

AN ABSTRACT OF THE DISSERTATION OF

Roxanne S. Wilson for the degree of Doctor of Education degree in Learning
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Title: Tenth Graders' Perceived Academic Self-efficacy in a One-to-one Laptop
Program

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This qualitative study examined tenth graders' perceptions of the connections between their academic self-efficacy and the one-to-one laptop program in a small New Hampshire high school. The author interviewed 16 students, analyzed self-efficacy questionnaires, and reviewed student work. Using a program theory exploration, these students reported high self-efficacy in relation to academic achievement, self-regulatory learning, and computer use. The author found a connection between students' self-efficacy beliefs and their use of laptops, in the area of self-regulatory learning.

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Tenth Graders' Perceived Academic Self-efficacy in a One-to-one Laptop Program

By

Roxanne S. Wilson, CAGS

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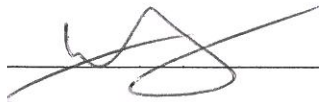
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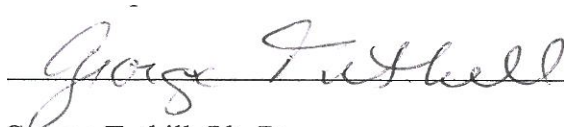
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ACADEMIC SELF-EFFICACY IN A LAPTOP PROGRAM

Chapter 1: Introduction

Statement of the Problem

In September 2011, Newtown High School (pseudonym) began its fourth year as a high school in New Hampshire and for the first time had a fully enrolled 9-12 comprehensive school to serve the students of the town. Newtown High School was also in its fourth year of implementing a one-to-one computer program. Each student was given a MacBook laptop with wireless connectivity throughout the school. Research on one-to-one laptop programs has focused on student outcomes such as scores on tests, grades, and writing (Gulak & Demirtas, 2005; John Hopkins University, 2007; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010; Suhr, Hernandez, Grimes, & Warschauer, 2010). Some research studies have looked at self-efficacy for computer use, but none were focused on the concept of academic self-efficacy in connection with a one-to-one laptop program (Karsten & Roth, 1998; Khorranmi-Arani, 2001; Parzinger et al., 2006).

Research supports the theory that self-efficacy beliefs are linked to educational achievement in academic domains such as reading, writing, mathematics, and science (Pajares & Graham, 1999; Schunk & Swartz 1993; Usher & Pajares, 2006). Bandura (1997) demonstrated that self-efficacy beliefs are powerful determinates of achievement outcomes (Schunk & Pajares, 2005). Studies have not focused on whether a laptop, as a tool, can influence a student's academic self-efficacy.

Purpose of the Study

According to Albert Bandura, “perceived self-efficacy refers to the beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (1997, p. 3). Academic self-efficacy refers to an individual's belief regarding successful achievement in school, at a designated level on an academic task or attaining an academic goal (Bandura, 1977).

The purpose of this study was to examine a select group of Newtown High School tenth graders’ academic self-efficacy. Because all of these students were participants in a one-to-one laptop program, a question arose about any possible connections between the students’ academic self-efficacy and their participation in this program. A meta-analysis (Moulton, Brown, & Lent, 1991) of studies conducted between 1977 and 1988 showed that self-efficacy beliefs were positively related to academic achievement.

During the implementation of the New Town High one-to-one laptop program, program theory explaining how the laptops contributed to students’ learning had not been developed. This study uncovered a connection between using the MacBook laptops and students’ academic self-efficacy; thereby, leading to a program theory of the one-to-one laptop program.

Research Questions

The research questions investigated by this author were:

1. How do tenth-grade students at Newtown High School perceive their academic self-efficacy?

2. Is there any change of students' perceived self-efficacy from eighth grade to tenth grade?
3. Do students describe a connection between using the MacBook laptop and their academic self-efficacy?

Background Context of the Problem

Community information. This study was conducted in a small town in New Hampshire. In 2009, the town opened its first high school, after many years of sending secondary students to a neighboring district. In 2011, all four grades were in full attendance at the new high school, reaching an approximate enrollment of 700 students.

Newtown (pseudonym) is situated in southeast New Hampshire. Newtown has a current population of 15,000 and has an area of approximately 27 square miles. Newtown residents earned more than the State average in income and spent more than the State average on educating its children. In 2009, the median household income was \$113,867, with a .6% poverty rate (U.S. Census Bureau, 2011). The State of New Hampshire's median household income for 2009 was \$60,567 (U.S. Census Bureau, 2010). Newtown spent \$12,908.73 in per pupil costs for educating their children, which was \$634.74 per pupil more than the State average for the costs of Preschool through twelfth grade (New Hampshire Department of Education, 2011).

District State testing data. The percentage of students at Newtown School District was above the State average on the 2010 statewide test, New England Common Assessment Program, (NECAP). The combined elementary, middle and high schools scores show that the results were generally ten points above the State average

(New Hampshire Department of Education, 2011).

Community commitment to education. Newtown, New Hampshire opened its doors to its new state-of-the-art high school in 2009. During the design phase of this new high school, the school board committed to providing a state-of-the-art building and curriculum. The school board equipped the high school with a technology-rich environment and provided each student with a laptop computer to use throughout their four years at school, implementing the first one-to-one computing initiative for all students in a public high school in New Hampshire. The building was designed with wireless Internet connections and interactive white board technologies in every classroom. The school integrated Moodle, which is an open-source, course management software. Each laptop had typical applications for word processing and spreadsheets, as well as the Apple iLife suite for photos, movies, and music. The school provided support for teachers to integrate technology into classroom lessons, homework, and projects. This was, and continues to be, a significant investment that helped meet the mission of Newtown High School:

We recognize our students have unique talents, gifts, and challenges. We empower each student to be an active learner who understands the interconnectedness of knowledge. We commit to a safe learning environment of individual responsibility, respectful action, and appreciation of diversity. We engage each student with dynamic instruction enhanced by collaboration, co-curricular opportunities, and 21st century technology. We aspire to be an exemplary school community wherein all students master lifelong skills to succeed as purposeful citizens of Newtown and the world (NHS Program of

Studies, 2011).

The goal of implementing the one-to-one laptop initiative at Newtown High School is to offer curriculum and learning tools to students in order to prepare them for the global and competitive world in which they would find themselves after graduation (NHS School Board minutes, 2008).

Use of technology. The use of computers and technology tools is changing the way in which we live and learn. Students attending today's public high schools have to be prepared for a vastly different world than that of their parents (Tapscott, 2009). In the last fifteen years, the use of technology has vastly changed the job markets and college experiences for many of our children (Partnership for 21st Century Skills, 2011). This pressures schools to deliver education differently than in the past, as exemplified by the Classrooms for the Future initiative in Pennsylvania (Pennsylvania Department of Education, 2011). The Classroom for the Future initiative "encourages teachers to move away from the long-standing didactic approach of lecturing from the front of the classroom and to have teachers engage students in a more student-centered manner" (Price, 2010, para. 6). Using a computer as a tool for education has become a requirement for a standard public school diploma as stated in *New Hampshire's Minimum Standards for Program Approval*, Ed. 306. In order to obtain a high school diploma in New Hampshire, students must receive credit for taking an information and communication technologies course or by creating a digital portfolio that demonstrates proficiency (N.H. Code of Administrative Rules, 2005).

In order to meet these NH Standards, public schools increased funding for technology-rich classroom environments. This trend was not limited to New

Hampshire. According to Compass Intelligence, an Information and Technology (IT) consultancy and market research firm, nationwide spending for IT reached \$50 billion in 2010 (Compass Intelligence, 2011).

Though researched-based standards require a greater integration of technology in US schools, the high cost of this technology caused the public and school officials to look at how technology impacts student performance and achievement. While there have been mixed results from studies examining the impact of technology on student achievement, studies since 1999 found positive connections (Gulak & Demirtas, 2010; Penuel, 2006; Schacter, 1999; Suhr, Hernandez & Grimes, 2010; John Hopkins, 2007).

Changes in student learning. Donald Tapscott, author of *Growing Up Digital* (1998) and *Grown Up Digital* (2009) coined the term “Net Generation” to describe the children born between the years of 1977-1997. According to Tapscott, the Net Generation is very different from their parents. Previous generations “value loyalty, seniority, security and authority, the Net Gen’s norms reflect a desire for freedom, fun, and collaboration” (2009, p. 160). According to Tapscott, the Net Geners are smart but impatient. They like to collaborate with each other and they reject one-way lectures. They want interactive learning, and “they are abandoning one-way TV for the higher stimulus of interactive communication they find on the Internet. Sitting mutely in front of a TV set -or a teacher- doesn’t appeal to this generation” (p. 131). They create or contribute to content using social media sites, blogs, and music videos. Current high school students have different ways of communicating, playing, working, consuming and learning than their parents (Tapscott, 2009). Learning goals and expectations in

the 21st Century are different from those of their parents' and their grandparents' generations. Tapscott notes that current youth are the first global generation, and from 2000-2008, the number of people using the Internet has more than tripled across the globe. According to Tapscott, "broadband Internet access is now ubiquitous: iPods are everywhere; mobile phones can surf the Internet, capture GPS coordinates, take photos, and swap text messages; and social networking sites such as Facebook let Net Geners monitor their friends' every twitch" (p. 17).

These generational differences impact public education in terms of school building and program design. According to Corbett and Huebner (2007),

Today's high schools must prepare students to enroll in college or complete a training program, or to enter the workforce at a level where they are expected to think critically and solve problems, learn new skills, and be in line for promotion and career advancement. (p.1)

One of the primary missions of high schools is to prepare students for post-secondary experiences such as post-secondary studies in colleges, universities or vocational schools. For other students, high school is used to prepare them for the job market and a career. Preparing students for today's world is vastly different from previous generations. As *Apple's Classrooms of Tomorrow* report states, "America is caught in the grip of a crisis in education that threatens the ability of an entire generation of young Americans to achieve success in life and work" (ACoT², 2008).

Public schools are being encouraged to prepare students for jobs that do not exist today (Partnership for 21st Century Skills, 2011). There are technological jobs today that did not exist fifteen years ago, and students will have to learn how to adapt

their skills to new emerging job markets that are coming. Not only are the jobs different, but also the worldview of our children is shaping new work norms.

Twenty-first Century skills. A survey conducted in 2010 in collaboration with the Bill and Melinda Gates Foundation, queried over 40,000 teachers nation-wide on the state of American education (Scholastic Inc., 2010). Results showed that “94% of teachers across all grade levels say learning experiences that provide students with 21st Century skills are absolutely essential (54%) or very important (40%) in impacting achievement” (Scholastic Inc., 2010, p. 33).

Twenty-first Century content includes mastering the core subjects, as well as, promoting an understanding of global awareness, financial, economic, business and entrepreneurial literacy, civic literacy, health literacy, and environmental literacy (Partnership for 21st Century Skills, 2011). Twenty-first Century skills include (a) learning and innovation skills, such as creativity and collaboration; (b) information, media, and technology skills; and (c) life and career skills such as self-direction, leadership, and personal productivity (Partnership for 21st Century Skills, 2011). According to research-based educational standards, public schools must help students learn how to use higher order thinking skills and evaluate the information with which they are barraged everyday (New England Commission of Secondary Schools and Colleges, 2011; Partnership for 21st Century Skills, 2011).

According to Baldi, Jin, Skemer, Green, and Herget (2007), American public school children are falling further behind their counterparts in the world setting, and public high school is not meeting the needs of all students, with many of these disaffected students choosing to drop out. According to Bridgeland, DuFulio, and

Morison (2006), 47% of students who drop out said a major reason for dropping out of school was that the classes were not interesting. Instead of the “one size, fits all” philosophy of the traditional school model, districts need to provide more curriculum and program options to students (Bridgeland, DuIulio, & Morison, 2006).

High schools must continue to provide students with an education that will enable them to continue their studies or enter the work force. With the increasing use of the Internet, the world has become more accessible to students than ever before. The world has “flattened” with people having global access to each other through the Internet at any time (Bandura, 1997, Freidman, 2005; Tapscott, 2009). Students have access to vast information in immediate fashion. Bandura (2006a) postulates, “increasing complexities in technologies, social systems, and international economy present different realities demanding new type of competencies” (p.9). Curriculum must connect to the global world using real world experiences in meaningful ways. Using personal laptops to make those connections is one way to access 21st Century content, anywhere, anytime.

Definition of Terms

21st Century Skills or 21st Century Learning

A framework for learning has been developed by the Partnership and requires that students master the knowledge and understanding of core academic subjects of math, reading or language arts, English, world languages, arts, economics, science, geography, history, government and civics. In addition, themes that must be woven into the core subjects are (a) global awareness; (b) civic literacy; (c) health literacy; (d) environmental literacy; and (e) financial,

economic, business, and entrepreneurial literacy (Partnership for 21st Century Skills, 2011).

Academic self-efficacy

Academic self-efficacy refers to an individual's belief regarding successful achievement in school, at a designated level on an academic task or attaining an academic goal (Bandura, 1977).

Generation Next or Generation Z

The children born between Jan 1998 to the present (Tapscott, 2009, p. 16).

Net Generation or Net Geners

The children born between Jan 1977 to Dec 1997. It was 21 years producing approximately 81.1 million children also called the Millennials or Generation Y (Tapscott, 2009, p. 16).

One-to-one computing

Providing students with use of portable laptop computers loaded with contemporary productivity software and wireless access to the Internet, used to complete academic tasks such as homework, tests, and presentations (Penuel 2006).

PC

Personal computer and for this paper, a non-Apple brand.

Self-efficacy

According to Albert Bandura, “perceived self-efficacy refers to the beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (1997, p. 3). In other words, self-efficacy is a

person's belief in his or her ability to succeed in a particular situation. Bandura described these beliefs as determinants of how people think, behave, and feel (1994).

Ubiquitous computing

Learning environments in which all students have access to a variety of digital devices and services, including computers connected to the Internet and mobile computing devices, whenever and wherever they need them. Technology is always available and technology itself is not the focus of learning. (Research Center for Educational Technology, 2010)

Limitations and Delimitations

This study took place at Newtown High School in a district where the author once worked. A limitation in this study is the community demographics from which the participants were drawn. Newtown has limited ethnic diversity and is considered an affluent community. The total population in Newtown is 96% white, while the U.S. rate is 75%. The median household income in Newtown is \$113,867 as compared to the U.S. median of \$51,425 (U.S Census, 2011).

The participants were delimited to students who were considered sophomores or tenth graders, who had been in attendance at NHS for a year, and who had a year's experience in using the laptops.

Organization of the Dissertation

This dissertation is organized into five sections. This first chapter introduces the problem, purpose, research questions, background context, key terms, and limitations and delimitations of the study.

Chapter 2 is a review of the literature. The author examined social cognitive theory to give foundation to the concept of self-efficacy. She reviewed self-efficacy studies and studies conducted one-to-one computing programs.

Chapter 3 discusses methodology and materials. The author used a qualitative approach to collect data through interviews and a survey. Participant selection and sampling is presented. Data instruments such as interviews and surveys are discussed in detail. Data collection and analysis processes are presented.

Chapter 4 presents the data and findings and provides an analysis of the data. Characteristics of the participants are presented. Themes that emerged from the interviews are revealed, and interview data is explained.

Chapter 5 presents the conclusions, implications of the results, and program theory that resulted. Themes from the qualitative study are presented, as well as interpretations of the data. Comments on research that can be done in the future are included.

Chapter 2: Review of Literature

Newtown High School is using a one-to-one computer environment for all students in order to increase their ability to meet 21st Century learning standards (Partnership for 21st Century Schools, 2011) and enhance student academic achievement. Each student is given a laptop for their four years in school.

There is strong theory and research (Bandura, 1977; Multon, Brown, & Lent, 1991; Pajares & Graham, 1999; Schunk & Pajares, 2005; Schunk & Swartz, 1993; Usher & Pajares, 2005; Zimmerman, Bandura & Martinez-Pons, 1992) that connects self-efficacy to student achievement. Academic self-efficacy, a domain under the broader field of self-efficacy, was examined to determine if any research had been conducted in relation to one-to-one laptop programs.

This literature review presents a synthesis of the research of the construct of self-efficacy, which is situated in the philosophy of Social Cognitive Theory (Bandura, 1997, 1986, 1977). The review also includes a synthesis of research studies on one-to-one laptop programs.

Social Cognitive Theory

Albert Bandura is widely considered the father of the construct of self-efficacy and Social Cognitive Theory (Pajares, 2006). Social Cognitive Theory was proposed by Bandura to describe human thought and action as a product of the dynamic relationship between (a) personal factors such as cognition, biological feedback, and emotions; (b) behavior; and (c) environmental factors (Bandura, 1994, 1986, 1978).

Bandura's Reciprocal Determinism Model (Figure 1) describes the relationship between these three factors (Bandura, 1978).

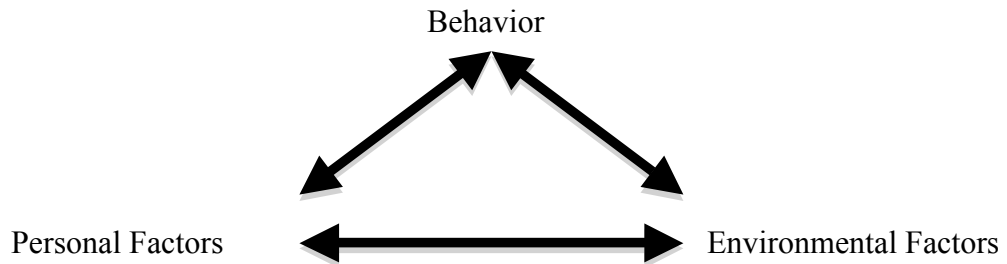


Figure 1. Model Illustrating Reciprocal Determinism (Bandura, 1978).

How people interpret certain events can influence the competence they believe they have, and the success they think they will have in accomplishing a task. If the environment is supportive, it may positively influence the action or behavior of a person, which in turn validates their personal beliefs, which in turn can affect the future action of the individual (Bandura, 1978). Bandura has said,

It is true that behavior is influenced by the environment, but the environment is partly of a person's own making. By their actions, people play a role in creating the social milieu and other circumstances that arise in their daily transactions. Thus, from the social learning perspective, psychological functioning involves a continuous reciprocal interaction between behavioral, cognitive and environmental influences. (1978, p. 345)

Bandura's publication of *Social Foundations of Thought and Action: A Social Cognitive Theory* (1986) provided a more cohesive view of how peoples' cognitive, self-regulatory, and self-reflective processes help humans view and interpret the world around them (Pajares, 2002). Instead of reacting to the world, Bandura posits, "people

are self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and shepherded by environmental forces or driven by concealed inner impulses” (Pajares, 2002, p.1).

Social cognitive theory and schools. Counselors and teachers use Bandura’s theory as they work with individuals focusing on strategies to improve personal, environmental, or behavioral factors. In schools, teachers work on improving all three areas by helping to provide supportive environments, improving self-confidence, and providing step-by-step guidance for taking action (Pajares, 2002).

Cognition and mastery learning plays a vital role in developing self-efficacy beliefs, and the classroom environment also contributes. The social milieu and context is a primary determinant of self-efficacy beliefs (Zimmerman & Cleary, 2006). Students’ sense of efficacy can be increased or lowered by the behaviors and/or feedback given by important people in their lives, such as parents, peers and teachers. It is common sense that the relationship a student has with a teacher influences academic success. Teachers using verbal persuasion, such as words of encouragement and giving specific performance feedback influence self-efficacy beliefs of students (Zimmerman & Cleary, 2006). Modeling specific strategies, behaviors, and meta-cognitive thoughts can also help contribute to self-efficacy development. The modeling can be done through explicit or vicarious experiences. The classroom and school environment created by teachers does play a role in influencing self-efficacy beliefs of students (Bandura, 1986; Zimmerman & Cleary, 2006).

Bandura (1986) emphasized that cognition plays a critical role in people's capability to construct reality, self-regulate, encode information, and perform

behaviors. Social Cognitive Theory gives counselors and teachers a solid foundation from which to help students overcome adversity in educational achievement. Students can control their thoughts, feelings, and actions, and are “contributors to their life circumstances not just products of them” (Bandura, 2006b, p. 3).

The construct of self-efficacy. The key element of Bandura’s Social Cognitive Theory is the construct of self-efficacy. Humans have the ability to control and change how they think, believe, and behave based on introspection and reflection (Pajares, 2002). Albert Bandura (1997) defined self-efficacy as the “beliefs in one’s capabilities to organize and execute the course of action required to produce given attainments” (p. 3). Self-efficacy

Influences the courses of action people choose to pursue, how much effort they put forth in given endeavors, how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self-hindering or self-aiding, how much stress and depression they experience in coping with taxing environmental demands, and the level of accomplishments they realize. (Bandura, 1997, p. 3)

Students’ self-efficacy beliefs are at the foundation for their motivation, well-being, and personal accomplishment. If students doubt their capability to succeed, they may not have incentive to act. They are less inclined to persevere in the face of challenging material (Pajares, 2002). If self-efficacy is so important to motivation and accomplishment, how does one establish strong self-efficacy beliefs? The key to helping students develop strong self-efficacy is through the four sources of self-efficacy.

The sources of self-efficacy. Bandura (1997, 1986, 1977) theorizes that self-efficacy develops from four primary informational sources. The first, and the strongest source, is the history that people have with personal successes and failures, or what he calls mastery experiences (Bandura, 1997). Past experience plays an important role in mastery expectations. Bandura (1994) adds, “a resilient sense of efficacy requires experiences in overcoming obstacles through perseverant effort” (p. 3). Successful experiences improve self-efficacy, and failures lower self-efficacy (Bandura, 1997).

The second source of self-efficacy is through vicarious experiences or watching the successes and failures of others. Although not as strong as actual experiences, observing others can influence self-efficacy, especially if the person being watched is perceived similar to the one who is doing the observing (Bandura, 1986). Schunk (1987) concluded that students who observed successful peers were motivated to attempt the task themselves, and were found to have increased their own self-efficacy.

Persuasion, both socially and verbally, is the third way that self-efficacy beliefs are influenced. This can be a coaching relationship where verbal feedback is shared regarding one's potential for accomplishing a task. Bandura showed that “people who are persuaded verbally that they possess the capabilities to master given activities are likely to mobilize greater effort and sustain it than if they harbor self-doubts and dwell on personal deficiencies when problems arise (1994, p. 3). Conversely, students who are persuaded that they lack the capabilities or skills tend to avoid challenging activities and give up quickly (Bandura, 1994).

The fourth way that self-efficacy beliefs are developed is through

physiological and emotional feedback that is associated with the anticipated task. The more the fear response is invoked, the harder it is to develop strong self-efficacy (Bandura, 1986). Modifying self-efficacy beliefs can be done by reducing people's stress reactions and altering their negative emotional misinterpretations of their physical states (Bandura, 1994).

There are correlations between the four sources and self-efficacy, but there are inconsistent results when examining those relationships (Usher & Pajares, 2006). One of the reasons is the difficulty of singling out only one variable, as the sources are often intertwined. Mastery experience is the stronger predictor of self-efficacy among the four sources (Bandura, 1997; Lent, Brown, Gover, & Nijjer, 1996). Bandura researched the sources of self-efficacy, as well as how self-efficacy influences other personal factors.

The influences of self-efficacy. Bandura (1994) has shown that self-efficacy beliefs affect cognition, motivation, emotions, and decision-making processes. Furthermore, self-efficacy plays a role in personal factors in education such as motivation, learning, self-regulation, goal setting, and academic achievement (Holden, Moncher, Schinke, & Barker, 1990; Zimmerman, Bandura, & Martinez-Pons, 1992; Zimmerman & Cleary, 2006). Pajares (1996) and Schunk (1995) showed self-efficacy influences academic motivation, learning, and achievement. Schunk concluded that students' "self-efficacy beliefs influence such actions as choice of tasks, persistence, effort and achievement" (1995, p. 2).

Studies have shown that self-efficacy influences vocational choice and career choices (Hackett, 1997; Hackett & Betz, 1995; Multon, et al., 1991), and health and

sports functioning (Holden, 1991; Maddux, Brawley & Boykin, 1995). Stajkovic and Luthans (1998) found a significant relationship between self-efficacy and work performance. Self-efficacy is an important construct in the pursuit of tasks and in the field of human motivation.

Other types of self-beliefs. There are various constructs of self-perceptions such as self-concept, self-esteem and self-regulation that sometimes are confused with self-efficacy. Bandura (1986) notes that self-efficacy is distinctive from other types of self-beliefs. For example self-concept refers to a generalized assessment of a sense of “self-worth and general beliefs of competence” (Zimmerman & Cleary, 2006, p. 48). Self-efficacy beliefs are context-specific and refer to the ability to execute a task. Self-efficacy does not answer the question, “How good you were at something?” but rather “How capable do you judge yourself to be in accomplishing it?” (Zimmerman & Cleary, 2006, p. 49).

According to Zimmerman and Cleary, “self-esteem is an affective reaction indicating how a person feels about him, or herself” (2006, p. 49). It is a judgment of self-worth. Self-efficacy is a cognitive judgment about one’s capabilities to complete a specific task.

Self-regulation is defined as “specific personal, behavioral, and environmental processes designed to attain personal goals cyclically” (Zimmerman & Kitsantas, 2005, p. 510). To be a self-regulated learner, one has to have “self-generated thoughts, feelings and actions that are planned, and cyclically adapted based on performance feedback to attain self-set goals” (Zimmerman & Cleary, 2006 p. 56). Self-regulatory learning includes behavioral observations, environmental adjustments, and cognitive

and affective reflection (Zimmerman & Kitsantas, 2005). Self-regulatory learning is often characterized by a collection of self-motivational strategies and behaviors such as goal setting, self-evaluating, organizing, monitoring, self-verbalizing, managing time, and planning (Zimmerman & Kitsantas, 2005). Though self-regulation is not the same as self-efficacy, these two concepts are related.

Self-regulation, self-efficacy, and achievement. Bandura (1997) along with Zimmerman and Cleary (2006), describe a reciprocal relationship between self-efficacy beliefs and self-regulatory behaviors. Students with high sense of academic self-efficacy “make greater use of cognitive strategies, manage their time and learning environments better, and monitor and regulate their learning more closely (Pintrich & Schrauben, 1992, as cited in Bandura 1997, p. 233). According to Zimmerman and Kitsantas (2005), self-regulatory skill and self-motivational beliefs help students develop optimal competence.

There is extensive empirical evidence that learners’ use of self-regulatory processes is highly predictive of their academic as well as athletic success. Furthermore, people’s self-efficacy beliefs about their self-regulatory competence proved to be predictive of not only their use of self-regulatory processes but also their learning and performance outcomes. (Zimmerman & Kitsantas, 2005, p. 523)

Strong self-efficacy beliefs help to sustain high levels of motivation and resiliency in learners when they are challenged (Zimmerman & Cleary, 2006). Students who have strong perceived efficacy to manage and regulate their learning have higher aspirations and accomplishments (Zimmerman & Bandura, 1994; Zimmerman, Bandura, &

Martinez-Pons, 1992). Bandura (2006a) notes that the goal of education is to provide students with the “intellectual tools, self-beliefs, and self-regulatory capabilities to educate themselves throughout their lifetime” (p. 10). Self-efficacy and self-regulation are both factors in student learning. Zimmerman and Cleary (2006) conclude that adolescents view of self-efficacy is influenced by their “capability to self-regulate their functioning such as setting optimal goals, implementing effective strategies, self-monitoring accurately, self-evaluating using appropriate criteria, and attributing causation to adaptable processes” (p. 65).

Self-efficacy beliefs exist within the self-regulatory system of three phases: the forethought phase, the performance phase, and self-reflection phase (Zimmerman and Cleary, 2006). Teachers use these three phases when working with students, as they help students plan to execute a task, perform a given task, and self-reflect on their performance. When looking at self-efficacy in the domain of education, the term academic self-efficacy is widely used.

Academic self-efficacy. The term “academic self-efficacy” is used when the self-efficacy theory is focused on the domain of achieving academic tasks or goals (Bandura, 1997; Schunk & Pajares, 2005). Academic self-efficacy refers to an individual's belief regarding successful achievement in school, at a designated level on an academic task or attaining an academic goal (Bandura, 1997). Subject-specific self-efficacy refers to the beliefs a student has in his ability to achieve a certain task in a specific subject, such as math. Self-efficacy is linked to achievement in academic domains such as reading, writing, mathematics, and science (Pajares & Graham, 1999; Schunk & Swartz 1993; Usher & Pajares, 2006). Zimmerman and Cleary (2006)

showed “when students believe that they can perform a task in a proficient manner, they will become more engaged in the activity, work harder, and sustain high levels of effort even when obstacles are encountered” (p. 51). A meta-analysis of studies conducted by Multon, et al., (1991) between 1977 and 1988 showed that self-efficacy beliefs are “generally related to academic behaviors in ways that support Bandura's (1977, 1982, 1986) theory and its extension to educational-vocational behavior (Hackett & Betz, 1981; Schunk, 1987)” (p. 36). Bandura demonstrated that self-efficacy beliefs are powerful determinates of achievement outcomes (Schunk & Pajares, 2005).

Learning strategies that teachers use and model, coupled with the student's self-regulated activities can improve academic self-efficacy. Motivational strategies such as setting goals and using rewards promote self-efficacy (Schunk, 1995; Zimmerman & Schunk, 2001). A study conducted by Zimmerman and Ringle (1981) found that observing and modeling affects self-efficacy (Zimmerman & Schunk, 2001). Linking prior achievements with attributional feedback statements, such as “you've been working hard,” led to increased self-efficacy (Zimmerman & Schunk, 2001). Self-verbalization strategies used in math, self-monitoring of educational progress, and self-evaluation contributes to self-efficacy (Zimmerman & Schunk, 2001). Students who are confident in their learning have higher aspirations and accomplishments (Zimmerman & Cleary, 2006). Students' aptitudes, prior experiences they've had, and social supports affect students' self-efficacy for learning (Schunk, 1995).

Three decades of research in self-efficacy has been conducted for applications in education and other various fields. While there is some research that links self-efficacy with computers, it has been more focused on the efficacy of using computers and computer software (Karsten & Roth, 1998; Khorrami, 2001; Parzinger, Reeves & Welch, 2006). Current research is very limited in examining whether the use of the laptop, itself, can contribute to perceptions of academic self-efficacy.

One-to-One Computing Research

Research conducted on one-to-one computing programs studied outcomes from three perspectives: changes in teacher behaviors or pedagogy; changes in student learning behaviors; and use of technology immersion and implementation (Bebell & O'Dwyer, 2010; Penuel, 2006; Rockman & Sloan, 2007; Shapley et al., 2010). There are a variety of one-to-one laptop programs being implemented in schools across the country. States such as Maine, Michigan, and Texas; and large districts such as Henrico County in Virginia, and Cobb County in Georgia, have implemented large-scale one-to-one programs. There are also many other smaller implementations done only in specific schools and in certain grades, such as New Hampshire's 2003 laptop trial for 7th graders titled: Technology Promoting Student Excellence (Bebell, 2005).

Research Outcomes. Case studies focusing on teacher behaviors showed that teacher's beliefs about students and technology influence how they use technology in the classroom (Inan & Lowther, 2010; Jaillet, 2004; Windschitl & Stahl, 2002; Zucker & McGhee, 2005). The outcomes that were observed include

- increasing collaboration between teachers,

- using new forms of assessments,
- altering schedules so students could collaborate, and
- using more project-based learning.

The Apple Classrooms of Tomorrow (2008) research found that as teachers became more comfortable with the technology, the more they worked in teams and collaborated across disciplines. Teachers began using new forms of assessment that were performance-based, and they altered their schedules more to permit students to collaborate on projects (Sandholtz, Ringstaff, & Dwyer, 1997). Teachers became more student-centered and used more project-based instruction when using the laptops (Rockman ET AL, 1997; Zucker & McGhee, 2005). Penuel found that “when teachers believe that technology can support student learning and offers resources that adds value to the curriculum, they are more likely to use it” (2006, p. 341). Bebell and Kay (2010) concluded that the one-to-one computing led to changes in teachers’ practices.

Research does support the fact that professional development and technical support are crucial elements to a successful one-to-one implementation (John Hopkins University, 2007; Penuel, 2006; Rockman ET AL, 1997). The Talbot County Public Schools study conducted by John Hopkins University (2007) suggested that the skills and experience that teachers gained in using the laptops for instruction help influence the student achievement gains. Bebell and Kay (2010) conclude:

There is little question that the student and teacher laptops, in addition to the increased professional development, support, and organizational structure

provided through the Berkshire Wireless Learning Initiative, truly changed teaching and learning conditions for the majority of students and teachers in these settings (p. 47).

Research in teacher use of computers has been limited, but the question of how computer use influences student outcomes has been studied for over 20 years.

Student outcomes using technology. Research on the one-to-one laptop initiatives started with Apple Computer with Apple Classrooms of Tomorrow (ACOT) in 1985 (Apple Computer, 2008). Apple Computer, in association with universities and the National Science Foundation, supported 10 years of research on the impact that one-to-one laptop learning had on both student and teacher performance. The goal was to study how technology use by teachers and students might change teaching and learning. Apple Classrooms of Tomorrow identified effective models for teaching and learning with technology. The findings of this first 10 years had positive outcomes associated with one-to-one computing both in terms of teacher and student behaviors (Sandholtz et al., 1997).

In 2006, William Penuel synthesized findings from research and evaluation studies from many schools implementing one-to-one computing. Penuel is the Director of Evaluation Research at the Center for Technology in Learning at SRI International. Apple computer funded the research synthesis. Penuel found that in 2001, there were only 19 studies that had analyzed outcomes (Penuel, 2006). At that time, the conclusion was drawn that there was too little evidence to determine whether programs were effective. In 2006, Penuel reviewed more studies and applied systematic criteria to identify the 30 studies that were selected out of the 245 of the

initial search. Of these 30 studies that Penuel used, some were outcome studies employing some type of experimental design, and others were implementation studies using systematic methods of analysis (2006).

Penuel (2006) concluded that laptop programs were designed around four broad goals (a) improving academic achievement, (b) increasing equity access of digital resources, (c) increasing economic competitiveness, and (d) transforming the quality of instruction. There were few quasi-experimental studies with pre-test and post-test designs and the use of comparison groups in his analysis. Based on the limited number (11) of studies meeting Penuel's selection criteria, he concluded that there is still a question as to "what the potential is for one-to-one computing initiatives to improve student achievement in core subjects" (Penuel, 2006). During the evaluation of Indiana's five-year project, *Tech-Know-Build*, Rockman ET AL (2007) also found no significant gains in student achievement data.

Since 2006, more current studies have shown connections between laptop use and gains in student achievement. One study showing gains in student achievement was conducted by John Hopkins University of the Talbot County, Maryland in 2007. This study concluded that the scores on the state high school test were significantly higher for students who had personal laptops. There was also significant improvement in the end-of-year grades in core subjects taught by teachers who had two years of technology-based instruction (John Hopkins University, 2007). Shapley et al., (2010) found that the strongest predictor of student achievement was the students' use of computers for homework and learning games. Shapely et al., (2010) confirmed that

students who used laptops had gains in the State English Language Arts test as compared to the control group. Suhr et al., (2010) found

After two years' participation in the program, laptop students outperformed non-laptop students on changes in the English language arts total score and in the two subtests that correspond most closely to frequent laptop use: writing strategies and literary response and analysis. (p. 3)

Additionally, Gulak and Demirtas (2005) found that “students who did participate in the laptop program tended to earn significantly higher test scores and grades for writing, English-language arts, mathematics, and overall Grade Point Averages (GPAs)” (p. 29).

Writing outcomes. Studies of one-to-one computing reveal that there are positive student outcomes related to writing. While Penuel's (2006) synthesis does not reveal strong findings with how one-to-one programs impact student achievement in core subjects, he does suggest that technology literacy and writing is impacted from the use of laptops. Studies of students using laptops report improvement of writing skills, however none of the studies used pretests to determine the actual improvement (Penuel, 2006). Rockman also found that students' writing improved (Rockman ET AL, 1998; Rockman & Sloan, 2007). Harris and Smith (2004) concluded that teachers in the Maine Learning Technology Initiative perceived that students with disabilities who used laptops had positive results in the areas of writing, organization, motivation and self-esteem. Suhr et al. (2010) found that “laptops may have a small effect on increasing such scores, with particular benefits in the areas of literacy response and analysis and writing strategies” (p. 38). Silvernail and Gritter (2004) found that middle

school students' writing improved through using the laptops. Finally a meta-analysis of the use of computers on student writing conducted by Goldberg, Russell, and Cook (2003) found "instructional uses of computers for writing are having a positive impact on students' writing" (p. 19). This impact is seen both on the quantity as well as the quality of writing.

Student work skills outcomes. A theme that emerges from the research focuses on student work skills, for both productivity and technological skills. Students owning laptops used computers in school nine times more than their peers who did not have laptops (Rockman ET AL, 1998). The use of laptops extended to outside of school, and into homework across the disciplines (Rockman ET AL, 1998). Students used productivity and design tools more often, and they integrated these skills into other assignments (Peneul, 2006; Rockman & Sloan, 2007).

During the Microsoft *Anytime Anywhere Project*, Rockman ET AL (1997) reported students displayed more collaboration, independent learning, enthusiasm for school and, problem-solving skills. Zucker and McGhee (2005) found similar results with increased student motivation, engagement and self-directed learning. Students had greater access to information, increased their interaction with teachers, and improved their organizational skills. In Indiana's *Tech-Know-Build Project*, schools using laptops had increases in attendance and enrollments (Rockman & Sloan, 2007). Rockman's evaluation of the *Tech-Know-Build Project* found that teachers and parents believed that the use of project-based learning with the laptops helped to increase the students' awareness of community issues. Some students reported that they could better understand their schoolwork and get their assignments done faster (John

Hopkins University, 2007). Bebell and Kay (2010) found that students with laptops had measurable changes in motivation, engagement, and achievement compared to the control group. Suhr et al. (2010) also confirmed that student engagement increased when laptops were used in classrooms. Bebell and Kay (2010) found that student engagement increased dramatically in response to the enhanced educational access and opportunities afforded by one-to-one computing.

Special populations. Another theme that emerges from the research is around special populations of students, such as students with disabilities, English Language Learners, or “at risk” students. The laptops seem to help teachers differentiate lessons better to meet students’ needs (John Hopkins University, 2007). Harris and Smith (2004) found that laptops improved students with disabilities’ engagement, motivation, organization, participation and class preparation.

Subject-specific efficacy areas. Studies that merge self-efficacy with computers are typically looking at computer self-efficacy, or how competent learners think they are in using computer applications (Karsten & Roth, 1998; Khorranmi-Arani, 2001; Parzinger et al., 2006). Studies that focused on computer instruction found that students who have higher self-efficacy for self-regulated learning were more successful with internet-based instruction (Joo, Bong & Choi, 2000).

There are several dissertations that relate technology to other subject-specific self-efficacy areas. A study using technology in an English as a Second Language (ESL) course found an increase in students’ self-efficacy about learning the language (Lambo, 2002). Another study (Mayall, 2002) reviewed gender differences in technology self-efficacy and academic self-efficacy. Mayall (2002) found that there

were gender-based differences for both technology and academic self-efficacy in high school students. Males reported higher levels of computer self-efficacy while females reported higher levels of academic self-efficacy. A study of middle school students examined learning processes of self-regulated learning and academic self-efficacy and how they are influenced in technology-integrated classrooms and traditional classrooms (Baltrus, 2003). Results showed that self-regulation and its antecedent variable of intrinsic value and academic self-efficacy operate in both classroom types. The study further confirmed that technology-integrated instruction influences student's self-regulatory processes (Baltrus, 2003).

Twenty-first Century Skills

Information literacy is crucial, so teachers are asked to teach in new ways and with new technology (Partnership for 21st Century Skills, 2011). A framework for 21st Century learning has been developed by the Partnership and requires that students master the knowledge and understanding of core academic subjects of math, reading or language arts, English, world languages, arts, economics, science, geography, history, government and civics. In addition, concepts that must be woven into the core subjects are: global awareness, civic literacy, health literacy, environmental literacy and financial, economic, business, and entrepreneurial literacy (Partnership for 21st Century Skills, 2011). Learning and innovation skills of creativity, critical thinking and problem solving, communication, and collaboration are emphasized. Information, media and technology literacy are taught, as well as life and career skills (Partnership for 21st Century Skills, 2011). The goal of the Framework for 21st Century Learning is to provide a vision of student success in the new global economy.

Central to the Framework for 21st Century Learning is the use of technology to access information, collaborate with others, and create content in a global marketplace (Partnership for 21st Century Skills, 2011). Teachers are increasing the use of computers in schools in order to engage and prepare students for college and work. There is more information available to students today than ever before due to the Internet. Learning how to access and critically evaluate information is an important cognitive skill for today's students (Partnership for 21st Century Skills, 2011).

Ubiquitous computing. Keefe and Zucker (2003) noted that Mark Weiser at Xerox Palo Alto Research Center first used the term “ubiquitous computing.” It was used to describe the future when technology would always be available. The Research Center for Educational Technology (2011) defines ubiquitous computing as having environments where students have access to computers, digital devices and services or mobile computing wherever and whenever they need them. In these environments, teachers and students are active participants in the learning process. As the Research Center for Educational Technology emphasizes, teachers and students “must critically analyze information, create new knowledge in a variety of ways (both collaboratively and individually), communicate what they have learned, and choose which tools are appropriate for a particular task” (2011, p. 1). One-to-one computing is part of this ubiquitous environment. It is best characterized as (a) providing students with portable laptop computers with current software for productivity, (b) accessing to wireless Internet services, and (c) focusing on using the laptops for completing schoolwork (Peneul, 2006).

Chapter Summary

The literature reveals that self-efficacy is rooted in a strong theoretical foundation of Social Cognitive Theory. Self-efficacy beliefs influence how students will behave, persevere and pursue academic goals. Academic self-efficacy does influence student achievement. There are learning strategies, such as setting goals, observing, modeling, using feedback, self-monitoring, and reflecting on prior experiences that influence academic self-efficacy. While learning strategies can be seen as adding value to academic self-efficacy, it has not been shown if a tool, such as a computer, can influence or add value. The one-to-one computing model, having been implemented in various public school settings for over 20 years, has shown positive contributions to student achievement in the area of writing. More recent studies have shown more connections to the use of laptops with gains in state testing scores and student grades. Student work skills such as organization, engagement, motivation and attendance have been shown to improve through the use of one-to-one computing.

Following Bandura's Reciprocal Determinism Theory, the more teachers structure the learning environment to produce success for students, the more achievement experiences they will gain, which in turn, improves their beliefs of academic self-efficacy. Experiencing achievement has the most influence on the development of academic self-efficacy (Bandura, 1997).

Self-efficacy plays a role in personal cognitive factors in education such as motivation, learning, self-regulation, goal setting, and academic achievement. A

reciprocal relationship exists between self-efficacy and self-regulation (Bandura, 1997; Pajares, 2002). Pajares (2002) noted

In general, researchers have established that self-efficacy beliefs and behavioral changes and outcomes are highly correlated and that self-efficacy is an excellent predictor of behavior. The depth of this support prompted Graham and Weiner (1996) to conclude that, particularly in psychology and education, self-efficacy has proven to be a more consistent predictor of behavioral outcomes than have any other motivational constructs. Clearly, it is not simply a matter of how capable one is, but of how capable one believes oneself to be.

(p. 9)

Self-efficacy influences student achievement (Bandura, 1997, 1986; Hackett & Betz, 1981; Moulton et al, 1991; Pajares & Graham, 1999; Schunk, 1987; Schunk & Swartz 1993; Usher & Pajares, 2006; Zimmerman & Bandura, 1994; Zimmerman, Bandura, & Martinez-Pons, 1992; Zimmerman & Cleary, 2006; Zimmerman & Kitsantas, 2005). Personal laptop use contributes to student achievement (Baltrus, 2003; Bebell & Kay, 2010; Bebell & O'Dwyer, 2010; Goldberg, Russell & Cook, 2003; Gulak & Demirtas, 2005; Harris & Smith, 2004; John Hopkins University, 2007; Peneul, 2006; Rockman ET AL, 1997; Rockman ET AL, 1998; Rockman & Sloan, 2007; Sandholtz et al, 1997; Shapley et al, 2010; Silvernail & Gritter, 2004; Suhr et al, 2010; Zucker & McGhee, 2005). Therefore, exploring the connections between laptop use, self-efficacy, and student achievement is important.

Chapter 3: Methodology

Qualitative Research Context

Qualitative methodology requires the researchers to consider many factors. Qualitative research looks at relationships of parts to form a whole (Merriam, 1998). The aim of qualitative research is to understand the participants' perspective. In the research, the participant's perspective is known as the emic, or insider's viewpoint. The opposite is the outsider's, or etic view (Merriam, 1998). The role of researcher is embedded in the study, and she must be mindful of biases and values and how they can influence the study (Creswell, 2003). The researcher is the data collector and analyzer, and can adapt techniques and strategies as the study unfolds (Creswell, 2003). In qualitative research, the researcher is physically on site conducting interviews, observations, and fieldwork in the natural setting (Creswell, 2003; Merriam, 1998). The inductive strategy is primarily used which allows the researcher to build concepts, hypotheses, and theories from the data (Creswell, 2003; Merriam, 1998).

The central question investigated by this author concerned how students describe their beliefs about their own academic self-efficacy and what, if any, is the connection between the laptop to their self-efficacy? This inquiry lent itself to a qualitative study where the experiences of participants were expressed and recorded. It was important to capture the words and thoughts of students through interviews. The

data were analyzed and interpreted. According to Creswell (2003), qualitative procedures take place in natural settings, use multiple measures that are interactive, and are based on open-ended observations, interviews and documents. The research process is more flexible as data collection might change and be refined when the researcher learns more about the experience (Creswell, 2003; Merriam, 1998). Qualitative research is interpretative, and conclusions are drawn from the themes being discovered from the data. When thinking about the appropriate research approach to use, the author examined qualitative research types of phenomenological, ethnographic, and case study approaches, along with grounded theory and program theory.

Qualitative Research Methods Considered

Phenomenological approach. The phenomenological research approach, rooted in philosophy and psychology, looks at a human experience and captures the essence of the phenomenon, as described by the participants, through their lens (Creswell, 2003, Merriam, 1998). Researchers must identify what they expect to discover and then put those ideas aside in order to remain open (Creswell, 2003). Participants are studied for a prolonged time period and questions are posed to get at the essence from a variety of perspectives. Since the author did not have access to the students for a prolonged period of time, this approach was not attempted.

Ethnographic approach. Ethnographic research is grounded in anthropology, the study of people, or a culture (Genzuk, 2003). It is considered a deliberate process guided by a point of view. It involves reflection, and questions are informed by the experience in the field (Erickson, 1984). The role of the researcher is as a reflective

observer and sometimes participant who studies key people who represent a cultural group in a natural setting for a set amount of time (Creswell, 2003; Genzuk 2003, Merriam, 1998). Interviews, conversations, and questionnaires are used to capture the participant experiences (Genzuk, 2003). Cohen (2003) adds, “The intention of ethnography is to capture the everyday, the unwritten laws, conventions and customs that govern the behavior of persons and sub-groups within a culture” (p. 1). Though this author did witness every-day routines and experiences of tenth-grade participants, a deep understanding of their culture was not the focus of this study.

Case study approach. The case study design is chosen when “researchers are interested in insight, discovery, and interpretation rather than hypothesis testing” (Merriam, 1998). Case studies have value as a research model that is an “all-encompassing method- covering the logic of design, data collection techniques, and specific approaches to data analysis” (Yin, 2003, p.14). Yin (2003), defines a case study as an “empirical inquiry that investigates a contemporary phenomenon with its real-life context, especially when the boundaries between phenomenon and context are not clearly present” (p. 13).

According to Robert Stake, a case study is “expected to catch the complexity of a single case” (as cited in Stufflebeam & Shinkfield, 2007, p. 311). A case can be a person, a group of people, or a program. The main purpose of a case study is “always to give as complete a picture as possible of the object being studied so that stakeholders may develop or enrich their understanding of the program and perhaps grasp the report’s significance for decision-making” (Stufflebeam & Shinkfield, 2007, p. 315). A case is a phenomenon of some sort occurring in a system that is bounded in

some kind of context (Merriam, 1998; Stake, 1995; Yin, 2003).

Case study characteristics. Merriam (1998) characterizes case studies as particularistic, descriptive, or heuristic. Particularistic case studies focus on a particular situation, event, or program (Merriam). The case study guides attention to specific problems, questions, and situations and is a good design for practical problems.

Descriptive case studies produce what is coined as “thick” descriptions of the phenomenon being studied (Creswell, 2003; Merriam, 1998). “Thick description is a term from anthropology and means the complete literal description of the incident or entity” (Merriam, 1998, p. 29). Descriptive case studies are useful in identifying and organizing information in an area where there has been little research (Merriam, 1998). The results are reported in detailed, narrative descriptions with quotes and examples. In descriptive case study, results are void of theory or hypotheses (Merriam, 1998).

Heuristic case studies present an understanding of the phenomenon being studied. The results can present new insights to confirm what was known, or extend the understanding (Merriam, 1998).

According to Cohen (2003), case studies are outward looking. From the details of the case, knowledge is expanded and it helps refine behavior. Cohen comments that the “final analysis is likely to be organized according to themes, which, while they grow out of intensive study of the particular case, expand our understanding of the phenomenon, and give us a framework within which to view other cases” (p. 3). This author did not choose a case study approach because the focus of the research was

simply to understand the participants' experience relative to their use of laptops.

Grounded theory. The end result of grounded theory approach is to derive a theory from the data (Creswell, 2003; Merriam, 1998, Patton, 1990). The data collection and analysis contribute to a theory that emerges. Rich descriptions of the phenomenon can be included in the study, but it is not the focus of the research. In education, Merriam (1998) describes the theory that evolves as substantive rather than formal. Substantive theory means it is seen in everyday situations and is specific to practice rather than generalized to more global concerns (Merriam, 1998). Conceptual elements of the theory are derived from the study, as categories and relationships emerge. The constant comparison of data is used to seek patterns in the data and develop the theory. For this author, the goal of the research was to create or derive program theory, grounded in social cognitive theory.

Program Theory. According to Funnel and Rogers (2011), program theory is an explicit theory or model that shows how an intervention, such as a program, a strategy, or an initiative contributes the intended outcomes. Typically program theories have two parts: a theory of change and a theory of action (Funnel & Rogers, 2011). A theory of change identifies the forces or processes that cause people to change, and the theory of action identifies how interventions or program are implemented to bring out these changes (Funnel & Rogers, 2011).

There are different ways in which program theory is developed. Some program theories are developed before the program is implemented, and others are created after the program is implemented (Rogers, Petrosini, Huebner, & Hacs, 2000). Most program theory is shown in diagrams, or logic models. Program theory can be

simple, based on one outcome that the program is trying to achieve. Increasing attendance in high school is an example of an outcome of program theory. More complex program theories show a series of intermediate outcomes in multiple areas, that when combined cause the ultimate program outcome, such as reducing the dropout rate (Rogers et al., 2000). Program theory can also be depicted by a series of boxes showing inputs, processes, outputs, and outcomes with connecting lines (Rogers et al, 2000).

Program theory can be used to help guide evaluations of programs. During evaluation, the program theory is tested often looking for the answer, “Does the program work?” (Rogers et al., 2000). According to Rogers et al. (2000), program evaluators have been recommending for thirty years that programs have explicit underlying assumptions about how programs are expected to work. While this qualitative study is not a program evaluation of the one-to-one laptop program, the data gathered in the study did lead to the development of program theory for this school’s use of laptops and their connections to academic self-efficacy. The author chose a program theory approach to this qualitative inquiry.

The Researcher’s Role

According to Creswell (2003) the author needs to identify personal values, assumptions and biases at the beginning of a qualitative research study.

Personal values. Due to the involvement of creating the new high school with a design for the one-to-one laptop program, the author investigated and learned how to implement a one-to-one laptop program in high school. She began this study with a perspective that personal laptops are an essential tool in education today. She

has seen schoolwork that students have accomplished using a wide range of technological applications. Based on her thirty years' experience, the use of computers is crucial to learning 21st Century skills.

Assumptions. This study took place at Newtown High School in a district where the author once worked as an Assistant Superintendent. Although the author was part of the team who designed the new high school, she did not have direct responsibility of the students or supervision for the school employees. The author no longer worked in the district at the time she completed her dissertation. There was no conflict of interest, and the author's role was external to the school's operation. She gained permission to conduct her qualitative study at Newtown High School from the Superintendent of Schools and the Principal.

During the interviews, the author assumed that students would respond openly, honestly and willingly. At the beginning of this study, no program theory was explicitly written about the one-to-one laptop program.

Biases. The author entered this study with a positive view of one-to-one computing in high school settings. She acknowledged that this is her personal value; and she ensured that interview questions remained neutral, so participants could have their own positive, neutral or negative response to questions.

The author recognized that she has a bias toward using the MacBook computer, and the Apple life suite of products. She converted to using a MacBook Pro laptop three years ago when the district implemented the one-to-one program with Apple. There was an understanding that the interview questions asked of students referred to the present-day laptops. While this study did not examine the pros or cons

of the type of laptop in use, it was the common understanding that students at Newtown High School use the MacBooks and associated software.

Ethical Considerations

All research using human subjects must identify and address ethical considerations (Creswell, 2003; Kitchener, 1984; Stufflebeam & Shinkfield, 2006).

The author has a strong ethical code rooted in the educational profession, which includes the principles of autonomy, nonmaleficence, fairness, beneficence, and fidelity that are expressed by Kitchener (1984).

Respecting autonomy is the first ethical principle (Kitchener 1984) adhered to by the author. Once students were identified for participation in the study, the students made their own decisions as to whether or not they would stay in the study. Because students are minors, their parents made the final decision as to whether their children could participate. However, students made their own decisions about whether to answer questions or stay in the study. Students had the ability to withdraw from the study at any time.

The author also abided by the principle of nonmaleficence, which is not causing harm to the participants of the study (Kitchener, 1984). She respected the rights, needs, and values of the participants by reviewing the research purposes and objectives both in writing and verbally, so they were clearly understood. Students and parents were invited to ask questions. Principles of informed consent were reviewed, and written permission was required by both students and parents before students were included as participants. The author arranged mutually agreeable interview times so as to minimize intrusions into daily schedules. In addition, the author received approval

from the Plymouth State University's Internal Review Board to conduct the study. The students' names were protected by the use of pseudonyms. In the final report, names and personally identifiable information were changed.

According to Kitchener (1984), justice is an issue of fairness and treating people with equal value. The author attempted to gather data from a representative sample of tenth graders in the school. Once identified, all participants were asked the same general questions. In the case of follow up questions, these questions were unique to the person or situation. Overall, students were not treated differently.

Beneficence is the concept that the research is "doing good for others" (Kitchener, 1984, p. 49). Researchers must balance the line between harm and benefit, or the good of one person versus the good of all. In this study, there was no potential risk of harm to participants. The benefits of the study contributed to the collective understanding of the program theory underlying the one-to-one laptop program in this school.

An important ethical consideration for all studies is fidelity, the obligation of researchers to keep their promises, to be honest, and to do what was agreed (Kitchener, 1984). The author modeled the ethical principles of fidelity by staying with the agreed upon research plan, being punctual for meetings, keeping information and interview responses confidential, and respecting participants choices.

Research Questions

The research questions investigated by this author were:

1. How do tenth-grade students at Newtown High School perceive their academic self-efficacy,

2. Is there any change of students' perceived self-efficacy from eighth grade to tenth grade?
3. Do students describe a connection between using the MacBook laptop and their academic self-efficacy?

Selection of Site and Participants

Setting. This study was conducted at Newtown High School, (pseudonym) in New Hampshire. In 2011, ninth through twelfth grades were in full attendance reaching an enrollment of 700 students. There were 183 tenth graders attending NHS. Each student was given a personal MacBook laptop computer for use throughout the four years at school.

Selecting student participants. At the outset, the author's was looking for a small sample size that could represent the sophomore class, and 9-10 % was used, resulting in 16-18 numbers of participants. The goal for participants in the study was to have an equal number of girls and boys. The author wanted participants who were as close as possible to their middle school experiences where they did not have school-provided laptops. The author also wanted participants who had at least a year's experience using their laptops, and so sophomores were chosen. In the end, 15 of the participating students were in attendance at NHS in their freshman year, and had the year's experience with laptops. One student spent ninth grade elsewhere and had 3 months use of the laptop use when interviewed for this study.

According to Merriam (1998), the most appropriate sampling strategy for qualitative research is purposeful. As seen in Table 1, there are several types of purposeful sampling used for different sampling outcomes.

Table 1

Types of Purposeful Sampling (Merriam, 1998)

<u>Type of Sampling</u>	<u>Definition</u>
Convenience	Based on time, money, location and availability
Maximum variation	Wide variance, great diversity in sampling
Snowball, chain, network	Participants refer others, who refer others
Theoretical	Evolving process guided by theory that emerges from the data
Typical	Reflects the average person, or site
Unique	Includes atypical or rare attributes

Note. Adapted from Merriam, 1998, p. 62-64.

The author used a purposeful sampling process (Merriam, 1998) to obtain a range of student diversity. She met with the Director of Guidance and the School Principal to outline the initial criteria for student selection. The author requested that the list include students from the top, middle and lower spectrum of the class, based on the statewide test scores and grades. Out of a total of 16 students, the plan was to have 10 students in the average range and three in the upper range and three in the lower range. Since 68% of the population is represented around the average using a bell

curve, the researcher started with a sampling to mirror that measure of central tendency. The request also specified that students were in attendance at NHS for freshman year. The Guidance Director returned a list of 16 students who met the criteria.

The Guidance Director, with over 20 years of public school experience, reviewed the student profiles for the sophomore class and selected a group of students according to scaled scores from the statewide test taken in eighth grade. High school students in New Hampshire do not take the statewide test until junior year, so scores from eighth grade had to be used. The Guidance Director also looked at the grade point average (GPA) at the end of ninth grade to determine which students to select. The Guidance Director contacted the initial group of 16 students and gave them the packet of materials that described the study. This packet included the Student Invitation Letter (Appendix A), the Student Registration Form (Appendix B), and the Informed Consent Form (Appendix C).

The author met with the initial group of students in early November 2011 to explain the project and review the Informed Consent Form. Out of the 16 who were contacted, ten students came to the meeting. Out of the ten students who attended the meeting, seven students participated in the study. Two students never turned in their informed consent forms, and one student did not participate because the parents did not want him to. The Director of Guidance continued to contact the initial group of remaining students who did not attend the meeting with the author. The Guidance Director reviewed the sophomore roster and contacted several more students, targeting them for diversity. Out of the initial pool of 16 students, 11 students participated in

the study. The Guidance Director sent out a last broadcast email to the sophomores, and five more students signed up for a total of 16. Though the goal was to obtain a typical sample, due to issues of availability, in the end, the 16 students who agreed to participate were a convenience sample that was not completely representative of their class. Most participating students had levels of academic performance that are above average for their class.

The author offered an informational meeting for parents during the November open house being held at Newtown High School. She was available for two hours and no parents came to the meeting. On the Informed Consent form and the Student Invitation Letter, she listed her personal contact information such as telephone and email addresses. The parents did not seem to have any concerns about the research study, as they all signed the informed consent without any questions.

A limitation to the self-selection process used in the study resulted in participatory group with limited academic diversity. Of the 16 participating students, nine were female and seven were male. The majority of students participating were average to above average students. Eight of the 16 students were taking honors classes with full schedules. The Director of Guidance tried to target some of the students in the below-average range, but they did not volunteer for the study. It took a lot of effort to get the final 16 students, and the range of student abilities was not as diverse as initially planned.

Data Collection Principles

When collecting data, Yin (2003) suggests that each researcher follow three principles to help validity and reliability. The first principle is to use multiple sources

of evidence (Creswell, 2003; Merriam, 1998; Yin, 2003). Using multiple sources helps in the development of converging lines of inquiry, or what is known as triangulation (Creswell, 2003; Merriam, 1998; Yin, 2003). Collecting data from multiple sources is aimed at corroborating the same fact or phenomenon and adds to construct validity (Yin, 2003). This study had multiple sources of evidence: student interviews, student work, and questionnaires; therefore, the data was triangulated for reliability.

The second principle according to Yin (2003) is to create a system to collect and organize the data (Yin, 2003). This helps increase the reliability of the case study and can be used for the raw data before writing the final narrative. Notes should be organized, categorized, complete and available for later use (Yin, 2003).

Maintaining a chain of evidence is the third important data collection principle according to Yin (2003). This also increases reliability of the information by allowing an external person to trace the initial data sets to the final conclusions (Yin). The author created a file containing the evidence from each participant so all the information was retrievable while developing the program theory.

Data Collection

The author collected data for this research study during the first semester of 2011, from mid-November to mid-December, at Newtown High School. She obtained written permission from the Superintendent and Principal of the school to be in the school, interview students, and obtain student and parents' names. In the course of the interviews, the author protected the privacy of the students by not sharing identifiable information with other students, or staff. All other collected data was kept in a secure

location at the author's home.

The students who participated were interviewed during the months of November and December 2011. The researcher met students during their study period or during an advisory class, which is non-academic time. In the case where a student did not have any free time during school because of a full schedule, the interview took place before school started.

In order to protect the identification of student responses, the author assigned a number to each student, and then a corresponding fictitious name. These names are used throughout the reporting to give the quotes more meaning to the reader.

Additionally, in order to give the reader more context, the demographics of the school district was analyzed.

Data collection events. In addition to speaking with the Principal and Director of Technology to obtain information about the one-to-one laptop program, there were four events in this study that corresponded to the data collection process (a) document review, (b) student questionnaire, (c) student interviews, and (d) student work evidence.

Document review. Document review is used to augment and corroborate other data sources (Yin, 2003). The author investigated what was written about the one-to-one laptop program in the high school program of studies. She also reviewed the meeting minutes that contain information on the design of the one-to-one program at NHS. She reviewed documentation about the orientation that was given to parents and students before school started. This was when students were given laptops, and parents were informed of the expectations for use and care.

Student questionnaire. Each student began the interview process by taking the Student Questionnaire about perceived self-efficacy (Appendix D). The researcher read the directions and reviewed a practice question having to do with how capable students felt about lifting objects, as suggested by Bandura (2006b). The Student Questionnaire asked students about their perceived self-efficacy in academic subjects, self-regulated learning, and laptop use.

Student interviews. According to Stufflebeam and Shinkfield (2007), interviewing is used to “unravel the complexities of a program” (p. 318). The reason to interview students is to get the students to use their own language and words. Since it is impossible to observe mental perceptions directly, asking probing questions to help students voice their thoughts and perceptions is a helpful technique (Creswell (2003).

The most common way to obtain information in a qualitative study is through interviewing participants. Interviews are conducted when the researcher wants to find out things that cannot be observed. Interviews can be highly structured, semi-structured or informal according to Merriam (1998). Highly structured interview questions are predetermined and standardized and used when socio-demographic information is needed (Merriam, 1998). Less structured interviews include more open-ended questions in order to capture the respondents’ unique perspectives (Merriam, 1998; Yin, 2003). Informal interviews are done when the researcher is exploring and there are no pre-determined questions (Merriam, 1998).

The author used a semi-structured format, with a mix of closed- and open-ended questions about accomplishing schoolwork and using the laptop computers, as

seen in the Student Interview Protocol (Appendix E). This allowed the respondents to use their own words when talking about their academic self-efficacy and experience in the one-to-one laptop environment. At times, the author posed related questions to elicit further elaboration from the students. The author was cognizant of interviewing methods and ethics. According to Merriam (1998), researchers must avoid jargon, leading questions, multiple questions, and yes or no questions during interviews.

These interviews were approximately 15-20 minutes long, and individually scheduled during a student's non-academic periods such as study, lunch, advisory, before or after school. According to Stufflebeam and Shinkfield (2007), it is essential that the participants understand the purpose of the interview. The author took time before each interview to put the student at ease by reviewing the purpose of the interviews and initiating small talk to elicit a personal connection with the student. The author used a digital tape recorder and took notes for each response. After the sessions, the author transcribed the interviews within one or two days of the interview, to ensure accuracy.

Student work evidence. According to Patton (1990), "multiple sources of information are sought and used because no single source of information can be trusted to provide a comprehensive perspective" (p. 244). As students talked about their self-efficacy, it was important to see examples or evidence of their perceptions to get a full picture of what they meant in the interviews. Participants were instructed to provide two examples of their work that demonstrated their beliefs about their capabilities as students. They were asked to email the samples to the researcher or to give copies to the Guidance secretary. Students emailed documents, PowerPoints,

iMovies, and brochures to the author. Three of the students wrote short descriptors of why the pieces were chosen.

Data Collection Instruments

Validity. Albert Bandura's *Guide for Constructing Self-Efficacy Scales* was an important resource for creating interview questions and strengthening construct validity (Bandura, 2006b). Two of the nine subsections of Bandura's *Children's Self-efficacy Scale* were used in the student questionnaire (Bandura 2006b). The subsections that were used verbatim were (a) Self-efficacy for Academic Achievement, and (b) Self-efficacy for Self-Regulated Learning (Bandura, 2006b, p. 326). These were the two subsections that related to the qualitative study. The author was not focused on the other self-efficacy areas in the Bandura's *Children's Self-efficacy Scale* such as leisure time, use of resources, social skills, peer pressure, and enlisting parental support. The subsections used were taken verbatim, and were used with the rating scale of 1-100 as recommended by Bandura. Since the focus of the questionnaire was to gain insight about individual ratings, and average ratings of the group in only two areas, using the two subsections did not invalidate the results. The author did not intend to draw any conclusions about the *Children's Self-efficacy Scale* itself.

Reliability. A familiar term found in test construction, reliability is the notion that the "operation of a study -such as the data collection procedures- can be repeated with the same results" (Yin, 2003, p.34). The aim is to minimize errors and biases in the study. Interview protocols were used as a way to overcome reliability problems. Yin (2003) suggests that it is important to document study procedures so the chain of

evidence can be followed. This was done in order to trace the development of the program theory from start to finish.

Context of student interviews and questionnaires. The study was designed to explore the participants' thoughts and perceptions of their current academic self-efficacy, as well as any changes they perceived from middle to high school. Albert Bandura (1977; 1986) notes that while self-efficacy is domain-specific, it is also task- and situation-specific; therefore, it is imperative that one knows what is being measured. Bandura contends "scales of perceived self-efficacy must be tailored to the particular domain of functioning that is the object of interest" (2006b, p. 308). It was important to understand how self-efficacy scales were created, and what makes them effective in designing the questionnaire for this study.

According to Bandura (2006b), when designing an interview or a questionnaire, the items should reflect the student's perceived capability of the task. The student questionnaire had content validity since the author used Bandura's *Children's Self-efficacy Scale* (2006b). The student questionnaire measured what it intended, perceived capabilities. The questions were phrased as "can do" rather than "will do" because "can" is a judgment of capability and "will," means an intention (Bandura, 2006b). Experts also warn against confusing the construct of self-esteem, which is associated with self-worth, not capability (Bandura, 2006b; Bong, 2006). Perceived self-efficacy is the judgment of capability one makes about executing a certain performance. Interview questions cannot be confused with outcome expectancies, which are "judgments about the outcomes that are likely to flow from such performances" (Bandura, 2006b, p. 309). A comprehensive questionnaire should

encompass questions that are linked to the behaviors over which people have control. In the academic realm, the students have no control over what the teachers do, but the students can control their responses and actions relevant to completing assignments, behavior in class, and studying.

One of the key elements in effective assessment of self-efficacy beliefs is the use of gradations of challenges to successful performance (Bandura, 2006b). Scales should not be an all-or-nothing judgment of one task. The difficulties of a task should be presented in gradations to uncover what makes it hard for people to perform a task regularly (Bandura, 2006b). For example, questions about academic self-efficacy were broken into several subsets, such as math, algebra, and social studies, so as to ascertain what particular area was a challenge to a student.

When designing questionnaires for students about self-efficacy, response scales should be unipolar ranging from zero to a maximum strength, usually 100, in ten point gradations (Bandura, 2006b). Students are asked to make judgments about their capabilities in the present time, not their potential or expected future capabilities. To make sure students understand how the rating form works, the questionnaire should start with a practice item so students can experience how to rate the answer using an example of “lifting objects of various weights” (Bandura, 2006b). According to Bong (2006), the question that needs to be asked of students is, “How confident are you that you can successfully perform these tasks?”

Student questionnaire. The Student Questionnaire (Appendix D) that was used for this case study included self-efficacy items of academic achievement and self-regulated learning, from Bandura’s *Children’s Self Efficacy Scale* (Bandura

2006b, p. 326). Using Bandura's guidelines, the author created other items designed to elicit responses about self-efficacy for laptop use. The items identified in the Self-efficacy for Laptop Use section were tasks associated with the routine use of laptops in the high school. This questionnaire demonstrated the how capable students thought they were doing the items on the scale.

Interviews. All interviews were conducted in a small office with the student seated across from or next to the author. The author started with an introduction and told the students what to expect with the questionnaire, interviews and follow up. All interview questionnaires were recorded without the student's name on the recording. The author assigned a number for each student and later a pseudonym name was assigned. A number designated students, so as to reduce any effects of social evaluative concerns. Only the author knew who was linked to each number. The interviews were scheduled for days without scheduled summative assessments, publishing of report cards, or major disruptions.

The purpose of the interview was to get a sample of what students at NHS think about their self-efficacy. The questions that were asked in the interview were intended to prompt students to think about themselves as students, and their participation in the one-to-one laptop program at Newtown High School. The student interview questions are shown in the Student Interview Protocol in Appendix E.

Self-efficacy. Questions about students' capabilities as learners were asked, since the focus of this case study is academic self-efficacy. Three questions were asked to inquire about the perceptions they had about themselves as students in eighth, ninth grade, and tenth grade. The researcher was interested to know if there were any

differences in self-efficacy ratings from middle school, and what, if any, students identified as the reasons for that difference.

Laptop connection. In order to ascertain if students make any connection between laptops and self-efficacy, five questions were asked during the interview. The degree to which students feel capable can influence their motivation, and performance of specific tasks (Bandura, 2006a). Students were asked to describe how they use the laptop during a typical day at school to reveal the extent the laptops are being used, and for what purposes. Students were asked to describe if there were any specific classes where they thought the laptop had helped them become better students, and to give examples. Students were asked if they believed the laptops helped them become a “less, same or better” capable student and the reasons why. The last question asked for students to summarize if the laptop made a difference in their academic life.

Environmental factors. Bandura’s Social Cognitive Theory (1986) emphasized that cognition plays a vital role in people's capacity to achieve. Bandura’s *Reciprocal Determinism Theory* (1986, 1978) identifies the dynamic relationship between personal (cognition), environmental, and behavioral factors in the development of personal agency. The author asked questions to ascertain what students thought about their school environment. The research study asked students to comment about the environmental factors in their school experience to see what themes emerged. Specifically, students were asked, “Is there anything that makes Newtown High School a good school?” This was asked to ascertain what, if any, themes developed. Additionally students were asked to comment on their eighth, ninth, and tenth grade experiences, to see if they revealed any environmental factors.

Mastery. According to Bandura (1994,1986) successful experiences improve self-efficacy, and failures lower self-efficacy. The strongest source of self-efficacy is the history that people have with personal successes, or mastery experiences, and failures (Bandura, 1994, 1986). As Bandura (1986) theorized, the degree a person has succeeded or failed in an experience plays a role in the development of self-efficacy. As background information, students were asked to describe their feelings about learning they would be given a laptop, in order to get a sense of their anticipation and preconceived notions, as they entered the high school. In order to identify if any technological barriers existed in using the laptops, students were asked how hard or easy it was for them to learn to operate it. It was important to know if students' mastery for using laptop is low or high in creating this groups' description.

Mastery experiences also include accomplishments and grades that students are obtaining in school. Since mastery experiences are so important to the development of self-efficacy, a question was asked of students to describe an accomplishment they have had at high school. Students identified an accomplishment, a mastery experience in order to see what themes emerged, and if the laptop played a role in that experience. Since learning outcomes are associated with grades in school, a question about grades was asked of students. Students were asked if “they are getting worse, same or better grades than they did in middle school, and explain why.” These mastery experiences described by students were analyzed for connections to the laptop program.

Data Analysis and Interpretation

Data analysis is the process of taking the multiple data sources and compiling them into categories of meaning. Merriam (1998) describes it aptly as a metamorphosis. Rubin and Rubin (2005) describe it as “classifying, comparing,

weighing, and combining material from the interviews to extract the meaning and implications, to reveal patterns, to stitch together descriptions of events into a coherent narrative” (p. 201).

Types of strategies. According to Merriam (1998) and Creswell (2003), there are four data analysis strategies commonly used in educational research: ethnographic, narrative, phenomenological and the constant comparative method.

Ethnographic analysis looks at all the data sources from a cultural viewpoint, and condenses the data with less concern of theory (Merriam, 1998). Rich, thick descriptions are usually the defining characteristic of ethnographic studies. Themes and issues usually emerge in ethnographic analysis (Creswell, 2003). The author was not focused on creating a rich description of the laptop program, so this analysis was not used

Narrative analysis is used when researchers study the experience through stories. First-person accounts are transcribed and the researcher analyzes the language and interprets it through a specific perspective (Merriam, 1998). Although students were asked to give their perspective, the interviews did not result in stories so narrative descriptions were not used.

Phenomenological analysis is a process where the units of data are analyzed to develop and describe the “essence” of the phenomenon (Creswell, 2003; Merriam, 1998). Researchers must bracket or remove their prejudices and assumptions in order to see the experience. Imaginative variation is used to see the phenomenon from different viewpoints (Merriam). The author was not trying to capture the essence of the one-to-one laptop program, so this approach was not used.

Constant comparative method was developed by Glaser and Strauss in 1967, and is used as part of developing grounded theory (Merriam, 1998). Researchers code data units and constantly compare the data sets with other data sets, which leads to categories that are then compared with other categories (Creswell, 2003; Merriam). This constant comparison ultimately leads to conceptualization of a theory. In this qualitative study, the author used the constant comparative method in order to develop themes and a description of student's self-efficacy experiences in the laptop program.

Preparing the data. The documents were gathered, and the interviews were transcribed, and the preparation of the data analysis began. The researcher assigned a code number and pseudonym for each student who participated. Each interview was transcribed into recognizable conversations. The author then created a matrix of student responses, all 16 answers to question number one were in one document, and all 16 answers for question two were in another document, and so forth. During data analysis, the author protected the anonymity of the participants.

Getting an initial sense of the data. According to Creswell (2003), it is important to get a general sense of the data before any in depth study is conducted. At this stage, the researcher is trying to get a sense of the meaning of the interviews, the general impression, and the credibility of the data (Creswell, 2003). As ideas or thoughts came up, the author wrote notes in the margins of the document. This was the beginning the coding process.

Coding the data. The author used a qualitative content analysis process where the "materials are analyzed, described as closely as possible and processes and trends are noted" (Stufflebeam & Shinkfield, 2007, p. 316). This is how researchers in a

qualitative design “organize the material into “chunks” before bringing meaning to those “chunks” (Rossman & Rallis, 1998, p. 171). Text was labeled and categorized with a term based in the actual language of the participant.

The researcher followed a coding process provided by Tesch (1990), which included:

- (a) getting a sense of the whole;
- (b) picking a document and asking, “what is it about?” and writing some thoughts in the margin;
- (c) clustering similar topics together and forming these topics into columns of major topics, unique topics and leftovers;
- (d) abbreviating the topics as codes and writing the codes next to the appropriate segment of the text, as a start to a categorizing system;
- (e) refining the system by using descriptive words for the topics and turning them into categories. Reducing the lists by grouping topics that are similar, and drawing lines between categories to show relationships;
- (f) making final decisions on the abbreviations for each code and alphabetizing them;
- (g) performing a preliminary analysis, by putting the data material belonging to each category in one place and summarizing the content, looking for commonalities, contradictions and missing data;
- (h) recoding the existing data, if needed. (Tesch, 1990, p. 142-145).

Since there were only 16 interviews to code, the author did it manually, rather than using a software program. The author developed a color-coding system to aid in

the analysis. She looked for topics that were expected, such as perceptions of academic self-efficacy, but was also open and looked for topics that were surprising.

Developing descriptions. According to Creswell (2003), the coding process is used to create a “description of the setting, people, as well as categories or themes and developed a code book for themes for analysis” (p. 193). During this step, a detailed account of information about the students, and the setting is created. Once this is done, coding is interpreted into themes, and these themes will appear and be discussed in the major findings section. The themes are reviewed in individual cases, as well as, in a collective perspective.

Reporting the findings. Information from the student interviews and student evidence was categorized and then synthesized into several themes. The author identified and discussed the themes and in the presentation of data and in the findings narrative.

Chapter Summary

Qualitative research focuses on phenomena in context and seeks to understand the meaning that individuals have constructed in the social world (Creswell 2003; Merriam, 1998). The study conducted at Newtown High School is heuristic in nature, as the outcome is to better understand the students’ perceived academic self-efficacy in the context of the one-to-one laptop program. The focus of the research was embedded in the real-life context, and in this situation, the one-to-one laptop program. The author chose to approach this qualitative study through the lens of program theory development.

The author has fully reflected on her role as a researcher and was mindful of

conflicts of interests, bias, and ethical considerations in working with students.

Student selection was done through a purposeful sampling method using a convenience sample. Informed consent from students and parents was obtained before any data was collected.

The author followed principles of data collection as expressed by researchers such as Yin, Merriam, and Creswell. The author used ethnographic data collection strategies and instruments including questionnaires, document reviews, and interviews to capture how tenth grade students at Newtown High School perceived their academic self-efficacy, and any changes they perceived since middle school. The questionnaire and interviews were designed using a researched-based resource: Bandura's *Children's Self-efficacy Scales* (2006b) to ensure construct validity. Interview questions were designed to elicit responses about students' self-efficacy, laptop use, school environmental factors, and mastery experiences.

The constant comparative method of data analysis and interpretation was used to uncover themes in the development of program theory. The author used steps of coding as provided by Tesch (1990), and created a matrix of student responses that was used for data analysis. The themes that emerged and data interpretation are explained in Chapter 4, Findings and Data Analysis.

Chapter 4: Findings and Data Analysis

Data analysis is a continual process of reflection about the data, asking critical questions, jotting down notes in the margins, and being open to ideas that emerge from the data (Creswell, 2003; Rossman & Rallis, 1998). This is where meaning is made from the findings. Through a qualitative study, the author investigated the themes that emerged from students' perceptions of academic self-efficacy and the phenomenon of a one-to-one learning environment.

Validating the Accuracy of the Findings.

Validity is “determining whether the findings are accurate from the standpoint of the researcher, the participant, or the readers of an account” (Creswell 2003, p. 196). In order to get validation of findings, the author employed peer examination. Merriam (1998) and Creswell (2003) advocate using peer examination as a way to check internal validity. According to Creswell, the peer “reviews and asks questions about the qualitative study, so the account will resonate with people other than the researcher” (Creswell, 2003, p. 196). The author's dissertation committee acted as peer reviewers.

Participant Demographics

This study occurred in a small town in New Hampshire, and the results will not be able to be generalizable to the nation as a whole. In order to obtain a description of the students who were in the study, the author analyzed several pieces of data. She reviewed their class schedules, grades, grade point averages, and Statewide tests

results. As a group the participating students are considered above average. This demographic information is important to include because while the students are a sample of the school, they are not a representative sample of the school or State, as a whole.

The 16 students are all sophomores, in tenth grade, with nine females and six males. Fourteen students are 15 years old, and two are 16 years old. One student was identified for special education services. Of the 16 students, 14 attended Newtown Middle School before they came to Newtown High School. One student was homeschooled, and another moved in from a nearby town. One student spent the ninth grade year at a neighboring Catholic School, while the rest attended Newtown High School for ninth grade.

Academics. Although the school has equipped their students with 21st Century tools such as the laptops, they still rely on a traditional, modified block schedule for organizing instruction. The schedule at Newtown High School allows for seven class periods and an advisory class. Most students at Newtown High School take six classes and one academic study. According to individual student schedules, each student in the study is carrying a full class load with six classes, an academic study, and an advisory period. Fifty percent of the participating students take at least one Honors Class, indicative of above average students. Students thought it was important to take challenging classes for preparation for college.

Grades and grade point averages. The author reviewed the grades of the students at Newtown High School (Appendix F). There were 12 students who gave the author permission to obtain their grades and GPA. The author chose to review the

grades in the American Studies class because it was common to all sophomores. This class is an integration of an English and Social Studies class. The math grades were also included since all students took a math class.

The average grade in American Studies for the participant group was a B, which was also the average grade for Math. There were three As, seven Bs, one C, and one D for American Studies. In math, there were five As, five Bs and two Cs. Five students were taking Honors American Studies (Appendix F).

Grade point averages (GPA) are calculated by converting numerical grades to points based on a table provided by Newtown High School in their Program of Studies (Appendix G). These scores were provided to help provide a descriptive picture of the students who were in the sample. Twelve students gave permission to obtain their GPAs. The average GPA for the group was 3.50, or in the B range, above average.

Statewide testing scaled scores. Students in New Hampshire take the Statewide test during grades three through eight, and 11. The New England Common Assessment Program (NECAP) tests students in math and English/Language Arts. Since the participating students were sophomores, the most current NECAP scores were the eighth grade test scores. Eleven students gave permission to obtain their NECAP scores. These participating students performed in the proficient or advanced level on the statewide test. The performance on the NECAP is consistent with their grades.

Coding Process

The author collected information about self-efficacy through two explicit methods (a) the Self-efficacy Questionnaire, and (b) specific questions during the

interviews. The complete interview was comprised of 15 questions (Appendix E). The author reviewed each student's transcript with all 15 interview questions. Additionally, the author created a separate matrix for each interview question asked. Each student's response for an individual question was copied into the matrix; so all 16 student responses for a specific question could be studied together.

The author coded the responses for each question matrix. The coding descriptions (Appendix H) were created ahead of time and amended as new categories emerged from the data analysis. As a starting place, the items presented in Bandura's *Children's Self-efficacy Scale* for (2006b) self-regulated learning (Appendix D) were used as broad categories for coding purposes. As other themes emerged that were not included on Bandura's Scale, the author identified them and reviewed the responses for that particular theme. The results of this qualitative analysis are presented in the following sections (a) personal factors, (b) behavioral factors, and (c) environmental factors which correspond to Bandura's (1978) *Model of Reciprocal Determinism*. The Coding Notebook (Appendix I) is an example showing the types of responses student gave.

Personal Factors

According to Bandura (1978), internal personal factors include cognition, biological feedback and affective emotions. These personal factors of the mind are integral in how we interact with our environment and how we behave in the world. What people think about their capabilities and self-efficacy beliefs are situated in this part of the triad (Bandura, 1978).

In this section, the participants' thoughts or beliefs about several areas are

presented. Current self -efficacy perceptions, as well as what the participants thought about their eighth, ninth and tenth grade self-efficacy are discussed. The second topic focuses on the participants' beliefs about the connections between the laptop use and their perceived academic capabilities. The third area presents the feelings the students had in learning they were going to be getting laptops. The last area deals with the participants' thoughts about what they considered an accomplishment and whether the laptop played a role in that success.

Self-efficacy. All 16 participants took the Student Questionnaire (Appendix D) that was designed to determine the students' current perceptions of their self-efficacy in three areas: academics, self-regulated learning, and laptop use. The author did not use Bandura's *Children's Self-efficacy Scale* (2000b) in totality because many of the subsections did not align with the research questions. The items for self-efficacy for academic achievement and self-regulated learning came from the corresponding subsections of Bandura's *Children's Self-efficacy Scale*, (2006b). The author created the questions for self-efficacy for laptop use, based on Bandura's *Guide for Creating Self-efficacy Scales* (2006b). The author also had conversations with the Principal and Guidance Director about the computer skills required of students in NHS in order to determine specific items.

Several interview questions dealt with the participants' self-efficacy beliefs during eighth, ninth and tenth grades. The questions asked students to talk about their experiences in eighth, ninth and tenth grade, respectively. Three questions asked students to rate how capable they believed they were in eighth, ninth, and tenth grade, and using Bandura's scale of 0-100. These ratings are presented in table format in

Appendix J. These questions were asked as another way to check the participants' current academic self-efficacy, and to explore whether students had any changes of their perceptions from middle school to high school. The students were also asked to explain the reasons why they rated themselves a particular way in order to obtain their own words about their capabilities.

Self-efficacy for academic achievement. The participants rated themselves in the high range for self-efficacy on the subsection of academic achievement, as seen in Appendix K. As a group, the students averaged a rating for academic self-efficacy of an 85, on the scale of 0-100.

Students rated the highest confidence in using computers. This item received an average of a 93. Confidence in reading and math also ranked a 90. The lowest rating was the item asking them about learning a foreign language, which received a score of a 69 (Appendix L).

Students were confident about their academic self-efficacy in most of the core academic subjects. Scores relating to mathematics, reading, writing, science, English, and Social studies were above an 80. The subject that they had the lowest efficacy score was in learning a foreign language. Looking at the students' schedules, two were taking Spanish I, seven were taking Spanish II, and two were taking Spanish III. One student was taking Latin I, and three were taking Latin II. Of the four students who rated the foreign language question a 50, three were in Spanish II and one was taking Latin I.

Eighth grade. The average rating for self-efficacy in eighth grade was 94. Participants spoke about a common theme of school workload and academic content,

when describing their school experiences. In eighth grade, students said they felt confident with the workload and content (Appendix J). Students validated how confident they felt in eighth grade doing eighth grade work through their quotes. All participants were given pseudonym names for reporting.

The interviews revealed that students believed they could handle the eighth grade content. Carl said, "I think I had good preparation. I thought seventh grade was the hardest. I thought eighth grade was a little easier and the teachers really did a good job in preparing us for the high school." George explained, "The only reason that kept me from completing work, is my procrastination. I had no problems completing the work or understanding the concepts, it's just procrastination, getting around to it in time." Kathy revealed, "It was not a very difficult year in general, I mean I never really had problems finishing homework or anything. The content wasn't very difficult." Ali said, "I felt like I could do most of the assignments, some of them were hard, but I felt like it was pretty good." Emily remarked, "the teachers were helpful, and the work wasn't very hard." Ike said he "never seemed to struggle in eighth grade." Molly explained that the "teachers were very clear about their instructions so I knew exactly what to do and how to do it." Penny expressed, "I felt I was capable of doing most of the work. Sometimes, it was a little hard balancing sports and stuff, but most of the work was pretty easy for me." Obviously, these students had high self-efficacy during their last year in middle school.

Ninth grade. The average of the ninth grade year was rated as 84 (Appendix J). The interviews showed that half of the participants thought the workload and content got harder at high school. Carl shared, "It was great, I was on the high honor roll.

There was a lot more to do and workload was a lot, but I felt that my time management skills really helped me to do all the work.” He added, “There’s a lot of work to do in high school, and it’s not so much the subject matter, but it’s the physical amount of work’s that hard.” Becky said, “When I first got into ninth grade, it wasn’t that hard, but as the year went on, it got harder, but I didn’t get all straight A’s, I just got A’s and B’s.” Emily thought, “It was a rough year, I did like it a lot though, hard because it was a big step from middle school.” Penny remarked,

I had to get used to doing the workload. The beginning took a little getting used to and high is much different than middle school, so it’s like more sports, more basically everything, but after you get used to it, it is much easier.

Len said, “It was much different. It was harder, but I wouldn’t say it was terribly bad. I actually really enjoyed last year.” These students thought the workload and content got harder at high school, which affected their self-efficacy.

Tenth grade. The average ranking of the perceived self-efficacy in the tenth grade was 85 (Appendix J). Participants used words similar to ninth grade to describe their tenth grade experience. One participant said, “I don’t like it as much as I did ninth grade. It’s a lot more work.” Carl mentioned, “There’s a lot more pressure, but I’m making it work.” Penny concluded that,

This year is much harder than it was last year. I’m taking Honors classes, and last year, I didn’t take Honors classes, so I feel like I challenged myself a little bit more, which is a good thing, but it takes harder work to accomplish the grades I want to get.

Emily stressed, “Some of the classes are harder.” Carl said, “it’s just that physically,

there is more work and it is a lot harder.” Olive remarked, “Some of the essays we’ve had to do are a lot more and a little difficult than we’ve done in the past.” She added, “More is expected in general because you are not new to the school anymore.”

Students in tenth grade continue to feel the pressure of increased work at high school.

Change in self-efficacy from eighth grade to tenth grade. The change or difference in perceived self-efficacy between eighth grade and tenth grade was lower by 9 points. (Appendix J). Most students rated their self-efficacy lower in tenth grade than in eighth grade. Students talked about the theme of increased workload and content at high school. Frannie shared, “I know I am capable for getting all my work done on time and everything, and I just push myself to make sure I have all my work done.” Kathy spoke, “It’s a lot more homework and stuff, and getting stuff done is a big thing. I mean, I am capable of it, and also the content this year- I’m really being more challenged.” George said he was “focusing more on my schoolwork and not procrastinating, and getting it done.” Students identified some classes in which they have some struggles, such as, Honors Biology, Latin, Honors Chemistry, Pre-calculus, Spanish, Geometry and American Studies.

Bandura demonstrated that self-efficacy beliefs are powerful determinates of achievement outcomes (Schunk & Pajares, 2005); therefore, one of the interview questions focused on the change of grades that students received from eighth grade to tenth grade. From the student’s perspective, academic outcomes are most often associated with the grades, which the interviews supported. Students were asked if they got “worse, same or better” grades in tenth grade than they did in eighth grade. This question was asked to get more information about how students perceived their

learning outcomes (grades) from middle to high school. The students were asked to talk about the reasons for any changes in grades from middle to high school.

Thirteen students responded that they were getting the same or better grades now than they did in middle school. Most of these student commented that they were more focused on grades, the work was more tailored to them, they were trying harder, and they were more connected to their teachers. Molly, said “ In high school, I think I focused more about classes for my life, pretty much for college. I really want to focus more. Penny explained,

I think I get better grades than I did in middle school. I think in high school I started trying much harder. I felt like I am much more focused on my grades than I was. I am a little more mature in school that I was in middle school.

George remarked, “Better, because the classes are more tailored to what I need. I felt like I would get bored before. I think that is what happens, I get bored with the class and then I don’t do the homework.” Olive said,

Better. In eighth grade I was still achieving honors, but I feel the laptops have helped me with the learning. Being able to connect with the teachers, so now it has increased my learning ability. So, now I’m able to achieve close to high honors.”

Molly responded, “Better. I’m not 100% sure, but I think it is because I have better communication with my teachers, and I’m more apt to ask questions.” Kathy explained,

Similar, because in middle school, it was kind of like I just went through without really thinking about my grades. It was like if you try, you get all A’s.

But in high school, I have started to pay a lot more attention to it, so while some classes are getting harder, I'm getting better grades in some classes because I'm paying more attention to getting the best grade that I can. While in other classes, they are harder, so I get slightly less grades.

Olive added, "I get about the same grades. I definitely think here at Newtown, the technology make a big difference because you are using that through your day, instead of using it occasionally like we did at middle school."

Three students who revealed their grades were lower in tenth grade identified the harder work at high school as the reason for the lower grades. Len responded by saying "... I definitely don't get better grades, though. I find it harder here." Ike expressed, "Probably a little worse, they're not far off, but I say they got a little worse. The work is harder, and there's more going on." Dan said, "I don't really remember the grades I got in middle school. I think I did a little better in middle school because the work is a little harder here."

Participants experienced a 9-point drop in academic self-efficacy ratings from eighth grade to tenth grade; yet, most of the students believed they were getting the same or better grades.

Self-efficacy for self-regulated learning. It was important to also determine the students' perceptions of their self-efficacy for self-regulation. Self-regulated learning means "self-generated thoughts, feeling, and actions that are planned and cyclically adapted based on performance feedback to attain self-set goals" (Zimmerman & Cleary, 2006, p. 56).

Students answered questions (Appendix D) taken from the self-regulated learning subsection of Bandura's *Children's Self-efficacy Scale* (Bandura, 2006b). Items about planning, organizing, concentrating, and completing work are associated with self-regulated learning. The results of the ratings are presented in table format in Appendix M.

As a group, the students averaged a rating of an 86 in a scale of 0-100. Students rated themselves very confident, above 90 on three items of finishing their homework assignments, organizing their schoolwork, and planning their schoolwork for the day. The three items for which the students had the lowest ratings were: arranging a study place without distractions, remembering information from class and texts, and using the library (Appendix N). The students' lowest average rating, as a group, was a 73 for using the library to get information for class assignments. Seven of the students ranked this item as a 90 or above, so they felt confident. The other nine students had an average of 53. This area might be worth further study, since there was a wide range of confidence ratings. Participants made other comments about self-regulatory skills, which will be discussed, under the behavior section.

Self-efficacy for laptop use. Students completed the Student Questionnaire about the third area, their laptop use. The questions are shown in Appendix D and were created by the author based on Bandura's *Guide for Creating Self-efficacy Scales* (2006b). There are established standards (NETS) about the computer skills required of students from the International Society for Technology in Education (2012), and the

school also had their own expectations. The author had conversations with the Principal and Guidance Director about the specific computer skills required by their school in order to identify rating items. The results of this questionnaire are presented in table format in Appendix O.

As a group, the students averaged a rating of an 89 in a scale of 0-100. This group of students perceived themselves to be very confident in using the laptop with ten out of 13 items receiving a rating of 90 or above. The students rated themselves high on using email for communicating with others, writing research papers and using presentation software such as PowerPoint or Keynote. The lowest average rating of a 59 was given for participating in a wiki or blog (Appendix P).

Software applications. During the interviews, students corroborated the self-efficacy ratings. Students believed they were confident about using the laptops for their schoolwork. They reported they used Microsoft Office software such as Word, PowerPoint, and Excel, which is the preferred package of the school. They reported they used Apple software such as Keynote, iPhoto, Pages, and iTunes with confidence. They used the laptops for taking notes, which was also evidenced in the interviews. Students felt less confident about creating podcasts, using Google calendar and participating in a wiki or blog. During the interviews, a few of the students spoke about using iCal or iProcrastinate as other ways to keep their calendars, indicating students were using a variety of calendar software programs.

During the interviews, seven students spoke about using Moodle, which is the course organization software used at Newtown High School. Students were confident in using it, with an average rating of a 97. One student who did not spend his freshmen

year at Newtown High School felt “completely lost” with using Moodle, the course organizational tool. Teachers at Newtown High School use a standard Moodle format to display their course syllabus, calendar, homework assignments, study guides, web links and other information associated with their course. Students can access it anytime and upload homework to the site.

The students’ averaged rank for using iMovie was a 97. During the interviews, seven students remarked that iMovie was their favorite application to use. They liked the interactive nature of it, and the presentation was engaging. Olive said “I like using iMovie and I like Keynote, also. It is a good way to make study guides and display information.” It is clear that this group of students has a high degree of confidence for using the laptop in school.

Personal laptop. Students were asked to describe how they felt when they learned that they would be getting a laptop for their personal use at the high school. This was posed as a way to identify their emotional perceptions of using the laptops before they got to high school, and to see if there were any preconceived ideas about the laptop. Only a few participants said they were nervous about it, mainly because they used PCs and were not familiar with Apple computers. Fifteen students used the word “excited” or “happy” at learning they would be given a personal laptop.

A majority of students commented about the personal nature of having “my own” laptop that made a difference. Ali spoke about “it is easier because I don’t have to write stuff on my own house computer, so it’s kind of my own, and I feel like it’s all my work, so I can maybe stay a little more organized with it.” Carl explained, “I was excited about getting my own laptop, and I thought it would be a big help. John

said, "Learning that I was going to have my own to be able to take home at night, really made it seem that much cooler to me." He added, "I've got the capability of having all my work on it through the years. It's just going to build up and become a greater and greater portfolio of my work and improvements that I've made." Emily remarked, "it's for myself now, and I can do all my work on it. I just feel there was so much off your shoulders, it's like more responsibility, but it's so nice to have one." Helen commented, "It really excited me because I wasn't used to getting something like that...I thought it would really help me because sometimes at home, people don't have computers so to get one of their own, helps out." Len explained, "It's not like I have a computer I have to share. It's all personal." Molly contributed, "I would just be able to have my own computer, where I could do all my school work on, and I don't have to worry about flash drives."

New opportunities. Five students were excited at what could be done with a laptop. Olive says "it gives us a lot of fun opportunities to do multimedia projects, where we're still learning information, but you get to present it in more interesting ways." Ike thought it would really help him because he could "take notes on the laptop, and I can type a lot faster than I can write, so I'll take notes on my laptop as much as I can." Dan thought it would help him so he "would not have to lug around all these textbooks because I'll have it on my computer." He also added, "I'll be able to do things that I wouldn't be able to do at home, because now I have a laptop." Becky started with a different opinion, "I didn't think it would make a lot of difference, honestly, I thought, Okay a laptop, but as the time went on, I realized how much it helps." She thought it would help her "record work, and do homework and if you're

absent, you can go to Moodle, and it has all the homework, and what you did for class work, so it is a lot easier instead of waiting until the next day.”

Connections between capabilities and laptops. Students were asked if they believed that the laptop makes them become a less, same or more capable student. This question was presented in order to capture if students perceived there was any connection with their academic capabilities, or their perceived self-efficacy, and the use of their laptops. This question gets to the essence of the research study.

Ten out of the 16 students responded that they believed that the laptop makes them become a more capable student. Six students felt they were the same capable student, regardless of the laptop. None of the students felt that the laptops made them less capable students.

More capable. The ten students who responded that they thought the laptop made them a more capable student presented a variety reasons. Penny remarked, “I’d have to say more capable, except for the times when if you like get a little bored in a class, and it’s sometimes distracting, but other than that, more capable to do things.” Becky said, “More capable. Organization and just keeping up with your school work, and you have a record of the stuff so you don’t lose it in your notebook.” Dan remarked, “Probably more capable, because it really helps me organize my notes when I study. I have everything right here, and it helps me to do better.” Frannie explained,

I say more and same, because without the laptop, we’d still be progressing as we are now, it would just be a little slower because we wouldn’t be looking online all the time, and we wouldn’t have the computers right here for us when we were doing projects or studying or something. If we didn’t have the laptops,

I know we would definitely still be learning, but the laptops do help us in different ways.

Nick shared, “More capable student, because it allows us to research things, that maybe the textbook doesn’t have, or gives us other applications to use to better expand our knowledge.” George expressed, “It [laptop] helps me become a better student in some ways because of communication, being able to check my homework and talk with people.” Olive answered the question by saying,

Well for me, a more capable student because it is a good way to keep me organized and have everything right there in one place, in files on the computer and stuff, better than sheets of paper in different folders. I think it is a good way to stay organized.

Ike said, “I say a more capable student. It really helps you with organization. You don’t have to worry about a ton of books. So, I say it makes me become a better student. It helps me study easier.” Molly mentioned, “More capable. It is easier to access our on-line Moodle classrooms so we are more up-to-date, and our homework and extra sources to figure out stuff.”

Same capability. Six students answered the question, “Do you believe the laptop makes you become a less, same, or more capable student” as the same. Ali thought,

Probably, the same. I don’t think it [laptop] has changed me that much.

Because I’m still putting the same work ethic in, and like I don’t know if maybe the laptops would make some people want to try harder, but I just keep the same.

Carl commented,

I have to say using the laptop educationally is really kind of equivalent to using notebooks. We're still learning new things and new skills, but it just helps us to keep a little bit more organized, so I guess I have to say I'm pretty much the same, but a little bit more organized.

John commented,

I would have to say the same. There are upsides to the laptops and downsides. Upsides, you never have to worry about losing a paper, unless a teacher gives it to us, and then I stick it right into my folders. The downside is there are some classes where it becomes a distraction, and the teachers have to keep saying to 'shut them' for some students. It will take away from the learning environment for everybody else in the whole.

Len commented, "I would say the laptop has its advantages and disadvantages. The Laptop definitely helps me in certain situations like doing stuff in science, writing papers, all that nice stuff. But it is definitely a distraction."

When answering if participants believed the laptops helped them be more capable learners, fourteen students gave examples of how the laptop helps them become better learners. The responses were categorized into five areas (a) completing homework, (b) organizing schoolwork, (c) conducting research, (d) expanding knowledge and skills, and (e) communicating with others. Several students mentioned that the laptop could be a distraction because there are more fun things to be doing with it than studying. The results of this question of what participants believed about laptops making them become a less, same or more capable student, aligns with the

responses student gave about if the laptop made a difference in their academic lives.

Did the laptop make a difference? One question asked participants “if the laptop made any difference in their academic life?” This was posed as a way for students to summarize closing thoughts about the connection of laptops to learning. Fifteen students responded that “yes” the laptop had make difference and the reasons for their answers were categorized in themes. Participants believed the laptops helped them in these ways (a) completing homework and studying, (b) organizing schoolwork, (c) taking notes, (d) researching, (e) monitoring grades, (f) expanding knowledge and skills, and (g) communicating.

Completing homework. Six students responded that yes, laptops made a difference with doing homework and studying. Kathy said, “It has definitely changed it. It’s a lot different because, you know, a lot of my work, I can just take my laptop if I’m going to a certain part of my house to do my homework, I can just bring my laptop.” Penny said. “Definitely yes. It’s much easier for me to do my homework and check my grades or check Moodle.” Ike spoke about “It helps me study and do my homework easier, so yeah, definitely I say it helps me.” Molly responded by saying, “...having it all in one place makes it easy to study.” Nick explained,

Yah, I think it has, because it just gave us more ways to study, and ways to connect with teachers. Without them, you might forget or not know if you have homework or something, and with laptops you can check Moodle or email your teachers.

When Olive responded to a question about how she would respond if she didn’t have the laptop, she answered, “it would definitely change how I take notes, and how I

handle my homework.”

Organizing schoolwork. Five students responded that yes, laptops made a difference with their “organization of work.” Dan shared, “The laptops helps to keep you organized, and if I didn’t have it, I think I would hate it.” Helen said, “Yes, only because I can do my work on there, so it doesn’t get lost. I have organization on it, so none of my work really ever gets lost.” Ike remarked, “I’d say so. [The laptop] keeps me more organized.” Molly responded that “I’m a very disorganized person, so just having it [notes] all in one space makes it very easy to study.” Olive commented, “I think it [laptop] has, [made a difference] just because it gives us lots of different opportunities and different ways to organize ourselves and deal with information that we are getting.”

Taking notes. Four students mentioned note taking as a reason why the laptop made a difference in their lives. George remarked, “I can type way faster than I can write them, so I can take the notes in class...so it definitely helps with the notes.” Carl said, “Maybe for taking notes. It’s a lot easier. Typing can slow you down, but I’m pretty good at taking notes. You know, it’s not perfect, some things don’t always work, but I think the laptop does help us.” Ali said the laptop did not make a difference, “Not too much I guess, with the notes again, it [laptop] helps me take better notes because I can elaborate faster when typing.” When asked how she would respond if she did not have the laptop, Olive responded, “It would definitely change how I take notes, and how I handle my homework.”

Researching. Three students felt the laptop made a difference because of the extra resources for researching a topic. George said, “Absolutely [it makes a

difference], it helps me research.” Dan mentioned, “I think the teachers are helpful, and certainly they give you all sorts of websites to go to, to help you do your work.”

Frannie expressed,

“I’d say yes to that, I say a big degree because it helps us expand, and like I said, we had the Internet to help us see different sides of things. In Western Humanities, we did debate, and we could see different sides and different people’s views.”

Monitoring grades. Three students talked about how easy it was to keep current with their grades and assignments, by using the laptop. Becky remarked,

If I didn’t know I missed any work I could on PowerSchool, so therefore, I can figure out like what I missed, so I can pull those grades up, and then emailing teachers, sending the work, if I wasn’t there.

Kathy shared,

Often times, it has made it really easy to look at my grades. I check them a lot. It’s kind of nice with PowerSchool and stuff, how I know if I am missing something because we are able to check that throughout the day.

Penny added, “Definitely, yes. It’s much easier for me to do my homework, and check my grades or check Moodle, and it is right in front of you whenever you need it, so yes definitely [the laptop makes a difference].

Expanding knowledge and skills. Three students felt that the laptop made a difference because it allows them to expand their knowledge and skills. Frannie said, “I’d say yes to that, I say a big degree because it helps us expand...” John remarked,

It truly has. There’s time when we can be using the books, and it’s

just...drudgery, and dragging on. It's just to the point that you're [thinking], I wish we had some other way to do it...In the next class, we pull out laptops and we're opening this and doing that. We're able to use different programs and create explorations that teachers have used. It ends up making it, not only are we reading a book, we are actually being able to make choices and turn it into an experience for ourselves.

Len talked about how he was able to help his father with a PowerPoint presentation. Len shared, "Going in [to school] and learning, and becoming an expert in all these things, [PowerPoint] gives you a huge advantage."

Communicating with others. Emailing teachers was another area that made a difference for students. Two students spoke about emailing. Nick replied, "...with laptops you can check Moodle or you can email them [teachers] also to ask, 'what do I need to do here?' so they can kind of help you outside the classroom." Becky spoke about emailing her teachers about grades or work.

A majority of students thought the computer made a difference for doing schoolwork. They spoke about self-regulatory skills such completing homework and studying, organizing schoolwork, taking notes, researching, and monitoring grades. Did these self-regulatory skills help students fulfill any school accomplishments?

Accomplishments and mastery experiences. Students were asked to describe an accomplishment they had at the high school. Afterwards, they were asked if the laptops played a role in achieving the accomplishment. Bandura's research shows that mastery experiences are the most influential source of efficacy (1997). Bandura adds, "Success builds a robust belief in one's personal efficacy" (Bandura, 1997, p. 80).

This question was asked to gain insight around the students' perception of a successful experience and whether the laptop played a role in it.

Academic Achievements. Nine students spoke about accomplishments that referenced academic achievements. Of the nine responses, six students felt the laptop played a role in achieving the accomplishment.

There were six references to obtaining good grades and three references to improved writing. Carl said, "I got high honors." He did not think the laptop played a role in that accomplishment. Molly spoke about her grades, "I'm definitely proud of my grades because they've improved since middle school." Molly thought the laptop had a part in that accomplishment. Nick felt the laptop helped him to achieve high honors. He replied "Yah, just giving me different tools to learn, like PowerPoints to go over, and like multiple sources I can use to study." Olive felt the laptop helped her get an A in Honors Western Humanities during her freshman year. When asked if the laptop played a role in that, she responded, "I think it did, because we used that probably the most compared to some of the my other classes. I think it helped with just having other resources online to used, but also using the Moodle site." Kathy shared, "Getting all A's maybe." She did not credit the laptop for this accomplishment.

Emily talked about "being a better writer, because I don't know, I've written a paper like three times, and it came out extremely amazing, I mean I was so impressed with myself." When asked if the laptop played a role in that accomplishment, Emily responded, "Yes." Helen had a similar experience with her American Studies Class. She remarked, "I did a really impressive essay. I was really proud of it. It's kind of a self-proclaimed accomplishment, but I was really proud of it." She thought the laptop

played a role in that accomplishment. John said, “I’ve been able to create some step by step works for papers, like the one we started for poetry.” He did not expressly attribute the laptop for helping him achieve the accomplishment, but he did talk about how the laptop helped him. “I’ve been able to be sitting in class working on it [poetry paper] and then quickly switch to the Internet and search for something on the author”.

Sports/clubs. There were six accomplishments that had to do with athletics or clubs. The accomplishments referenced sports teams such as cheerleading, soccer, robotics, lacrosse, and golf. In these cases, the students answered that the laptop did not play a role in these accomplishments. The Robotics Club was mentioned as Newtown High School earned an award for their first year of competition. In this case, the student did attribute the laptop in playing a role in that accomplishment. Len thought the laptop “definitely” played a role in allowing the robotics team to win an award last year.

Self-confidence. Frannie shared that her accomplishment was having more self-confidence in school. She shared,

It is more along the lines of I’ve learned different applications, and I learned a lot in school. I always push myself to do my best, and I will stay after. So I feel I have gotten the accomplishment of having the self-confidence I need to stay after, and I’m not embarrassed by it, like I was in middle school.

When asked if the laptop played any role in that, she replied, “I feel that it did because I didn’t have to talk to my teachers face-to-face about staying after. I could email them if I wasn’t in class with them.”

Summary of personal factors. Personal factors include how students think

and feel about school. Participants had high self-efficacy for academics, self-regulatory learning, and laptop use as evidence by the questionnaire, and interviews.

Confidence in reading and math was high, while the lowest rating learning a foreign language. Students talked about the ease of eighth grade when compared to doing tenth grade work. Several students remarked about the pressure increasing at high school. Participants thought the workload and content got harder at high school, and this did cause them to behave differently in order to achieve getting the grades they wanted. They increased their attention, focused on grades, worked harder, and were more connected to their teachers.

Students rated themselves very confident on self-regulatory skills of finishing their homework assignments, organizing their schoolwork, and planning their schoolwork for the day. Participants thought the laptops made a difference in self-regulatory skills of taking notes, organizing schoolwork, researching, studying, completing homework, and monitoring grades.

This group of students perceived themselves as being very confident in using the laptop and learning how to use the laptop was “easy” for them. The students rated themselves high on using email for communicating with others, writing research papers and using presentation software such as PowerPoint or Keynote. They were confident in using a variety of software applications. According to Bandura (1978), high self-efficacy in skills, such as this group’s computer skills, does influence their behavior as to how they use laptops in the classroom.

A majority of students thought the laptop helped to make them become more capable learners. The laptop assisted them in these five areas (a) completing

homework and studying, (b) organizing schoolwork, (c) conducting research, (d) expanding knowledge and skills, and (e) communicating with others. A majority of participants who had academic accomplishments in school believed the laptop played a role in the success. These beliefs also corroborate what students said about how they use laptops in the classrooms in the next section.

Behavioral Factors

Behavior is the second tenet in Bandura's *Model Illustrating Reciprocal Determinism* (1978). Behavior is what people do, or the actions they take as influenced by their personal thoughts and external environment. People's behaviors are shaped by how they think and feel, as well as by the social context and environment (Bandura 1978). Students with high self-efficacy view new situations as presenting opportunities, while inefficacious students view new situations as risky and failing (Bandura, 1997). The differences in self-efficacy will influence the risk-taking and perseverance behaviors of the students, when faced with challenging opportunities (Pajares, 2002).

The participants in this study have high self-efficacy for laptop use, and they utilize behaviors that are associated with achieving academic success. Specifically, they use the laptops for a variety of self-regulatory skills as evidenced by the interviews and work samples.

Laptop use. There were two questions asked during the interview about laptop use and how students used them in school. The first question asked students to respond to how easy or difficult it was to learn how to operate the laptop and use the applications. This was asked to ascertain the level of familiarity students had with

MacBooks, and to see if any technological barrier got in the way of using the laptops. If students thought that the technology was hard to use, or they experienced frustration with using the laptops, the negative experience might influence their beliefs about the laptop; thereby, reducing their self-efficacy for laptop use.

Fifteen students said it was fairly easy to learn how to use the MacBook laptop and software. Some had experiences with Mac, such as Ali, who said, “It was pretty easy for me because I understand a lot from my Mac at home.” Dan said, “It was super easy and I’ve grown up with computers all my life. I never had a problem.” George, who preferred PCs, said, “The only thing was switching from a PC to a Mac was getting used to the track pad, other than that, it was fine.” Kathy said, “It was easier than I expected. They’re actually pretty user-friendly, and the teachers are helpful with learning that stuff.” Carl remarked, “In each class, the teacher taught us different applications as we went through the year, so I really was able to pick it up fairly easily.”

The second question asked students to talk about how they used a laptop in a typical day at school. The responses gave the author an idea of how students actually used the computers during the day. It was also used to validate the rating of the students’ self-efficacy for laptop use, and thoughts about how the computer makes a difference for them. Students made several references as to how they used the laptop, and the themes included (a) researching, (b) participating in class, (c) taking notes, (d) completing homework, (e) communicating, and (f) monitoring grades. These themes correspond with the students’ thoughts about how laptops help them be more capable students, and how the laptops make a difference in their academic lives.

Researching and participating in class. Thirteen students referenced using the laptop for Internet or websites for research and class work. Dan uses the laptop for “websites when I have to search something.” Frannie said, “I use the laptop Internet, going on certain websites to help me during the day or if I’m in study hall.” Kathy shared that “Our teachers will have links for websites that we can go on, that we are looking at.” Olive explained, “There’s different websites our teachers give that we can use and we go through during class. Sometimes instead of handouts, we just read something online. So, I think it is a good way to save paper.”

Taking notes. Eleven students made references to using the laptops for taking notes in class. Ike said “Mostly, I use it for taking notes.” Len said, “I do a lot of note-taking on them.” Nick shared that he “takes notes in some classes.” Dan said, “I take notes in classes.” Emily expresses that she uses a “laptop if we are writing outlines, if we are taking notes.” Helen remarked, “I just use it for notes and doing my work.” Ike uses the laptop for “mostly for taking notes.” Penny responded, “During a typical day, I’d use the laptop for mostly Microsoft Word to take notes or to do warm ups activities that the teachers have me do.”

Completing homework. Eleven students referenced using the laptops for accessing and using Moodle for uploading homework and getting assignments. Ali spoke about the teachers, “telling us to go to Moodle, and that is our school website where we can get information and assignments.” Dan said, “I get on Moodle a lot, especially when the teachers want you to check your assignments, or to work on something.” Nick expressed, “I do Moodle uploads and will upload homework assignments, and sometimes when I forget to check homework, it’ll be on Moodle.”

Frannie use the laptop because “it helps me do some homework for class, like looking up answers if I don’t know them. I think it helps out a lot.” Carl said, “I get on Moodle a lot to look at my assignments, and when the teachers tell us to go on, because there are lots of thing that they put p there for each of the classes.” John shared that he “uses it [laptop] mainly to check homework to make sure everything is uploaded correctly, and to make sure I have everything ready the night before.” Len added, “Sometimes, you do assignments on Moodle.”

Communicating. Four students talked about using the laptop for emailing others, especially teachers. George said,

There’s the contact between classmates and teachers. I think that is the biggest part. Being able to contact people, instead of having to text my friends ‘what’s the homework?’ I can go on Moodle or email the teacher if I need help with something. I would never talk to any of my teachers if I did not have the laptop, I would talk to them in class and that’s it.

Molly “checks my email to make sure teachers emailed me about upcoming assignments.”

Monitoring grades. Two students mentioned they use the laptop daily to check their grades. Penny said, “[I use the laptop] to check my grades, I check my grades a lot.” Becky mentioned, “I use the dashboard to record my homework and stuff, and I frequently check PowerSchool [grades] and my email.”

The participants used the laptops to help them accomplish schoolwork, both in terms of applying self-regulatory learning processes, as described above, and producing the actual products for class assignments. The samples of student work

exemplified the instructional content and technological skills that students were learning.

Student work samples. Participants' examples of student work also gave evidence that students were using the laptops in a variety of ways for assignments. Fourteen students submitted two samples of work for a total of 28 samples. A variety of academic work was given to the author. Ninety-six percent of the samples were digital files such as documents, PowerPoints, iMovies, Excel files and brochures. One sample was a handwritten paper, and one student sat with the researcher to explain the movie that she created.

When students questioned what to send in, the author asked them to send in evidence of the type of student they think they are. All of the students sent in samples of assignments they did for classes. Several students sent in what they considered as an exceptional piece of writing of which they were proud.

Sixteen samples were from the Humanities courses of American Studies or Western Humanities. These consisted of essays or papers written for assignments such as the symbolism used in *Ethan Frome*, and a National Defense speech. It was also clear that some papers were research projects about the Magna Carta, iron trade, bullying, and the American Revolutionary War. The student who completed the paper on bullying said it was the "best paper I've ever written", and she was quite proud of the effort she put in. Other samples included a movie and a PowerPoint depicting a campaign ad for Thomas Jefferson.

Seven samples were from science class. Five of these samples were completed in a brochure or newsletter template describing climates, biomes and renewable

energy. One sample was a comprehensive lab report that described the corresponding lab done on melting points in chemistry. One sample that was very entertaining to watch was an iMovie that showed how parts of a house are metaphors for parts of plant cell.

Three samples were from Wellness class, one sample was from a Writing Class, and one was from Spanish. An excel file was developed to track a student's exercise routine in Wellness class. A paper written about exercising in a strange place was very descriptive. A video was created to describe a student's personality traits, and she remarked about being quite proud of that piece of work. The writing class assignment was a research paper on comparing five colleges. A PowerPoint presentation exemplified a student's daily routine using Spanish captions.

The 28 samples of work exemplified the students' capabilities as learners, and gave a richer context to the type of work that students were producing. It also documented the various ways in which students were using the laptop to complete assignments and validated their high confidence in laptop use.

Summary of behavioral section. Participants had an easy time learning how to use the laptop. There were no technological barriers that got in the way of their using the laptops. Participants were actively using laptops in school. Students used the laptops for self-regulatory learning processes, such as (a) researching, (b) participating in class, (c) taking notes, (d) completing homework, (e) communicating with others, and (f) monitoring grades. Student work samples included products demonstrating the content they were learning, as well as the technological skills employed. There were digital files such as MS Word documents, PowerPoints,

iMovies, Excel files and brochures. Students were proud of the work they shared, and their high self-efficacy of laptop use translated into competence with the laptop for school assignments.

Environmental Factors

The third area of Bandura's *Model Illustrating Reciprocal Determinism* (1978) is the environment. What students think about the school environment can influence how they act. The social milieu and context is a primary determinant of self-efficacy beliefs (Zimmerman & Cleary, 2006). The author asked several questions to ascertain what students thought about their school environment and the laptop program. For the most part, the students had positive comments concerning the school and program opportunities. Participants spoke often about the support they got from teachers as part of this environment. They also spoke highly of the laptop program, and how the laptops helped them as learners.

Positive experience. The majority of students used positive words to describe their tenth grade experience. Ali said, "so far it's good." Emily remarked, "I really like it so far. It is actually so much better now because I know the routine and everything. I feel my classes are 10 times better." Becky remarked, "It's going good. I think much better than ninth grade." Frannie responded with "My tenth grade experience is going good so far." George mentioned, "I feel like it is a lot easier." Ike expressed,

I really like it. It's been a lot better than my ninth grade experience. I feel like I've learned a lot more and I really like the block periods because we actually get time to do labs in chemistry, and we just have more time in every class to learn more.

Kathy said, “I’m used to high school. It’s getting harder, but I’m also starting to get better at my time management since there is more expected of me. It’s good.”

Students were asked if there was anything about Newtown High School that made it a good school. This was asked to ascertain what students thought about their environment and to use their own words to develop themes. Student responses centered on three main themes of (a) technology, (b) teachers, and (c) learning environment.

Technology. Thirteen of the students made references to the technology as an element that makes Newtown High School a good school. Some of the words that students used are included below:

- Laptops are definitely a plus.
- Technology is great.
- Laptops are better to connect with teachers.
- Technology helps a lot for studying.
- Laptops make it a good school.
- Laptops help in all different ways.
- Computers make everything easier, so you don’t have to carry around a ton of books.
- We get a lot of opportunities that a lot of other schools can’t offer to their students through, mostly the technology.
- Everyone is able to take laptops home at the end of every day.
- Technology really helps out because we have computer applications

classes, which will help us in the future.

- Things like the pen-casts that the math teachers do, and when they do things from the iPads that they have.
- Laptops make it so I don't have to worry about taking a USB [flash drive] from one computer to another and printing out at home. I can just come to school and print it out right away.
- I really like the technology, some people don't like it, but I'm pretty good at it...so it makes me more interested in learning. It makes me more interested in learning when we do technology, and when we do PowerPoints, and take notes with the laptops.

Teachers. When students were asked if there was anything about Newtown High School that made it a good school, many students had similar answers. Eleven students commented on the quality of teachers at Newtown High School. The responses are below:

- I like the teachers; teachers are awesome for the most part.
- Teachers are also really good.
- The teachers being there for you.
- The new teachers are really good and help us a lot.
- The teachers are great.
- I like all the teachers, and I like that most of them are on the younger side, so they connect with us better.
- Teachers really help teach us a lot and give us a lot of information to

get us ready.

- There are a lot of really good teachers hired.
- Teachers seem like they care about every student that they have, and they really want them, every student, to do as well as they can.
- Guidance counselors really understand.
- Teachers are always there for support. I have teachers always looking after me.
- I think we have a lot of good teachers here who help us, when we need the help.

Some students referred to the teachers when answering the question about how capable they felt doing tenth grade work. Penny shared, “I really like this year because I love all my teachers and my classes, and I’m pretty interested in what we’re learning.” Carl mentioned, “the teachers really do a great job getting us ready and teaching us.” Emily added, “The teacher does what you need to do, he prepares you for the next year.” John remarked,

The beginning of the year was kind of fun getting back to see everybody and to get into the classes. One I got back into the routine of everything, I’m seeing all the teachers I would see last year. I actually have a few of them, and it is really fun to be able to walk into their class, sit down, and be able to reflect upon what we were doing last year.

Helen said, “the teachers are really nice and they are good at teaching.”

The way students viewed teachers at Newtown High School was very positive.

It would be interesting to know if students who had low to moderate self-efficacy would have the same response. Clearly these participants had productive connections to teachers and spoke about it frequently. It must be an important part of the school environment from their perspective.

Learning environment. Comments about what makes Newtown High School a good school also centered on the climate, facility, and program offerings. Students expressed their thoughts:

- A variety of extracurricular activities and sports are offered.
- The atmosphere is really welcoming and it's a really nice high school.
- We are the introduction class, making traditions, and setting the pace for all the other kids coming up.
- The fact that it is a new school, that definitely helps.
- There are good electives and programs such as the Art program and theater.
- There is a sense of community of the high school; you really get to know people better.
- Kids who want to follow in their parents' footsteps of being successful; being around people who want to be successful and that encourages you to be successful.
- It is very interesting. I'm interested in what we are learning, so it makes it easier to learn.
- I feel like it is family here, and I'm cared for a lot.

Specific Classes. Students were asked if there were any specific classes where the laptop helped them be a better a student. The reason for this question was to get an idea if students attribute the laptop in any way to helping them be better students in a specific class. The responses helped to get a better picture of how laptops were used in classes. Fifteen students identified one or two classes. A theme that emerged from the student comments is that students are connecting the laptop to skills of self-regulatory learning of organizing, taking notes, completing homework, and researching. These themes corroborate those found in the Behavior Section. Students also commented that the laptop provides for specific interactive tools for math, science, and First Robotics that helps keeps them engaged.

American Studies. Eight students mentioned American Studies, the class where the laptop helped them be better students. This class combines social studies and English. When asked to elaborate on this, Ike remarked, “Probably, American Studies because I can take notes in a more organized way, with Word, you can use the note-taking feature, and it really helps me organize my notes.” Molly said,

I think my American Studies class, my humanities class. It’s easier to keep all my notes together in one place and just access them in one place, say when I have a test. I can easily go back to them and study off them.

Dan agreed, saying, “Probably American Studies because you really have to take a lot of notes there, and you got to stay organized, and it really helps organize your notes and folders. You can also record your homework.” Frannie said,

American Studies this year, Western Humanities last year, so a lot of my classes. It [laptop] helped me be a better student for certain projects we could

do, and we could work on our laptops during class so it could help get our projects done.

George said, “Honors American Studies. I guess it helps.” He added, “Research, and being able to take the notes faster...so the speed of the computer helps.” Helen commented, “American Studies” and she added, “It helps get our homework done because you have Moodle, and those classes have more homework, so it is easier.” John shared, “I would have to say American Studies classes and History classes.” He added,

We could be talking about certain things and taking notes. They [teachers] could say something that I’m not really that sure about and I were to finish typing what they were saying before they moved on, I can easily switch it to an Internet browser and search that to get a little more information on it and then add it to my notes.

Ali explained why the laptop helped her in American Studies by saying, “I have my own laptop and person space to write, so I can keep it organized, definitely a more organized space, to keep all my writing.”

Science. Six students spoke about having a laptop help them in science classes. Len thought the laptop helped in Integrated Science class. He said, “I think the laptop really increased what you could do in the class with the potential of doing labs. I would definitely say science class that the laptop really increases the experience of it.” Nick agreed saying, “I’d say biology because the teacher makes guided notes, so we don’t have to take all the notes down by ourselves. It allows us to pay attention more in class, other than just taking down the notes.” Olive agreed that in science, “We used

a lot of tools that we would hook into our computer and it showed us graphs and different ways to present our information and do different experiments online and simulations online.” Carl explained,

I have to say science. The laptops are big there. There’s a lot of interactive stuff that the teacher uses and that you can find on the Internet. I had to do a video project and so the laptop was really helpful.

George identified Biology as a class where the laptop helps. He added, “Research, being able to take the notes faster, especially with Biology. I tend to catch on to science quickly, so I just need to get the notes down...so the speed of the computer helps.” Helen identified science and added, “When you are doing [work] with the computer, you can have an online book for it and stuff so instead of carrying around a huge text book, you can use that in class.” She also pointed out that, “It helps you get your homework done because you have Moodle and those classes [science and American Studies] have more homework, so it is easier.”

Writing. Two students thought the laptop helped them in writing class. Emily answered the question by saying,

I would say probably writing class. I like to put my thoughts on paper then write, then I feel like I do better, because I have better ideas, there are bigger words on the computer, and it’s just helpful.

Len said, “Then you have writing classes. It’s nice to have your own computer to go write everything out on. You can show it to the teachers in class. It makes it more convenient.”

Other classes. Several students mentioned other classes where they thought

the laptop helped. Becky thought, “Math class because there is like a program where you can use graphs and stuff, and you can plot points, and that helps a lot.” Frannie mentioned. “Wellness [class] last year, we used our laptops a lot, and I feel like half my grade was because of my laptop, because I make iMovies and PowerPoints.” George thought the laptop helped in “First Robotics Class.” Penny said it [laptop] helped her in all classes, “it’s really easy to organize your homework, check grades and send emails to teachers about extra help or something.”

Summary of environmental factors. Participants used positive terms when describing their school environment. Participants were excited and positive about the technology opportunities given to them at Newtown High School. Of particular interest to them was the notion of having “a personal” laptop available at any time with all their work in one place. A majority of students spoke about the quality of teachers that made the school a “good “ school. They viewed the teachers as caring, supportive and “good” teachers. They used words to describe how the laptop helped them stay connected with teachers. Students saw the learning environment at NHS as positive with a choice of program opportunities. Students said the laptops helped them in specific classes such as American Studies, science and writing. Students identified self-regulatory learning skills of organizing, taking notes, completing homework, and researching as ways in which the laptop helped them in classes.

Chapter Summary

Sixteen sophomores took the three self-efficacy questionnaires and responded to the 15 questions asked of them. The questions were asked to help gather a picture of how tenth-grade students at Newtown High School perceive their academic self-

efficacy, and how students described the connections between the MacBook laptop and their beliefs about their academic self-efficacy. The results showed that students had a variety of thoughts relating their use of laptop and their capabilities of students.

Participants in the study are contributors to their academic success. The participants have high self-efficacy beliefs, and they perceive a capable student as one who completes the work on time, understands the content, takes challenging classes, and gets good grades. They view high school as harder than middle school, and this difference forces them to change their own learning strategies in order to still obtain good grades. They employ self-regulatory learning skills in their daily routines. They use the laptop for these self-regulatory behaviors: organizing schoolwork, monitoring grades, taking notes, studying, communicating with others, managing time, and completing homework. Students also use the laptops for researching, participating in class, and creating work products. They regard the laptop as their own personal tool, conveniently accessible, that helps them become more capable students. Students have an ease of use with the laptops without technological barriers getting in the way of their use. Students regard their teachers as supportive and want classes to be interactive and engaging. Students view the laptop as a way to keep them interested in class when teachers use software or tools associated with science and math, and they provide interactive activities.

Themes emerged from the personal, behavioral, and environmental sections. The personal factors section included six general themes:

- (a) Students had high self-efficacy in academic achievement, self-regulated learning and laptop use.

- (b) There was a slight decrease (9 points) in self-efficacy ratings when students entered high school.
- (c) Schoolwork was harder and workload got heavier in high school, which demanded changes in their learning behaviors and focus.
- (d) High value is placed on self-regulated learning skills of being organized, taking notes, managing time, monitoring grades, completing homework, and researching.
- (e) Laptops made a difference in their academic lives and made them more capable students.
- (f) Being more capable meant completing the work on time, understanding the content, taking challenging classes, and getting good grades.

Three themes emerged in the behavioral section:

- (a) It was easy to learn and use the laptop.
- (b) Students used the laptops for, work processes: various self-regulated learning skills.
- (b) Students used the laptops for work products: school assignments.

Three themes resulted in the environmental section:

- (a) Connections to teachers were important attributes of a good school.
- (b) Classes need to be interesting and engaging and laptops helped with expanding knowledge, researching topics, and using specific tools or software.
- (c) The convenience and accessibility of use of their own, personal laptop was important to their learning.

Using Bandura's (1978) *Model of Reciprocal Determinism* as the theoretical foundation, the author was able to develop a program theory connecting self-efficacy and the one-to-one laptop program, as a result of the themes that emerged. A reciprocal nature exists among (a) self-efficacy beliefs, (b) self-regulatory learning behaviors, and (c) the supportive learning environment, which includes personal laptops and supportive teachers.

Program Theory Emerging

Returning to Bandura's Social Cognitive Theory, human thought and action is a product of the dynamic relationship between (a) personal factors such as cognition, biological feedback, and emotions; (b) behavior; and (c) environmental factors (Bandura, 1994, 1986, 1978).

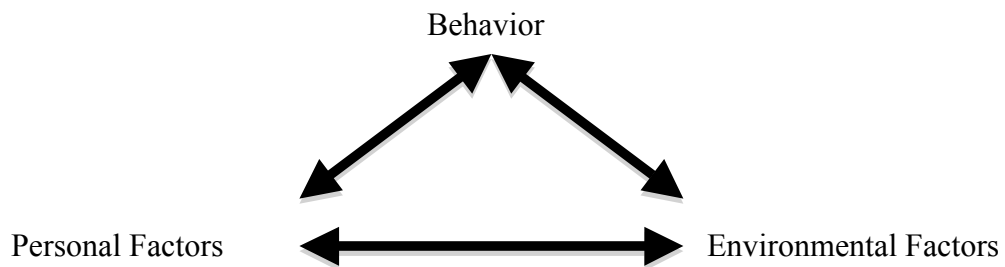


Figure 2. Model Illustrating Reciprocal Determinism (Bandura, 1978).

How people interpret certain events can influence the competence they feel, and the success they think they will have in accomplishing a task. If the environment is supportive, it may positively influence the action or behavior of a person, which in turn validates their personal beliefs, which in turn can affect the future action of the individual (Bandura, 1978). Participants in this study have high self-efficacy, are in a supportive learning environment, and engage in behaviors that are conducive to

learning. The chances are good that these students will continue to build on their self-efficacy as they continue to apply self-regulated learning skills, and the teachers and program offerings support their needs.

The author is interested in this connection between self-efficacy and self-regulatory skills. The themes resulting from this study shows that students with high self-efficacy are using a variety of self-regulatory skills. The bridge between these two important variables of academic success is the laptop computer. Students view the laptop as the tool that helps them improve their capabilities, especially with self-regulatory processes. The next chapter will present conclusions, recommendations, program theory, and considerations for future research

Chapter 5: Conclusions and Recommendations

Purpose of the Study

According to Albert Bandura, “perceived self-efficacy refers to the beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (1997, p. 3). Academic self-efficacy refers to an individual's belief regarding successful achievement in school, at a designated level on an academic task or attaining an academic goal (Bandura, 1977).

The purpose of this study was to examine a select group of Newtown High School tenth graders’ academic self-efficacy. Given that these students attended a high school with a one-to-one laptop program, a question arose about the possible connection between the students’ academic self-efficacy and their participation in this program. A meta-analysis (Moulton, Brown, & Lent, 1991) of studies conducted between 1977 and 1988 showed that self-efficacy beliefs were positively related to academic achievement. Through this study, the author had the opportunity to discover any connections between academic self-efficacy and participation in the one-to-one laptop program. This investigation was done to discover themes that would aid in developing a program theory for the one-to-one laptop program at a small New Hampshire high school.

Research Questions

The research questions investigated by this author were:

1. How do tenth-grade students at Newtown High School perceive their academic self-efficacy?
2. Is there any change of students' perceived self-efficacy from eighth grade to tenth grade?
3. Do students describe a connection between using the MacBook laptop and their academic self-efficacy?

Review of Methodology

The author used a qualitative approach to discover themes and develop program theory. According to Funnel and Rogers (2011), program theory is an explicit theory or model that shows how an intervention, such as a program, a strategy, or an initiative contributes the intended outcomes. The author was interested in developing program theory for the one-to-one laptop program, where students are given a personal laptop throughout their high school years.

The author used a convenience type of purposeful sampling (Merriam, 1998) to identify the 16 students who participated in the study. Data was gathered from 16 sophomores at Newtown High School. Data included (a) a questionnaire on self-efficacy, (b) interviews, and (c) samples of student work. The questionnaire items came from Bandura's *Children's Self-efficacy Scale* (2006b). This questionnaire (Appendix D) included self-efficacy items in areas of academic achievement, self-regulated learning, and laptop use. Students rated themselves from 0-100 in how confident they were in doing each of the described items. The individual interviews were digitally recorded and transcribed and copied into a matrix so all the responses of

a particular question could be viewed together. Data also included samples of student work that were submitted.

The ratings from the questionnaire were calculated for average scores for the group. The author used a constant comparative coding process to analyze the interview data. Interview responses were coded, categorized and reviewed for themes.

Recurrence of themes addressed the validity of the study. Samples of student work were reviewed for descriptive purposes and to provide evidence for the ways in which students were using the laptops for schoolwork.

Student Group Description

There were 16 tenth grade students, nine girls and seven boys, who participated in the research study. All were 15 or 16 years old. The group of students who participated in the study was generally considered above average using the indicators from the statewide test, GPA, and course grades. The Guidance Director, who knew the students, also verified that this was a valid description of the whole group. Eight students in the group took at least one honor's level class.

Research Questions Conclusions

How do tenth-grade students at Newtown High School perceive their academic self-efficacy? The answer to the first research questions was captured in the ways in which students spoke about their capabilities in academic achievement, self-regulatory learning, and laptop use.

Self-efficacy of academic achievement. Data from the questionnaire and interviews yielded insights into the students' thoughts and feelings about their academic self-efficacy. Participants had high self-efficacy with group ratings of 85 or

above for academics achievement, self-regulatory learning, and laptop use. They perceive their self-efficacy as high. It was not surprising to see a rating of 93 for the use of computers. Their confidence in reading and math was high, while the lowest rating of a 69 was for learning a foreign language. This result bares further study as to the reasons why students rated it lower.

Recommendation. It is interesting to note is that the use of computers in learning a foreign language has been promoted for years; yet, teachers of languages lack training in integrating technology into instruction (Hubbard & Levy, 2006). Could students' high level of self-efficacy in computer use be the key to increasing their self-efficacy of a foreign language through computer-assisted instruction? Further study might be done in the specific area of language learning.

Self-efficacy of self-regulatory learning. Self-regulatory learning is often characterized by a collection of self-motivational strategies and behaviors such as goal setting, self-evaluating, organizing, monitoring, self-verbalizing, managing time, and planning (Zimmerman & Kitsantas, 2005). Participants in the study rated themselves in the higher range with an average score of 86. The participants rated themselves very confident on self-regulatory skills of finishing their homework assignments, organizing their schoolwork, and planning their schoolwork for the day, with ratings of 90 or above. The lowest rating was about using the library to get information with a 73. This area could be further studied to determine why students rated this lower. It could be as a result of having the Internet readily available to students; therefore, they are not accessing the library as they once did.

Recommendation. While the students in the study had high self-efficacy in self-regulatory learning, a question remains about the ratings of all students in this grade and/or school. Participants in the study were above average students, and it was not surprising to see their high self-efficacy ratings. It would be interesting to know if high self-efficacy of self-regulatory learning was a characteristic of this school's total population. Are there groups of students who experience low self-efficacy, and would this information lead to any intervention or instructional changes? The results of this study showed that students do connect the laptops to academic self-efficacy through self-regulatory skills. Intervention plans could be developed to target those self-regulatory skills using the laptops.

Self-efficacy of laptop use. This group of students was confident in using the laptop and a variety of software applications. The students rated themselves high on using email for communicating with others, writing research papers and using presentation software such as PowerPoint or Keynote. They perceived themselves very confident in using the laptop and learning how to use the laptop was easy for them.

Interesting to note is what students weren't saying, as much as what they did say. None of the students spoke about any problems with laptops not working or connectivity being down. There were no complaints about the technology infrastructure. Students did not speak about technological barriers that got in their way, except one student's difficulty in learning how to use Moodle. This student did move in from another district, and had no previous history with this course organizational software. Newtown High School might want to offer assistance for these students who did not attend eighth grade in district.

Is there any change from students' perceived self-efficacy from eighth grade to tenth grade? Yes, there was a change from eighth to tenth grade. The interviews showed that the participants had a 9-point drop in academic self-efficacy from eighth to tenth grade, from 94 to 85. Participants experienced this drop in academic self-efficacy ratings; yet, most of the students felt they were getting the same or better grades. As the demands got more challenging, students employed different self-regulatory skills in order to achieve the same grades.

Increased demands. The themes that emerged from the interviews showed that students thought (a) the workload increased and content got harder in high school, which made students work harder; and (b) they were more focused on grades, when they came to high school. Penny captured the general thought that,

This year is much harder than it was last year. I'm taking Honors classes, and last year, I didn't take Honors classes, so I feel like I challenged myself a little bit more, which is a good thing, but it takes harder work to accomplish the grades I want to get.

The students found ways to acclimate to the increased high school demands and accomplish similar grade outcomes. They used strategies such as increasing focus on work, using time management, communicating with teachers, asking for extra help, and using technology to meet the increased expectations.

The results of this qualitative study reveal a drop of self-efficacy beliefs for students when they enter this high school. This drop seems to be connected to the increased workload and more challenging content associated with high school.

Recommendation: Further study can be done to determine if this 9-point drop

of academic self-efficacy is consistent across all sophomore students, and if it is significant. Attention should be given to studying the self-efficacy of all students, especially the underclassmen, to determine if any interventions are needed to avoid this reduction of academic self-efficacy. Research shows that there is a strong connection of self-efficacy beliefs and academic achievement (Schunk & Pajares, 2005).

According to Bandura (1994), self-efficacy is influenced and developed through four sources. The strongest source is mastery experience (Bandura, 1994). It is the personal experiences with success and failure that shapes students' beliefs about capabilities. The more teachers do to help students experience academic successes, the more self-efficacy will improve (Zimmerman & Schunk, 2001). Participants in the study thought positively about the teachers at Newtown High School. This environmental factor is a crucial component to influencing self-efficacy.

Teachers can also act as coaches, which is a second source of self-efficacy development. Sharing verbal feedback about the capabilities of students accomplishing a task can help persuade students to overcome self-doubt and take a risk (Zimmerman & Schunk, 2001). Allowing students to see other students succeed, and the steps they took, is a third way to develop self-efficacy (Zimmerman & Ringle, 1981). Students learn through vicarious learning, and the interviews revealed that students learned a lot about laptop use through watching their peers. The fourth way is to reduce the physiological stress reactions that students feel about certain tasks (Bandura, 1994). There are three decades of research and studies about interventions that have been successful in influencing academic self-efficacy, should the faculty of

Newtown High School wish to examine it further.

Do students describe a connection between using the MacBook laptop and their academic self-efficacy? The results of the interviews showed that students had a lot to say about laptops and connections to grades and capabilities. Fifteen students out of 16 students responded that “yes” the laptop had make difference in their academic lives. Ten students responded that they believed that the laptop makes them become a more capable student. Participants thought the laptops made a difference in self-regulatory skills of completing homework and studying, organizing schoolwork, taking notes, researching, monitoring grades, expanding knowledge and skills, and communicating with others. Students also use the laptops for researching, participating in class and creating work products. The samples of student work corroborated that students are producing work of which they are most proud, reflecting their high self-efficacy. The connection between laptop use and self-efficacy manifests itself through self-regulatory learning. This connection reoccurred throughout the interviews, questionnaires, and student comments.

Students regard the laptop as their own personal tool, conveniently accessible, which helps them become more capable students. Students view the laptop as a way to keep them interested in class when teachers use software or tools associated with science and math, and they provide interactive activities.

A majority of participants who had academic accomplishments in school believed the laptop played a role in their success and grade outcomes. Dan spoke about being on the honor roll in ninth grade. He said, “You really have to do really well on quizzes and you know, instead of having five different notebooks, you study it

all together on folders on the laptop, so yeah, I think it made a difference.” The results of this qualitative study showed that students connected the laptop to improved capabilities, especially in the area of self-regulatory skills.

Recommendation. Research demonstrates that a reciprocal relationship exists between self-efficacy beliefs and self-regulatory learning skills (Zimmerman & Cleary, 2006). The results of this qualitative study showed that there is a clear connection between the laptops and students’ beliefs about their academic capabilities, their self-efficacy. This connection is through self-regulatory learning processes. Self-regulatory skills mentioned by students included completing homework, studying, organizing schoolwork, taking notes, researching, monitoring grades, expanding knowledge and skills, and communicating with others.

Knowing about this connection, a more explicit way of helping students develop their self-regulatory skills could be implemented. The outcomes could impact both improved self-regulatory skills and academic self-efficacy beliefs. While students learn through vicariously watching their peers, other more explicit methods could be created. Modeling and coaching self-regulation strategies are effective ways to achieve competence. Zimmerman and Cleary (2006) conclude that adolescents view of self-efficacy is influenced by their “capability to self-regulate their functioning such as setting optimal goals, implementing effective strategies, self-monitoring accurately, self-evaluating using appropriate criteria, and attributing causation to adaptable processes” (p. 65). A class for teaching self-regulatory learning skills could be created, piloted and evaluated for further consideration.

Program Theory

A program theory emerged that is situated in Bandura's *Reciprocal Determinism Model* (1978). Human thought and action is a product of the dynamic relationship between (a) personal factors such as cognition, biological feedback, and emotions; (b) behavior; and (c) environmental factors. The author thought it important to use this framework as the foundation to the program theory, since self-efficacy research is already rooted in this model.

The themes that emerged during this study showed that students with high academic self-efficacy are using a variety of self-regulatory behaviors. The connection between these two important variables of academic achievement is the laptop computer. Students view the laptop as the tool that helps them improve their self-regulatory processes and their capabilities as learners.

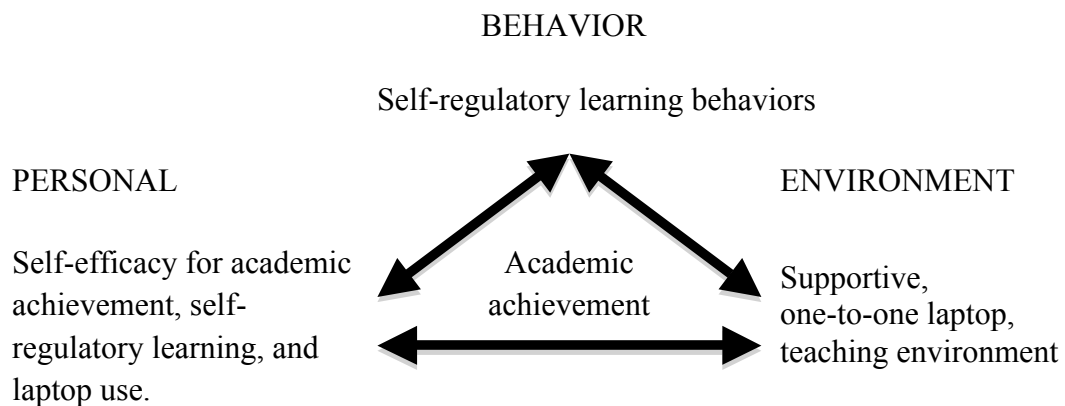


Figure 3. Program Theory of the One-to-One Laptop Program based on Bandura's *Reciprocal Determinism Model* (1978).

A supportive school environment can positively influence the action or behavior of a student, which in turn validates their personal thoughts and beliefs,

which in turn can affect the future action of the individual (Bandura, 1978).

Environmental factors such as, school climate, program offerings, technology support, and teacher connections with students, influence students beliefs and thoughts about their capabilities.

Laptops are a means to the ultimate goal of academic achievement. The laptops are part of the supportive learning environment given to students. This environment includes supportive teachers who use technology for interactive, engaging ways to deliver the content. The environment also includes technology hardware, software and connectivity infrastructure. It is important to students that the laptops and software be easy to learn and use, and be conveniently accessible when they need them.

Once the technology is in place in a supportive environment, students use the laptops for a variety of behavioral factors. The students use laptops for subject-specific assignments and work products like: essays, spreadsheets, movies, presentations, and brochures. Students also use laptops for work processes of self-regulatory learning skills, such organizing schoolwork, monitoring grades, taking notes, studying, communicating with others, managing time, and completing homework. These skills are very important to students in becoming capable learners.

Students who experience success or master using the laptops to improve their self-regulatory learning skills increase their beliefs about their self-efficacy of laptop use and self-efficacy of self-regulatory learning. This improved self-efficacy influences the academic tasks that the students attempt and perform. The more the students experience success in their self-regulatory learning behaviors and subject-

specific tasks, the more this success contributes to their self-efficacy for academic achievement. This cyclical reflection process and cognitive judgments made about self-efficacy, influence students' decisions, risk taking, resiliency, emotional well-being, and level of accomplishments (Bandura, 1997).

A theory of change and action. According to Funnel and Rogers (2011), program theories have two parts: a theory of change and a theory of action. A theory of change identifies the forces that cause people to change, and the theory of action identifies how interventions or program are implemented to bring out these changes.

Theory of change. The ultimate goal of the one-to-one laptop program is to effectuate academic achievement of students. The forces that impact academic achievement are the relationships of (a) personal factors such as thoughts and feelings, (b) behavior, and (c) environmental factors (Bandura, 1978).

Academic self-efficacy is part of personal factors and can be changed through behaviors and the environment. Researchers have shown that self-efficacy can be developed in four ways: (a) mastery experiences, (b) persuasion and coaching (c) vicarious learning, (d) physiological feedback (Bandura, 1997).

Behavior impacts how students think and feel about their capabilities. The connection of academic self-efficacy and self-regulatory behavior has been shown in the literature. Bandura (1997), and Zimmerman and Cleary (2006), describe a reciprocal relationship between self-efficacy beliefs and self-regulatory behaviors. Self-regulatory behaviors include organizing schoolwork, taking notes, monitoring grades, studying, communicating with teachers, managing time, completing homework, and planning. The theory logic is: improving self-regulatory learning

causes a reciprocal improvement in self-efficacy beliefs that leads to improved academic achievement.

Another area of behaviors are the technological skills and work processes, that lead to the work products that the students produce as evidence of learning. The Partnership for 21st Century Skills (2011) underscores the importance of using technology for classwork. The routine practice students have in producing quality work with their laptops increases their rate for academic success, which impacts their academic self-efficacy.

The classroom environment also impacts academic achievement. If the classroom environment is improved, the results influence how students think and feel about school and their learning. What teachers do in the classroom to set the climate and deliver lessons influences self-efficacy, and simultaneously, behaviors. The ways in which teachers engage students in learning do influence students' self-efficacy. Students' interviews reveal that they value interactive lessons that engage them. They want to use technology tools associated with math and science for running experiments and graphing. They use the laptop for in-class research and web links associated with the current lesson. This technology-rich, engaging classroom environment impacts self-efficacy, and the behaviors of students in response.

Theory of action. The theory of action identifies how the one-to-one laptop program brings about the change of improved personal, behavioral or environmental self-regulatory learning processes. The laptop, as a tool, consists of a compact place to store most schoolwork and assignments, in one convenient, accessible place. It is

important to students to have “their own” workspace, and the laptop provides this workspace that is immediately available.

The laptop provides students with a variety of software that is designed to help students organize their schoolwork, take notes, monitor their grades, manage deadlines, complete homework, study, and communicate with teachers. The software is immediately available to students, in one convenient location. The one-to-one laptop program provides self-regulatory learning strategies that are consistent to all students. Students learn the strategies through training in advisory classes, modeling by teachers, observing peers, and self-tutorials. Students successfully use their self-regulatory learning skills; thereby, improving their performance, mastery experiences, grades, and academic self-efficacy.

Additionally, the laptop program provides students with the means to produce the work products that teachers are using for evidence of academic performance. The Partnership for 21st Century Skills (2011) stresses the integration of technology with content in order to prepare students for college and jobs. Students use the laptops to write, calculate, research, design brochures, create art, make movies, make music, and develop presentations. Students produce evidence to document their learning in various ways, and by having their own laptops available to them 24/7, it increases their use and skill in using the software. This successful behavior leads to increased self-efficacy and academic achievement.

Lastly, the one-to-one program provides the tools to create opportunities for a technology-rich learning environment. Students are able to immediately use their laptops for a multitude of purposes to assist them in learning. Teachers are also able

to access tools and resources beyond the text book, for the most current information. Teachers infuse technology into class lessons. They implement Moodle, the online course management system to help organize lessons, materials, assignments, and communication. Wireless connectivity to the Internet provides immediate access to research and resources. The school-wide email system also provides immediate access for communication with each other. The technology department at the school is crucial in making sure the hardware, software, and infrastructure is working. The learning environment is supportive to students using technology in many ways, which leads to improved academic self-efficacy and technological behaviors that prepare students for college and careers.

Chapter Summary

The one-to-one laptop program gives students and teachers the tools to affect behavioral, environmental and personal change. This program theory of the one-to-one laptop program is born from the voices of students and rooted in the context of Bandura's Social Cognitive Theory. While the laptops are only tools in the school's mission to deliver the curriculum content and process standards, the important role that the laptops play in helping students become more capable students through self-regulatory learning is now more clear.

Recommendation for Further Study

1. Students spoke about the connection between the laptops and self-regulatory learning. What this study did not identify was the significance of this relationship in a quantitative manner. Identifying which self-regulatory skill was the

most important to their academic success, and to what extent the laptop helped them with that skill could be informative for future program interventions.

2. A majority of students referenced several environmental factors, such as, educational opportunities, programs and relationships with teachers in relation to this case study. Bandura's *Reciprocal Determinism Model* (1986, 1978) reveals that the environment can influence student's cognition and perceptions of self-efficacy. Research that is focused on the impact of the teacher-student relationship and the influence it has on the self-efficacy beliefs of students will help deepen the understanding on how the environment influences self-efficacy. This author supports the questions posed by Zimmerman and Cleary (2006).

Do children benefit more from mastery experiences than from teacher encouragement and observing students succeed? Does exposure to technologically competent peer models enhance adolescents' self-efficacy? How can technology be integrated across the curriculum to promote self-efficacy at different development levels? (p. 98).

Educators need to continue to explore the topic of self-efficacy development in relation to environmental factors and technology.

3. The results reflect a small sample of above average, high school students making connections between their academic self-efficacy and the use of laptops. Further research using a larger sample size and adding more diversity in terms of learning characteristics would help strengthen the validity of the results. It would be interesting to see if there are any differences in the results if the study is conducted

with students' with low academic self-efficacy, or students with low computer self-efficacy.

4. This study was focused on personal self-efficacy of students, but the author had questions about the collective efficacy seen in the group of sophomores, and even broader, the high school community. Collective efficacy is defined as "a group's shared belief in its capability to attain its goals and accomplish desired tasks" (Pajares, 2006, p. 362). Schools with strong collective efficacy can have influences on academic achievement (Pajares, 2006). There seemed to be high collective efficacy with this small sample of students. Does this school have a high collective efficacy, and does it have any relationship to the one-to-one laptop program? More research in the role that technology plays in collective efficacy could be helpful.

Closing Thoughts

The author was involved in a research study in 1995 called *Take Charge*, where self-efficacy was studied in relation to self-determination of high school students with chronic health challenges. This was the first time that she studied the self-efficacy work of Albert Bandura. The results of that study showed that students with disabilities who were given opportunities, information, support, and skill building, increased their self-determination skills and achieved goals they never thought possible (Powers, Wilson, Matuszewski, Phillips, Rein, Schumacher, & Gensert, 1996). That study had a profound effect on the author's perspective that self-efficacy beliefs contribute to academic success. In 2012, the author completed this qualitative study that underscores this important concept once again.

Bandura (2006) notes that the goal of education is to provide students with the “intellectual tools, self-beliefs, and self-regulatory capabilities to educate themselves throughout their lifetime” (p. 10). Personal, behavioral and environmental factors all contribute to academic achievement. The results of this qualitative study presented the connection between the laptop computers in the one-to-one program with academic self-efficacy. This connection is through self-regulatory learning. The study also contributed a program theory about the one-to-one laptop initiative at Newtown High School. The author wishes to thank all the staff at Newtown High School who assisted in this study, with a special appreciation to the student participants who lent their voices to this research.

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APPENDIX

Appendix A
Student Invitation Letter

A research study is being conducted at Newtown High School during the fall semester of 2011. The research is being conducted by Roxanne Wilson, who is a Doctoral student at Plymouth State University. Mrs. Wilson worked as the assistant superintendent for the Newtown School District, from 2005-2011. Mrs. Wilson was on the design team for the opening of Newtown High School, and she is conducting a case study about what students experience in the one-to-one laptop program.

Mrs. Wilson met with the NHS school administrators, and asked for names of sophomores, who might be interested in participating. You were selected as a person who might like to be involved. She needs 16 tenth grade students to volunteer for the project. She is looking for a variety of learners, and each student will need his/her parents' permission to participate. More details will be explained at a later date, but here are the project activities that students will do:

- A quick questionnaire (10 minutes) about how you see yourself as a student,
- A 45 minute taped interview with Mrs. Wilson,
- Sharing evidence of student work with Mrs. Wilson,
- Two evening meetings: one in late fall, and one in the winter.

Mrs. Wilson will keep the information you share with her confidential. After she analyzes all the information, she will write a report about the results, and share it with you, the school community, and Plymouth State University. There will be quotes from students in the report, but the names will be changed to protect your identity. As a participant, you can get community service hours as required by NHS. If you are interested in participating in this case study, please fill out the attached registration form. Mrs. Wilson will contact you to talk further and invite you and your parents to an informational meeting.

Thank you, Roxanne Wilson PSUresearchstudy@gmail.com

Appendix B

Student Registration Form

Registration Form for the PSU Research Project

Please return this form to the secretary, in the Guidance Department by __, 2011.

Name: _____

Age: _____

Email address: _____

Male or Female? _____ male _____ female

Did you attend WHS for a full year in 2010-11? _____ yes _____ no

Are you a sophomore? _____ yes _____ no

When is the best time to come to a 15 minute briefing to hear more about the research study? (Check all that apply)

before school, after school, lunch, during school: block _____,

advisory, other: _____

I agree to bring the invitation sheet home, so my parents can read it. They will be invited to a meeting to hear more about the case study. Informed, written consent will be needed by both students and parents, before any research activities can start.

Thank you,

Roxanne Wilson PSUresearchstudy@gmail.com

Appendix C

Informed Consent Form for Qualitative Research

Title of study: Tenth Graders' Perceived Academic Self-efficacy in a One-to-one Laptop Program

Principal investigator: Roxanne Wilson, CAGS

Institute: Plymouth State University, Plymouth N.H.

Introduction:

I am Roxanne Wilson, a Doctoral Candidate from the College of Graduate Studies at Plymouth State University. I am conducting research on how tenth graders' who are in a one-to-one laptop program perceive their academic self-efficacy. I want to see if students think the laptops influence how capable they feel about doing academic work.

Background information:

Academic self-efficacy refers to an individual's belief regarding successful achievement in school, at a designated level on an academic task or attaining an academic goal (Bandura, 1977). Research supports that self-efficacy beliefs are linked to educational achievement in academic domains such as reading, writing, mathematics, and science (Pajares & Graham, 1999; Schunk & Swartz 1993; Usher & Pajares, 2006). Bandura demonstrated that self-efficacy beliefs are powerful determinates of achievement outcomes (Elliot & Dweck, 2005).

Purpose of this research study

The purpose of this qualitative case study is to examine the connections of perceived academic self-efficacy of Newtown High School tenth graders in relationship to the one-to-one laptop program. The process will also be used to uncover other themes of the one-to-one laptop program that emerge through this case study.

Procedures**Students:**

In this study, I will interview 10-16 students, individually, and ask questions about his/her capabilities as a student. This interview should take about an hour. This interview will be tape-recorded and transcribed. Depending on the information gathered, I may schedule another time to ask follow-up questions. I will also ask

students to complete a questionnaire about their self-efficacy. This should take 10 minutes. I will also email students and ask them to comment on the preliminary research findings, once the results are compiled.

Confidentiality

I will respect and hold the information shared with me from the questionnaire and interviews in confidence. All student interviews will be tape recorded and transcribed. What students say in the interviews will not be shared with other teachers, staff, administrators, parents, or other students.

Student participants' names will be not disclosed except to administrators or staff for scheduling purposes. Names and circumstances will be changed in the final, public report so students cannot be personally identified. The data may be seen by an ethical review committee and may be published in a journal and elsewhere without giving actual names.

Possible risks or benefits

There is no risk or cost involved in this study except participants' valuable time. There is no direct benefit to participants. However, the results of the study may help us better understand student's academic self-efficacy in the NHS' one-to-one laptop program. Students who complete the study will be able to apply the hours to the school requirement of community service hours.

Right of refusal to participate and withdrawal

Students are free to choose to participate in the study. Participants may also withdraw any time from the study without any adverse effect. Participants may also refuse to answer some or all the questions if they don't feel comfortable with those questions.

Available Sources of Information

If you have further questions you may contact the Researcher,

Roxanne Wilson, at PSUresearchstudy@gmail.com

1. AUTHORIZATION

I have read and understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this form. I voluntarily choose to participate, but I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study. I further understand that nothing in this consent form is intended to replace any applicable Federal, state, or local laws.

Student Participants:

A. _____

Student Participant’s Signature	Name (printed)
Date: _____	

B. _____

Signature of Parent or Guardian	Name (printed)
Date: _____	

Researcher:

C. _____

Principal Investigator’s Signature	<u>Roxanne Wilson</u> Name (printed)
Date: _____	

Appendix D

Student Questionnaire

This questionnaire is designed to help us get a better understanding of the kinds of things that are difficult for students. Please rate how certain you are that you can do each of the things described below by writing the appropriate number on the same line next to the statement. Your answers will be kept confidential and will not be identified by name.

	10	20	30	40	50	60	70	80	90	100
Can not do at all					Moderately Can do					Highly certain can do

1. Self-efficacy for Academic Achievement (adapted from Bandura’s Children’s Self-efficacy Scale, 2006)

I can learn...	Confidence (0-100)
(a) General mathematics	
(b) Algebra	
(c) Science	
(d) Biology	
(e) Reading	
(f) Writing	
(g) To use computers	
(h) A foreign language	
(i) Social studies	
(j) English grammar	

2. Self-efficacy for Self-regulated Learning (adapted from Bandura, 2006)

I can...	Confidence (0-100)
(a) Finish my homework assignments by deadlines	
(b) Get myself to study when there are other interesting things to do	
(c) Concentrate on school subjects during class	
(d) Take good notes during class instruction	
(e) Use the library to get information for class assignments	
(f) Plan my schoolwork for the day	
(g) Organize my schoolwork	
(h) Remember well, information presented in class and textbooks	
(i) Arrange a place to study without distractions	
(j) Get myself to do school work	

Student Questionnaire continued

0	10	20	30	40	50	60	70	80	90	100
Can not do at all					Moderately Can do					Highly certain can do

3. Self-efficacy for Laptop Use (Wilson 2011)

I can...	Confidence (0-100)
(a) Use the laptop for taking notes in class	
(b) Create a podcast using Garage Band	
(c) Download media (music, video) files from iTunes	
(d) Use email for communicating with others	
(e) Use MS Office such as Word, PowerPoint and Excel	
(f) Make a movie using iMovie	
(g) Write a research paper using MS Word or Pages	
(h) Use Moodle for class information and assignments	
(i) Use Google calendar to keep track of when assignments are due	
(j) Use PowerPoint or Keynote to present ideas	
(k) Participate in a wiki or blog to create and share content	
(l) Use iPhoto for pictures	
(m) Use Google docs for sharing and working on documents with others	

Appendix E

Student Interview Protocol

Your answers will be kept confidential and will not be identified by name except some of your answers may be shared with your teacher during the teacher interview, in order to see if he/she has the same perception about your school work.

1. What school did you attend before you came to NHS, and what was your experience like there?

2. Using this scale below, please rate how capable you felt in 8th grade in doing 8th grade school work?

0	10	20	30	40	50	60	70	80	90	100
Can not do at all					Moderately Can do					Highly certain can do

Can you explain why you rated yourself that way?

3. Tell me about what your 9th grade experience was like here at NHS?

4. Using this scale below, please rate how capable you felt in 9th grade in doing 9th grade school work?

0	10	20	30	40	50	60	70	80	90	100
Can not do at all					Moderately Can do					Highly certain can do

Can you explain why you rated yourself that way?

5. Tell me about what your 10th grade experience is like now.

6. Using this scale below, please rate how capable you feel in 10th grade in doing 10th grade school work?

0	10	20	30	40	50	60	70	80	90	100
Can not do at all					Moderately Can do					Highly certain can do

Can you explain why you rated yourself that way?

Student Interview Protocol continued

7. Do you get “worse, same, better” grades now than you did in middle school?
What do you think is the reason for any difference?
8. Is there anything about NHS that makes it a good school? What?
9. Describe how you felt when you learned that you would get a laptop for your own personal use at NHS.
10. Describe how easy or difficult it was for you to learn how to operate the laptop and use the applications.
11. Describe how you use the laptop during a typical day.
12. Are there any specific classes where you think the laptop has helped you be a better student? Explain how.
13. Do you believe the laptop helps you become a “less, same or more” capable student? Why?
14. Describe an accomplishment that you have had at NHS.
Did the laptop play any role in that?
15. Has the personal laptop made a difference in your academic life? Explain.

Appendix F

Grade Distribution of American Studies, Math, and Grade Point Averages of
12 Students from Newtown High School

American Studies		Math		GPA*
American Studies	B	Geometry	B+	3.49
American Studies	B	Geometry	B+	3.43
Honors American Studies	B+	Honors Algebra II	A-	4.13
American Studies	B-	Geometry	C+	3.02
Honors American Studies	C-	Honors Algebra II	A-	3.46
American Studies	D-	Geometry	C	2.26
Honors American Studies	A	Honors Pre-calculus	A+	4.41
American Studies	A-	Geometry	A	3.40
American Studies	A-	Geometry	B+	3.53
American Studies	B+	Algebra II	B+	3.98
Honors American Studies	B	Algebra II	A-	3.69
Honors American Studies	B	Geometry	B-	3.18
Group Average	B		B	3.50

* GPA scores as of June 2011, from the Newtown Guidance Department.

Appendix G

Grade Point Average Table from Newtown High School

Letter Grade	Range	College Prep	Honors	Advanced Placement
A+	97-100	4.33	4.67	5.00
A	93-96	4.00	4.33	4.67
A-	90-92	3.67	4.00	4.33
B+	87-89	3.33	3.67	4.00
B	83-86	3.00	3.33	3.67
B-	80-82	2.67	3.00	3.33
C+	77-79	2.33	2.67	3.00
C	73-76	2.00	2.33	2.67
C-	70-72	1.67	2.00	2.33
D+	67-69	1.33	1.67	2.00
D	63-66	1.00	1.33	1.67
D-	60-62	0.67	1.00	1.33
F	50-59	0.00	0.00	0.00

Note. Source: Newtown High School 2011-12 Program of Studies, page 11.

Appendix H

Coding Descriptions

Broad Categories	Descriptions
Personal Factors (P)	Thoughts or beliefs about self-efficacy: Capabilities of accomplishing school work/academics (SE-A) Capabilities of self-regulated learning (SE- SRL) Capabilities of laptop use (SE-LU) Emotions &Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P) Negative (stressful, pressured, nervous, harder, difficult, struggled) (N)
Behavior (B)	Actions or skills students are doing Laptop use (LU) Self regulatory learning skills (SRL)
Environment (E)	School facility (F) School climate & relationships (R) Students (S) Teachers (T) Program offerings (PO) Classes (CS) Extracurricular/ Clubs (CB) Technology (Tech) Town Community (Comm)

Coding Descriptions continued

Categories	Descriptions & Codes
School Work (SW)	Instructional content (C) Amount of work (A) Difficulty of work (D) Grades (G)
Self-regulatory learning (SRL)	Organizing school work (OG) Taking notes (TN) Studying (SY) Monitoring grades (MG) Completing homework (CH) Participating in class (PC) Concentrating /focusing (CF) Remembering information (RI) Managing time (MT) Pushing myself (PS) Asking for help (AH)
Laptop Use (LU)	Emailing /communication with others (Eml) Storing school work (Sto) Tracking tasks, due dates and calendar events (Tra) Producing class products: documents, brochures, iMovie's, etc. (Pro) Researching topics / Internet use (Rea) Expanding knowledge and skills (Exp) Using specific software applications or tools: MS Office, iMovie, probes, graphing apps, etc. (Sof) "My own" personal laptop, don't have to share (Myo) Accessing Moodle (Moo) Convenience of all schoolwork being accessible (Con) It can be a distraction (Dis)

Appendix I

Coding Notebook

Question	Responses were sorted into:
<p>1. What school did you attend before you came to NHS, and what was your experience like there?</p>	<p>Newtown Middle School</p> <p>Other</p>
<p>2. Using this scale below, please rate how capable you felt in 8th grade in doing 8th grade school work?</p> <p>Can you explain why you rated yourself that way?</p> <p><i>Personal factors</i></p>	<p>Instructional content (C)</p> <p>Amount of work (A)</p> <p>Difficulty of work (D)</p> <p>Grades (G)</p> <p>Thoughts or beliefs about self-efficacy:</p> <p> Capabilities of accomplishing school work/academics (SE-A)</p> <p> Capabilities of self-regulated learning (SE-SRL)</p> <p> Capabilities of laptop use (SE-LU)</p> <p>Emotions & Adjectives</p> <p> Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed)</p> <p> (P)</p> <p>School climate & relationships (R)</p> <p> Teachers (T)</p> <p>Managing time (MT)</p> <p>Tracking tasks, due dates and calendar events (Tra)</p> <p>Completing homework (CH)</p>
<p>3. Tell me about what your 9th grade experience was like here at NHS?</p> <p><i>Environment</i></p>	<p>Instructional content (C)</p> <p>Amount of work (A)</p> <p>Difficulty of work (D)</p> <p>Grades (G)</p> <p>Thoughts or beliefs about self-efficacy:</p> <p> Capabilities of accomplishing school work/academics (SE-A)</p>

	<p>Capabilities of self-regulated learning (SE-SRL)</p> <p>Capabilities of laptop use (SE-LU)</p> <p>Emotions & Adjectives</p> <p>Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P)</p> <p>Negative (stressful, pressured, nervous, harder, difficult, struggled) (N)</p> <p>School climate & relationships (R)</p> <p>Teachers (T)</p> <p>Managing time (MT)</p> <p>Tracking tasks, due dates and calendar events (Tra)</p> <p>Completing homework (CH)</p> <p>Technology (Tech)</p> <p>School facility (F)</p> <p>School climate & relationships (R)</p> <p>Students (S)</p> <p>Teachers (T)</p>
<p>4. Using this scale below, please rate how capable you felt in 9th grade in doing 9th grade school work</p> <p>Can you explain why you rated yourself that way?</p> <p><i>Personal factors</i></p>	<p>Instructional content (C)</p> <p>Amount of work (A)</p> <p>Difficulty of work (D)</p> <p>Grades (G)</p> <p>Thoughts or beliefs about self-efficacy:</p> <p>Capabilities of accomplishing school work/academics (SE-A)</p> <p>Emotions & Adjectives</p> <p>Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P)</p> <p>Negative (stressful, pressured, nervous, harder, difficult, struggled) (N)</p> <p>School climate & relationships (R)</p> <p>Students (S)</p> <p>Teachers (T)</p> <p>Managing time (MT)</p> <p>Tracking tasks, due dates and calendar events (Tra)</p> <p>Completing homework (CH)</p>

<p>5. Tell me about what your 10th grade experience is like now.</p> <p><i>Environment</i></p>	<p>Instructional content (C) Amount of work (A) Difficulty of work (D) Grades (G) Thoughts or beliefs about self-efficacy: Capabilities of accomplishing school work/academics (SE-A) Emotions &Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P) Negative (stressful, pressured, nervous, harder, difficult, struggled) (N) School climate & relationships (R) Teachers (T) Managing time (MT) Studying (SY) Asking for help (AH) Technology (Tech) Emailing /communication with others (Eml) Completing homework (CH)</p>
<p>6. Using this scale below, please rate how capable you feel in 10th grade in doing 10th grade school work?</p> <p>Can you explain why you rated yourself that way?</p> <p><i>Personal factors</i></p>	<p>Instructional content (C) Amount of work (A) Difficulty of work (D) Grades (G) Concentrating /focusing (CF) Managing time (MT) Studying (SY) Technology (Tech) Push myself (PS) Completing homework (CH) Asking for help (AH) Thoughts or beliefs about self-efficacy: capabilities of accomplishing school work/academics (SE-A) Emotions &Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P) Negative (stressful, pressured, nervous, harder, difficult, struggled) (N)</p>

	School climate & relationships (R) Teachers (T)
<p>7. Do you get “worse, same, better” grades now than you did in middle school?</p> <p>What do you think is the reason for any difference?</p> <p><i>Personal factors</i></p>	<p>8 same, 5 better, 3 worse</p> <p>Thoughts or beliefs about self-efficacy: Capabilities of accomplishing school work/academics (SE-A)</p> <p>Grades (G) Difficulty of work (D) Emailing /communication with others (Eml) School climate & relationships (R) Teachers (T) Emotions &Adjectives Negative (stressful, pressured, nervous, harder, difficult, struggled) (N) Concentrating /focusing (CF) Completing homework (CH) Pushing myself (PS) Asking for help (AH) Technology (Tech)</p>
<p>8. Is there anything about NHS that makes it a good school? What?</p> <p><i>Environment</i></p>	<p>School facility (F) School climate & relationships (R) Students (S) Teachers (T) Program offerings (PO) Classes (CS) Extracurricular/ Clubs (CB) Technology (Tech) Town Community (Comm) Emotions &Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P)</p>
<p>9. Describe how you felt when you learned that you would get a laptop for your own personal use at NHS.</p>	<p>15 “excited or happy”</p> <p>Emotions &Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P) Negative (stressful, pressured, nervous, harder, difficult, struggled) (N) Organizing school work (0G)</p>

<i>Personal Factors</i>	Completing homework (CH) Having “my own” personal laptop, don’t have to share (Myo) Emailing /communication with others (Eml) It can be a distraction (Dis)
10. Describe how easy or difficult it was for you to learn how to operate the laptop and use the applications. <i>Behaviors</i>	<i>15 said it was easy or not too difficult</i> Emotions & Adjectives Positive (new, happy, proud, excited, easy, helpful, good, supportive, love, enjoyed) (P) Using specific software applications: MS Office, iMovie, etc. (Sof) School climate & relationships (R) Teachers (T) Students (S)
11. Describe how you use the laptop during a typical day. <i>Behaviors</i>	Emailing /communication with others (Eml) Tracking tasks, due dates and calendar events (Tra) Producing class products: documents, brochures, iMovie’s, etc. (Pro) Researching topics / Internet use (Rea) Using specific software applications or tools: MS Office, iMovie, probes, graphing apps, etc. (Sof) Accessing Moodle (Moo) Self-regulatory learning skills (SLR) Organizing school work (OG) Taking notes (TN) Monitoring grades (MG) Completing homework (CH) Participating in class (PC) Concentrating /focusing (CF) Managing time (MT)
12. Are there any specific classes where you think the laptop has helped you be a better student? Explain how.	<i>American Studies, Science, math, writing, First Robotic, Wellness</i> Having “my own” personal laptop, don’t have to share (Myo) Emailing /communication with others (Eml)

<p><i>Environment</i></p>	<p>Organizing school work (0G) Taking notes (TN) Storing school work (Sto) Researching topics / Internet use (Rea) Expanding knowledge and skills (Exp) Accessing Moodle Studying (SY) Concentrating /focusing (CF) Monitoring grades (MG) Completing homework (CH) Participating in class (PC) Using specific software applications or tools: MS Office, iMovie, probes, graphing apps, etc. (Sof)</p>
<p>13. Do you believe the laptop helps you become a “less, same or more” capable student? Why?</p> <p><i>Personal factors</i></p>	<p>10 – more capable, 6- same, 0- less</p> <p>Thoughts or beliefs about self-efficacy: Capabilities of accomplishing school work/academics (SE-A) Capabilities of self-regulated learning (SE-SRL)</p> <p>Grades (G) Instructional content (C) Expanding knowledge and skills (Exp) Storing school work (Sto) Tracking tasks, due dates and calendar events (Tra) Organizing school work (0G) Taking notes (TN) Studying (SY) Monitoring grades (MG) Completing homework (CH) Participating in class (PC) Concentrating /focusing (CF) Managing time (MT) Emailing /communication with others (Eml) Researching topics / Internet use (Rea) Expanding knowledge and skills (Exp) Using specific software applications or tools: MS Office, iMovie, probes, graphing apps, etc. (Sof) Convenience of all schoolwork being accessible (Con)</p>

	<p>It can be a distraction (Dis) Accessing Moodle (Moo)</p>
<p>14. Describe an accomplishment that you have had at NHS.</p> <p>Did the laptop play any role in that?</p> <p><i>Personal factors</i></p>	<p><i>6- sports/clubs, 6- grades, 3-writing, 1-self confidence</i> <i>9 yes, 7- no</i> Grades (G) Program offerings (PO) Classes (CS) Extracurricular/ Clubs (CB) Convenience of all schoolwork being accessible (Con) Expanding knowledge and skills (Exp) Push myself (PS) School climate & relationships (R) Students (S) Emailing /communication with others (Eml) Researching topics / Internet use (Rea) Accessing Moodle</p>
<p>15. Has the personal laptop made a difference in your academic life? Explain.</p> <p><i>Personal factors</i></p>	<p><i>15- yes, 1 –not really</i> Organizing school work (OG) Taking notes (TN) Studying (SY) Monitoring grades (MG) Completing homework (CH) Participating in class (PC) Emailing /communication with others (Eml) Researching topics / Internet use (Rea) Expanding knowledge and skills (Exp) Using specific software applications or tools: MS Office, iMovie, probes, graphing apps, etc. (Sof) School climate & relationships (R) Teachers (T) Convenience of all schoolwork being accessible (Con)</p>

Appendix J

Student Results of Interview Questions 2, 4, and 6: Capabilities of Doing Schoolwork

<u>Student</u>	<u>Question 2</u>	<u>Question 4</u>	<u>Question 6</u>		
	Eighth grade	Ninth grade	Tenth grade	Range from 8 th to 10 th	Change from 8 th to 10 th
1	90	80	90	10	0
2	100	90	90	10	-10
3	100	95	90	10	-10
4	80	80	80	0	0
5	80	90	80	10	-10
6	90	90	80	10	-10
7	90	85	95	10	+5
8	100	90	90	10	-10
9	100	60	80	40	-20
10	100	70	80	30	-20
11	99	85	79	20	-20
12	90	80	80	10	-10
13	90	90	90	0	0
14	100	100	100	0	0
15	90	80	80	10	-10
16	100	80	70	30	-30
Average	94	84	85	13	-10

Appendix K

Student Ratings in Self-efficacy for Academic Achievement

Students	a	b	c	d	e	f	g	h	i	j	Avg
1	80	80	70	90	100	100	100	100	100	100	92
2	100	100	100	100	100	100	100	60	100	100	96
3	100	90	90	90	90	90	90	90	90	95	92
4	90	90	90	90	100	80	100	70	80	90	88
5	60	70	50	40	30	70	100	50	70	40	58
6	90	80	90	70	70	80	80	50	60	60	73
7	100	80	85	89	100	100	100	75	100	95	92
8	70	100	90	90	100	100	100	70	80	80	88
9	90	80	100	100	100	100	100	60	70	50	85
10	100	90	90	70	90	80	90	50	70	100	83
11	90	90	83	80	80	85	80	90	85	95	86
12	100	90	80	80	90	80	90	90	70	70	84
13	80	70	80	100	90	80	80	60	50	60	75
14	100	100	100	75	100	100	100	75	100	100	95
15	90	90	80	80	100	90	100	50	80	80	84
16	100	90	90	80	100	80	80	70	70	90	85
Avg	90	87	86	83	90	88	93	69	80	82	85

Note. Items taken from Bandura's Children's Self-efficacy Scale (2006b).

Appendix L

Self-efficacy for Academic Achievement: Group Average Ratings in Descending Order

I can learn...

Item	Confidence (0-100)
(g) To use computers	93
(a) General mathematics	90
(e) Reading	90
(f) Writing	88
(b) Algebra	87
(c) Science	86
(d) Biology	83
(j) English grammar	82
(i) Social studies	80
(h) Foreign language	69

Appendix M

Student Ratings in Self-efficacy for Self-regulated Learning

Student	a	b	c	d	e	f	g	h	i	j	Avg
1	100	100	100	100	100	100	100	100	100	100	100
2	100	100	100	100	70	100	100	100	100	100	97
3	100	100	100	100	95	100	100	95	100	100	99
4	70	90	90	60	40	60	70	70	80	70	70
5	100	100	100	100	50	90	90	90	90	100	91
6	100	70	70	60	40	90	90	60	70	80	73
7	80	70	75	90	100	95	85	100	45	60	80
8	100	60	80	100	100	100	100	80	100	70	89
9	100	80	70	70	40	80	90	60	60	90	74
10	90	90	90	90	60	100	100	80	80	80	86
11	99	90	90	89	50	85	85	80	60	99	83
12	100	60	90	90	100	90	90	80	80	90	87
13	100	80	70	80	50	50	50	60	70	80	69
14	100	100	100	100	100	100	100	75	100	100	98
15	100	90	100	100	80	100	100	90	100	100	96
16	100	80	80	80	90	100	100	70	70	100	87
Avg.	96	85	88	88	73	90	91	81	82	89	86

Note. Items taken from Bandura's Children's Self-efficacy Scale (2006b).

Appendix N

Self-efficacy for Self-regulated Learning: Average Ratings in Descending Order

I can...

Item	Confidence (0-100)
(a) Finish my homework assignments by deadlines	96
(g) Organize my schoolwork	91
(f) Plan my schoolwork for the day	90
(j) Get myself to do school work	89
(d) Take good notes during class instruction	88
(c) Concentrate on school subjects during class	88
(b) Get myself to study when there are other interesting things to do	85
(i) Arrange a place to study without distractions	82
(h) Remember well, information presented in class and textbooks	81
(e) Use the library to get information for class assignments	73

Appendix O

Student Ratings in Self-efficacy for Laptop Use.

Student	Items												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1	100	100	100	100	100	100	100	100	90	100	90	100	100
2	100	90	90	100	100	100	100	100	100	100	60	100	100
3	100	100	100	100	90	100	100	100	85	100	80	85	60
4	80	70	90	100	100	100	100	90	50	90	40	90	80
5	50	90	90	100	100	100	100	100	50	100	100	100	100
6	90	50	80	100	100	100	100	90	40	100	30	50	100
7	100	60	100	100	100	90	100	95	70	100	60	100	80
8	100	80	100	100	100	100	100	100	100	100	90	100	100
9	100	90	100	100	100	100	100	100	100	100	80	100	100
10	100	30	100	100	90	80	80	100	50	100	0	100	50
11	99	100	50	100	90	90	100	90	87	90	0	85	100
12	100	0	90	100	90	90	100	100	80	100	50	100	90
13	100	60	90	100	90	100	100	100	50	90	50	80	90
14	100	100	100	100	100	100	100	100	0	100	100	100	100
15	100	80	100	100	100	100	100	100	80	100	70	100	90
16	60	50	100	100	100	100	100	80	70	100	50	100	100
Avg	92	72	93	100	97	97	99	97	69	98	59	93	90

Note. Items created by R. Wilson (2011).

Appendix P

Self-efficacy for Laptop Use: Average Ratings in Descending Order

I can...

Item	Confidence (0-100)
(d) Use email for communicating with others	100
(g) Write a research paper using MS Word or Pages	99
(j) Use PowerPoint or Keynote to present ideas	98
(e) Use MS Office such as Word, PowerPoint and Excel	97
(f) Make a movie using iMovie	97
(h) Use Moodle for class information and assignments	97
(l) Use iPhoto for pictures	93
(c) Download media (music, video) files from iTunes	93
(a) Use the laptop for taking notes in class	92
(m) Use Google docs for sharing and working on documents with others	90
(b) Create a podcast using Garage Band	72
(i) Use Google calendar to keep track of when assignments are due	69
(k) Participate in a wiki or blog to create and share content	59
