1 educational model. Retrieved from http://www.apple.com/education/profi les/indianapolis_1to1.

Apple Computer. (2004c). Manatee County Schools: Starting small, thinking big. Retrieved from http://www.apple.com/education/profi les/manatee.

Apple Computer. (2005a). The School at Columbia: iBook supports global learning. Retrieved from http://www.apple.com/education/profi les/schoolcolumbia.

Apple Computer. (2005b). Greene County School System: From agriculture to the information age. Retrieved from http://www.apple.com/education/profiles/greene.

Atwater, S. G. (2008). A description of the relationship between process management and the Quality Schools Model in three rural Alaska school districts. PhD, University of Alaska Fairbanks, Fairbanks.

Aud, S., Hussat, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The condition of education 2011* (NCES 2011-033). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Bain, A. (2004). Secondary school reform and technology planning: Lessons learned from a ten year school reform initiative. Australasian Journal of Educational Technology, 20(2), 149-170.

Baker, Elizabeth (Ed.) (2010). *The New literacies: Multiple perspectives on research and practice.* New York City, NY: The Guilford Press.

Barnette, B. G., & Muth, R. (2008). Using action-research strategies and cohort structures to ensure research competence for practitioner-scholar leaders. *Journal of Research on Leadership Education, 3*(I).

Barth, R. S. (2001). *Learning by heart.* San Francisco, CA: Jossey-Bass.

Bebell, D., & Kay, R. (2010). One to one computing: A summary of the quantitative results from the Berkshire Wireless Learning Initiative. *Journal of Technology, Learning, and Assessment, 9(2).* Retrieved from http://escholarship.bc.edu/cgi/viewcontent.cgi?article=1222&context=jtla

Bebell, D., & O'Dwyer, L. M. (2010). Educational outcomes and research from one to one computing settings. *Journal of Technology, Learning, and Assessment, 9(1).* Retrieved from http://www.jtla.org.

Becker, H., & Ravitz, J. (2001). Computer use by teachers: Are Cuban's predictions correct? Paper presented at the *Annual Meeting of the American Educational Research Association,,* Seattle.

Blood, R. (2000, July 12, 2011). Weblogs: A history and perspective. *Rebecca's Pocket* Retrieved July, 2012, from http://www.rebeccablood.net/essays/weblog_history.html

Borja, R. (2006, May 10). Researchers weigh benefits of one computer per lap. *Education Week*, p. 10.

Bransford, J., Brown, A., & Cocking, R. (2000). *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academy.

Brien, S. J. (1992). *The adult professional as graduate student: A case study in recruitment, persistence, and perceived quality.*, MI, Ann Arbor.

Brady, T., Marshall, N., Prencipe, A., & Tell, F., (2002). Making sense of learning landscapes in project-based organisations. *CoPS Innovation Centre.* Paper presented at the Third European Conference on Organizational Knowledge, Learning, and Capabilities, hostly by ALBA, Athens, Greece, 5-6 April 2002.

Brown, J. S., Collins, A., & Duguid, S. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42. Retrieved from http://www.ilt.columbia.edu/publications/papers/JohnBrown.html

Bruner, J. (1985). Vygotsky: An historical and conceptual perspective. In J. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 21-34). London, UK: Cambridge University Press.

Burns, K. & Polman, J. (2006). The impact of ubiquitous computing in the Internet age: How middle school teachers integrated wireless laptops in the initial stages of implementation. *Journal of Technology and Teacher Education, 14*(2), 363-385.

Canfield, A. (1988). *Canfield learning styles inventory*. Los Angeles: Western Psychological Services.

Charmaz, K. (2006*). Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks, CA: Sage Publications.

Chun, M. (2010). Taking teaching to performance task: Linking pedagogical and assessment practices. *Change,* 42(2), 22-29.

Colvin, G. (2008). *Talent is overrated: What really separates world-class performers from everyone else.* London, UK: The Penguin Group.

Cooper, H. (1984). *The integrative research review: A systematic approach*. Beverly Hills, CA: Sage Publications.

Cope, D. L. N. (2008). *The Quality Schools Model of education reform: A description of knowledge management beliefs and practices using Baldridge in education criteria.* PhD Dissertation, University of Alaska Fairbanks, Fairbanks.

Coughlin, E., & Martin, C. (2004). Funding one to one computer initiatives across the nation. Culver City, CA: Metiri Group.

Crawford, K. (1996). Vygotskian approaches to human development in the information era. *Educational Studies in Mathematics*, 31, 43-62.

Creamer, E. G. (2004). Collaborators' attitudes about differences of opinion. The Journal of Higher Education, 75(5), 556-571.

Creswell, J. W. & Miller, D. L. (2000). Determining validity in qualitative inquiry. Theory into Practice, 39(3), 124-131.

Creswell, J. W. (2007). Qualitative inquiry & research design: Choosing among five approaches (2nd ed.). Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.). Thousand Oaks, CA: Sage Publications.

Crumley, R. L. (2008). *A description of Baldridge in education leadership Concepts within the Alaska Quality Schools Model of Education.* PhD, University of Alaska Fairbanks, Fairbanks.

Csikszentmihalyi, M. (1990). Flow: The psychology of optimum experience. New York, NY: Harper & Row.

Cuban, L. (2006a, October 18). Commentary: The laptop revolution has no clothes. *Education Week*, p. 29.

Cuban, L. (2006b). One to one laptops transforming classrooms: Yeah, sure. *Teachers College Record,* 56(5). Retrieved from www.tcrecord.org/

Dalgarno, N. (2009). *Compulsory laptop programs: Teachers' responses to the adoption and implementation process.* Ph.D, Education, Queen's University. Retrieved from http://hdl.handle.net/1974/1966 (16:55:43.987).

Darling-Hammond, L. (1997). *The right to learn: A blueprint for changing schools that work.* San Francisco, CA: Jossey-Bass.

Dede, C., Whitehouse, P., & Brown-L'Bahy, T. (2002). Designing and studying learning experiences that use multiple interactive media to bridge distance and time. In C. Vrasidas & G. Glass (Eds.), *Current perspectives on applied information technologies*, Vol. 1: Distance education (pp. 1-30). Greenwich, CT: Information Age Press.

Dede, C. (2004). Enabling distributed learning communities via emerging technologies. *THE Journal,* 32(2/3), 12-22, 16-26.

Dede, C. (2005). Planning for neomillennial learning styles. *Educause Quarterly*, 28(1). Retrieved from www.educause.edu/node/634.

Delorenzo, R., Battino, W., Schreiber, R., & Gaddy, B. (2009*). Delivering on the promise: The education revolution.* Bloomington, MA: Solution Tree Press.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2008). *Strategies of qualitative inquiry.* Thousand Oaks, CA: Sage Publications.

Dorn, S., & Papalewis, R. (1997). Improving doctoral student retention. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, Illinois.

Dorn, S., Papalewis, R., & Brown, R. (1995). Educators earning their doctorates: Doctoral student perceptions regarding cohesiveness and persistence. *Education Policy Analysis Archives, 116*, 305-314.

Dunleavy, M., & Heinecke, W. (2007) The impact of 1:1 laptop use on middle school math and science standardised test scores, *Computers in Schools*, Vol. 24(3/4).

Dwyer, D., Ringstaff, C., & Sandholtz, J. (1990). *The evolution of teachers' instructional beliefs and practices in high-access-to-t technology classrooms first–fourth year findings.* Paper presented at the American Education Research Association.

Eisner, E. W. (2002). Benjamin Bloom 1913-99. Retrieved from http://www.ibe.unesco.org/International/Publications/Thinkers/ThinkersPdf/bloome.pdf

Embry, R. (2008). One-to-one computing in public schools: Lessons from "Laptops for All" Programs. Retrieved from http://www.abell.org/pubsitems/ed_onetoone_908.pdf

Encyclopedia Britannica, I. (Ed.) (2007) (April 10, 2008 ed.).

Fitzmaurice, M., & Coughlin, J. (2007). Teaching philosophy statements: A guide. In C. O'Farrell (Ed.), *Portfolio Practice in Ireland: A Handbook.* . Dublin, IR: Centre for Academic Practice and Student Learning.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* New York, NY: Basic Books.

Gardner, H. (1993*). Multiple intelligences: The theory in practice.* New York, NY: Basic Books.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century.* New York, NY: Basic Books.

Gardner, H. (2008). The five minds for the future. *Schools: Studies in Education.* Vol. 5, No. 1/2 (Spring/Fall 2008), pp. 17-24. Published by: The University of Chicago Press.

Gargani, J. (2012). Running hot and cold for mixed methods: Jargon, jongar, and code Retrieved July, 2012, from http://evalblog.com/2012/03/26/running-hot-and-cold-for-mixed-methods-jargon-jongar-and-code/.

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

Gee, J. P. (2003). *What video games have to teach us about learning and literacy.* New York, NY: Palgrave Macmillan.

Gee, J. P. (2010). A situated-sociocultural approach to literacy and technology. In E. Baker (Ed.), *The new literacies: Multiple perspectives on research and practice* (pp. 165-193). New York, NY: Guilford Press.

Glaser, B. G. (1978). *Theoretical sensitivity.* Mill Valley, CA: The Sociological Press.

Greaves, T., & Hayes, J. (2008). *America's digital schools 2008: Six trends to watch.* Shelton, CT: MDR.

Greaves, T., Hayes, J., Wilson, L., Gielniak, M., & Peterson, E. (2010). Project RED key findings. Retrieved from www.one-to-oneinstitute.org/NewsDetail.aspx?id=85.

Gulek, J. C. & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *Journal of Technology, Learning, and Assessment, 3(2).* Available from http://www.jtla.org.

Hage, (1972). *Techniques and problems of theory construction in sociology,* New York: Wiley.

Hamilton, B. (2007). *It's elementary! Integrating technology in the primary grades.* Eugene, OR: International Society for Technology in Education.

Hansen, S., & VanFleet, J. (2003). A handbook on issues and options for traditional knowledge holders in protecting their intellectual property and maintaining biological diversity. In *AAAS 0- 87168-690-2*. Washington, D.C.

Hanson, W., Creswell, J., Plano-Clark, V., Petska, K., & Creswell, J. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology,* 52(2), 224-234.

Harden, R., & Crosby, J. (2000). The good teacher is more than a lecturer - the twelve roles of the teacher. *AMEE Education Guide*, 22(4), 224-247.

Harris, M. J. (2010*). Impactful student learning outcomes of one-to-one laptop programs in low socioeconomic schools* (Doctoral dissertation). Retrieved from http://www.st-andrews.org/Customized/uploads/Parents/Leaflet/Dec_15/MJH_Dissertation.pdf.

Hasselbring, T. (2010). Reading proficiency, the struggling reader and the role of technology. In E. Baker (Ed.), *The new literacies: Multiple perspectives on research and practice.* New York, NY: Guilford Press.

Horrigan, J., Rainie, L., Allen, K., Boyce, A., Madden, M., O'Grady, E. (2003). "The ever-shifting Internet Population: A new look at Internet access and the digital divide." Pew Internet and American Life Project. Washington, DC.

Howe, N., & Strauss, W. (2000). Millennials rising: The next great generation. New York, NY: Vintage.

Hu, W. (2007, May 4). Seeing no progress, some schools drop laptops. The New York Times, p. 1. Retrieved from www.nytimes.com/2007/05/04/education/04laptop.html

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

Janesick, V. J. (2004). Stretching exercises for qualitative researchers. Thousand Oaks, CA: Sage Publications.

Kajder, S. B. (2007). Bringing new literacies into the content area literacy methods course. Contemporary Issues in Technology and Teacher Education, 7(2), 92-99.

Kalantzis, M., Cope. B, & Cloonan, A. (2010). A multiliteracies perspective on the new literacies. In E. Baker (Ed.), The new literacies: Multiple perspectives on research and practice. New York, NY: Guilford Press.

Kawagley, A., Norris-Tull, D., & Norris-Tull, R. (1998). The Indigenous worldview of Yupiaq culture: It's scientific nature and relevance to the practice and teaching of science. Journal of Research in Science Teaching, 35(2), 133-144.

Keefe, J. (1979). Learning style: An overview Student learning styles: diagnosing and prescribing programs Reston, WA: National Association of Secondary School Principals.

Krueger, R. A. (1994). Focus groups: A practical guide for applied research (2nd ed.). Thousand Oaks, CA: Sage Publications.

Krueger, R. A. (1998a). Analyzing and reporting focus group results. Thousand Oaks, CA: Sage Publications.

Krueger, R. A. (1998b). Developing questions for focus groups. Thousand Oaks, CA: Sage Publications.

Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: Sage.

Land, S., & Hannafin, M. J. (1997). Patterns of understanding with open-ended learning environments: A qualitative study. *Educational Technology Research & Development,* 45(2), 47-73.

Ledoux, L. (2012*). Polishing the mirror: A multiple methods study of the relationship between teaching style and the applicaiton of Alaska's rural one to one digital classrooms.* (Unpublished dissertation). University of Alaska, Fairbanks.

LeFever, L. (2012). Social bookmaring in plain English Retrieved May 16, 2012, from http://www.commoncraft.com/video/social-bookmarking

Lei, J., & Zhao, Y. (2006). What does one-to-one computing bring to schools? In C. Crawford, D. A. Willis, R. Carlsen, I. Gibson, K. McFerrin, J. Price, & R. Weber (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2006* (pp. 1690-1694). Chesapeake, VA: AACE.

Lemagie, S. (2010, November 21). 1 student, 1 laptop proves costly. *Minneapolis Star-Tribune.* Retrieved from www.startribune.com/local/109779099.html

Lemke, C., Coughlin, E., Thadani, V., & Martin, C. (2000). *enGauge 21st century skills for 21st century learners: Literacy in the digital age.* Retrieved from http://www.metiri.com/features.html

Lemke, C., & Martin, C. (2004). *One to one computing in Maine: A state profile.* Culver City, CA: Metiri Group.

Lemke, C., & Coughlin, E., (2006). *1 to 1 learning: A review and analysis.* Culver City, CA: Metiri Group.

Lemke, C. (2009). *Emerge one-to-one laptop learning initiative: Year one report.* Alberta, Canada: Metiri Group and the University of Calgary for Stakeholder Technology Branch.

Leu, D. J., Jr. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M. L. Kamil, P. Mosenthal, P. D. Pearson, and R. Barr (Eds.) *Handbook of Reading Research, Volume III* (pp. 743-770). Mahwah, NJ: Erlbaum.

Leu, D. J., Jr. (2002). The new literacies: research on reading instruction with the internet. In A.E. Farstrup, & S. Samuels (Eds.), *What Research Has to Say About Reading Instruction* (pp. 310-336). Newark, DE: International Reading Association.

Leu, D. J., Jr., Kinzer, C. K., Corio, J., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other communication technologies. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and process of reading (5th ed.,* pp. 1570-1613). Newark, DE: International Reading Association.

Leu, D. J., Jr. (2006) New literacies, reading research, and the challenges of change: A deictic perspective. In J. V Hoffman, D. L. Schallert, C. M. Fairbanks, J. Worthy, & B. Maloch (Eds.), *55th National Reading Conference Yearbook* (pp.1-20). Oak Creek, WI: National Reading Conference.

Lincoln, Y. S. (2008). Institutional review boards and methodological conservatism: The challenge to and from phenomenological paradigms. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 165-181). Thousand Oaks, CA: Sage Publications.

Livingston, P. (2006). *1-to-1 learning: Laptop programs that work.* Washington, DC: International Society for Technology in Education.

Lloyd, P. (2012). *Digital dead ends along Alaska's information highway: Broadband access for students and teachers in Alaska's one to one laptop programs* (Unpublished dissertation). University of Alaska, Fairbanks.

Lowther, D. L., Ross, S. M., & Morrison, G. M. (2003). When each one has one: The influences on teaching strategies and student achievement of using laptops in the classroom. *Educational Technology Research and Development,* 51(3), 23-44.

Lowther, D. L., Strahl, J. D., Inan, F. A., & Bates, J. (2007). *Freedom to learn program: Michigan 2005–2006 evaluation report.* Memphis, TN: Center for Research in Educational Policy.

Mahiri, J. (2006 September) Digital dj-ing: Rhythms of learning in an urban school. *Language Arts,* v84, n1, p.55-62. National Council of Teachers of English.

Marzano, R. J., Waters, T., & McNulty, B. (2005). *School leadership that works: From leadership to results.* Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J. (2003). *What works in schools: Translating research into action.* Alexandria, VA: ASCD.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement.* Alexandria, VA: ASCD.

McCauley, S. (2008). *The Quality Schools Model of education reform: A description of staff focus beliefs and practices using Baldridge in education criteria.* PhD, University of Alaska Fairbanks, Fairbanks. Mead, M. (1937). Cooperation and competition among primitive peoples. New York: McGraw-Hill.

Mead, M. (1937). *Cooperation and competition among primitive peoples.* New York: McGraw-Hill.

Merriam, S. B. (2002). *Qualitative research in practice: examples for discussion and analysis.* San Francisco, CA: Jossey-Bass.

Mertens, D. M. (1998). *Research methods in education and psychology: Integrating diversity with quantitative and qualitative approaches.* Thousand Oaks, CA: Sage Publications.

Miller, W., & Irby, B. (1999). An inquiry into the exigency of a beginning doctoral cohort in education leadership. *College Student Journal, 33*(3).

Morgan, D. (Ed.). (1993). *Successful focus groups.* Newbury Park, CA: Sage Publications.

Morgan, D. (1998). *Focus groups as qualitative research.* Newbury Park, CA: Sage Publications.

Muir, M., Knezek, G., & Christensen, R. (2004). The Maine Learning Technology Initiative: An exploratory study of the impact of ubiquitous technology on student achievement. Retrieved from http://www.mcmel.org/MLLS/MLLS0401.pdf

Oblinger, D. (2003). Understanding the new students: Boomers, gen-xers, millennials. *EDUCAUSE Review*, 38(4), 37-47.

O'Dwyer, L. M., Russell, M., Bebell, D., & Seeley, K. (2005). Examining the relationship between home and school computer use and students' English/language arts test scores. *Journal of Technology, Learning, and Assessment,* 3(3). Retrieved from http://www.jtla.org

O'Dwyer, L., Russell, M., Bebell, D., & Seeley, K. (2008). Examining the relationship between student's mathematics scores and computer use at home and school. *Journal of Technology, Learning, and Assessment*, 6(5), 45.

Ohler, J. (2009). An inside look at AASB's consortium for digital learning 1-to-1 initiative: CDL mid-project summary report. Retrieved from http://edtech.phoenix.wikispaces.net/file/view/Ohler_CDL_Progress_Report.pdf

Ohler, J. (2011). An inside look at AASB's Consortium for Digital Learning 1-to-1 initiative: CDL project summary report. Retrieved from http://web.mac.com/aasb.cdl/Consortium_for_Digital_Learning/2011_CDL_Progress_Report_files/%202011+2009_CDL_Reports-Web_1.pdf

Oppenheimer, T. (1997, July). The computer delusion. *Atlantic Monthly*, 280, 45-62.

Oppenheimer, T. (2003). *The flickering mind: The false promise of technology in the classroom and how learning can be saved.* New York, NY: Random House.

Otto, T., Hannon, N., Mainzer, L., & Bautz, A. (2010). Talbot County Public Schools one to one laptop initiative 2005-2010: Successful implementation through systemic change. Retrieved from http://www.tcps.k12.md.us/c5update/files/7013/3657/8103/JHU_yr5_eval.pdf

Partnership for 21st Century Skills. (2011). *Partnership for 21st Century Skills.* Retrieved Oct. 29, 2011

Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks,CA: Sage Publications, Inc.

Penuel, W. R. (2006). Implementation and effects of one-to-one computing initiatives: A research synthesis. *Journal of Research on Technology in Education*, 38(3), 320-348.

Prensky, M. (2001a) Digital natives, digital immigrants. On the Horizon, 9(5). Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Prensky, M. (2001b) *Digital game-based learning.* New York, NY: McGraw-Hill.

Prensky, M. (2006). *Don't bother me mom, I'm learning.* St Paul, MN: Paragon House.

Prensky, M. (2012). *From digital natives to digital wisdom: hopeful essays for 21st century learning.* Corwin. Thousand Oaks, CA.

Pulaski, M.A.S. (1971). *Understanding Piaget: An introduction to children's cognitive development.* New York, NY: Harper & Row.

Rockman S., et al. (1997). Report of a laptop program pilot: A project for Anytime Anywhere Learning by *Microsoft Corporation Notebooks for Schools* by Toshiba America Information Systems. San Francisco, CA: Rockman, et al.

Rockman, S., Chessler, M., & Walker, L. (1998). *Powerful tools for schooling: Second year study of the laptop program.* San Francisco, CA.

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

Rockman, S. (2003). Learning from Laptops. *Threshold,* 1(1), 24-28.

Russell, M., O'Dwyer, L., Bebell, D., & Tucker-Seeley, K. (2004). Examining the relationship between students' mathematics test scores and computer use at home and at school. *In T. a. A. S. Collaborative* (Ed.). Boston, MA: Boston College.

Schwartzbeck, T. (2012). The digital learning imperative: How technology and teaching meet today's education challenges June 2012. Retrieved from http://www.all4ed.org.

Scollon, R., & Scollon, S. B. K. (1980). Interethnic communication: How to recognize negative stereotypes and improve communication between ethnic groups. Retrieved from http://www.alaskool.org/resources/teaching/ethnic/Interethnic_Comm.htm

Silverman, S., & Casazza, M. (2000). *Learning and development: Making connections to enhance teaching.* Hoboken, NJ: Jossey-Bass Higher and Adult Education Series.

Silvernail, D. L., & Lane, D. M. M. (2004). *The impact of Maine's one-to-one laptop program on middle school teachers and students: Phase one summary evidence.* Portland, ME: Maine Education Policy Research Institute, University of Southern Maine.

Silvernail, D. (2007). The impact of the Maine Learning Technology Initiative on teachers, students, and learning. Retrieved from http://usm.maine.edu/cepare/mlti.htm

Silvernail, D., & Buffington, P. (2009). *Improving mathematics performance using laptop technology: The importance of professional development for success.* Gorham, ME: Maine Education Policy Research Institute.

Smith, G., & Sobel, D. (2010). *Place-and community-based education in schools.* New York: Routledge.

Sobel, D. (2004). *Place-based education: Connecting classrooms and communities.* Great Barrington, Maryland: The Orion Society.

Sparrow, L., Sparrow, H., & Swan, P. (2000). Student centered learning: Is it possible? . Paper presented at the *9th Annual Teaching Learning Forum,* Perth, Australia.

Stewart, D., & Shamdasani, P. (1990). *Focus groups: Theory and practice.* Newbury Park, CA. Sage Publications.

Strauss A., & Corbin J. (1998). *Basics of qualitative research: techniques and procedures for developing theory.* Newbury Park, CA. Sage Publications.

Swan, K., Van't Hooft, M., Kratcoski, A., & Unger, D. (2006). Uses and effects of mobile computing devices in K–8 classrooms. *Journal of Research on Technology in Education,* 38(1), 99-112.

Tapscott, D. (1998). *Growing up digital: The rise of the net generation.* New York, NY: McGraw-Hill.

Texas Education Agency. (2002). Update to the long-range plan for technology, 1996–2010: *A Report to the 78th Texas legislature.* Austin, TX: TEA.

Van Eck, R. (2006). Digital game-based learning: It's not just the digital natives who are restless. *EDUCAUSE Review,* 41(2). Retrieved from http://www.educause.edu/ero/article/digital-game-based-learning-its-not-just-digital-natives-who-are-restless

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes.* Cambridge, MA: Harvard University Press.

Warschauer. M. (2004) Technology and social inclusion : Rethinking the digital divide. *The MIT Press,* October.

Wertsch, J. V., & Sohmer, R. (1995). Vygotsky on learning and development. *Human Development,* 38, 332-37.

Wesson, L. H., Holman, S. O., Holman, D., & Cox, D. (1996). Cohesion or Collusion: Impact of a Cohort Structure on Educational Leadership Doctoral Students. Paper presented at the American Educational Research Association, Arkansas.

Weston, M. E., & Bain, A. (2010). The end of techno-critique: The naked truth about one to one laptop initiatives and educational change. *Journal of Technology, Learning, and Assessment,* 9(6). Retrieved from http://www.jtla.org

Whicker, R. (2012). *Framing complexity: Teacher and student use of technology in Alaska one to one learning environments.* (Unpublished dissertation). University of Alaska, Fairbanks.

Wikipedia. (2011). Digital Divide, 2012, from http://enwikipedia.org/wiki/Digital_divide