EFFECTIVE TECHNOLOGY INTEGRATION IN MODULE-BASED CURRICULUM

by

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CERTIFICATION OF THESIS WORK

We the undersigned certify that this thesis by Lindsay Putman, candidate for the Degree of Master of Science in Education, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this thesis.

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ABSTRACT

This empirical study began with the question of what types of technology are teachers actually using and integrating into their instruction and delivery of the Common Core Module based curriculum of New York State, in order to increase student achievement? A mixed methodology was used in this observation study. Participants were three elementary school teachers, all female, all Caucasian, all in the same western New York school, and all recognized by their principal as being “successful” integrators of technology into a Module-based curriculum. Data were collected from two individual interviews each, and from classroom observations of Module-based lesson teaching, using an observation sheet designed by the researcher. Results show that individual teacher use of technology ranged from 57% of the lesson time to 100% of the lesson time, and the most common functions for integrating technology were for topic introduction, providing information, modeling a skill, and student practice. The most common technology devices were Interactive Whiteboard (IWB), with Clickers and teacher computers (laptops and desktop) second. The most commonly used software was word processing and PowerPoint. Results also show that successful teachers have received professional development specifically on integrating technology into instruction, but are also confident enough to engage in their own trial and error learning. In addition to finding that these successful teachers combine strong knowledge about instructional technology and about instruction generally, results show that in order to successfully integrate technology into Module-based lessons, actual technology integration also depends on the focus of the individual teachers: what is developmentally appropriate, or student-centered instruction, or knowing students’ existing knowledge.
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Chapter 1: Introduction

Statement of Problem

According to the International Reading Association (IRA, 2009), students in today’s schools need to be “proficient in the new literacies of 21st century technologies” (p. 1). This statement demonstrates the need for integrating technologies into literacy curriculums. New York State has mandated the Common Core State Standards (CCSS, 2012) as the framework for the curriculum in New York schools. Schools have the option of delivering these Standards through the newly created curriculum Module presented on EngageNY (2013). An initial glance at one of these Module has shown very little in the way of integrating technology into the lessons and curriculum. This lack raises the question of technology use with the Common Core Module curriculum. An issue is teacher knowledge about appropriate types of technology that could be integrated into a Module-based curriculum. Types of technology refers to more than just software programs and “apps”; various electronic devices can carry the same software. Therefore, the bigger issue is teacher familiarity and comfort with using actual electronic devices, or “hardware”. An appropriate research question to address this issue is, what types of technology are teachers actually using and integrating into their instruction and delivery of the Common Core Module based curriculum of New York State, in order to increase student achievement? Answering this question requires an empirical study.

Background

As the International Reading Association (IRA, 2009) states, technologies have “proven to be powerful tools in the classroom” (p. 2). In my classroom, I enjoy using technology to teach my students; however, since my district is moving to adopt the CCSS Module for its curriculum, I wonder about the technology complement of those Module. Will I still be able to use many of the technology tools I now use? These questions and others from my colleagues made me curious about the technology in Module-based curriculum. I also think it is beneficial to further understand which technologies can be integrated into a module-based literacy curriculum. From my experience, it has also become apparent that while some teachers may have access to various
technologies, they do not always implement them during instruction. Based on this observation, it may be useful to further understand which factors affect teacher implementation of technology in the classroom. Therefore, I have decided to conduct some empirical research related to this topic.

**Terminology**

For the purpose of this research study, terms are defined below to provide the reader with a better understanding of the topic. The first key terms are “technology” and “instructional technology”.

*Technology*: this term can encompass many types of media, but for this empirical project, technology will be defined as digital, electronic, or computer based devices.

*Instructional Technology*: Miranda and Russel (2012) define instructional technology as “the use of digital or computer technologies for teaching and learning in the classroom” (p.655). Adapting that definition slightly produces this one for this research: digital, electronic, or computer-based devices, which can be used by an educator for teaching purposes.

*Software or programs*: for this study, this term will include programs and other operating information that can be used by an electronic device.

*Electronic device or hardware*: will refer to actual equipment that operates electronically and carries the software.

**Theoretical Stance**

One theory that supports this study is literacy as socially situated, as a social practice (Gee, 1991). Gee explains the idea of “Discourses” and how they each have their own type of literacy and literacy practices. Voss (1996) builds on this idea with her work related to out-of-school literacies. The use of electronic devices is a major part of most students’ out-of-school lives and part of their own “culture” or “Discourse.” How a teacher handles the features of these cultures depends on what a teacher knows about these features and the culture (Bird, 2005).
This proposed study also aligns with the International Reading Association (IRA) Standards for Reading Professionals (2010), especially Standard 1, Professional Knowledge and Standard 2, Curriculum and Instruction. Standard 1 requires reading specialist candidates to “understand the theoretical and evidence-based foundations of the reading and writing processes and instruction.” The purpose of this research is to examine the role of technology in literacy instruction; this examination is possible only with an understanding of the theory involved in viewing technology as part of the social practice of literacy. Standard 2 states that comprehensive reading programs must provide a wide variety of “traditional print, digital, and online resources” that meet the needs of diverse learners. This Standard strongly correlates with integration of technology into instruction because while reading teachers are expected to provide their students with digital print and online resources, these resources are available on some form of electronic device. The purpose of this research is to determine how well teachers know the features of their devices. The Literate Environment Standard 5 presented by IRA (2010) focuses on the need for reading teachers to synthesize their “foundational knowledge” about content, physical space, instructional materials and technology to create a literate environment that meets the needs of students. This standard also correlates with technology integration because IRA (2010) has determined that in order to create a literate environment, the teacher would do well to consider elements related to instructional materials and technologies.

Rationale

Over the past few years, there has been an increasing emphasis on the Common Core State Standards (CCSS), which were mandated in 2010 (engageNY, 2013). To help implement the CCSS, the New York State Education Department (NYSED) has created EngageNY to provide a Module-based curriculum, with materials and resources, which aligns with the CCSS and supports educators in reaching “the State’s vision for a college and career ready education” (EngageNY, 2013, para. 1). The resulting Common Core Module may be either adopted, adapted, or ignored by school districts. An analysis of the grade one to grade four English Language Arts (ELA) Module shows that this module-based curriculum does not offer suggestions for ways to integrate technology into instruction. The IRA (2009) in its position statement on New Literacies and 21st century Technologies claims that the Internet and other
forms of information and communication technologies (ICTs) are “redefining the nature of reading, writing, and communication” (p.1). Therefore, it appears essential that reading teachers understand and implement instruction that incorporates the use of electronic devices. Given that some teacher are always striving to be at the forefront of technology use in their classrooms, this research study will enable those teachers, and others, to share what they have been doing with electronic devices to enhance their Module-based instruction. This new knowledge has the potential to assist teachers who are less technologically “savvy” than others, and thereby enhance the instruction that all students receive.
Chapter 2: Literature Review

Introduction

The issue of teacher use of instructional technology, specifically electronic devices, in a module-based curriculum has led to the research question on the types of electronic devices teachers are actually, currently using and integrating into their curriculum. Before starting the empirical research to answer that question, I have conducted a literature review to find existing research that studied instructional technology with various electronic devices. For this literature review, I have used the search terms of instructional technology, technology, and electronic devices to search the major education databases. I then grouped the 20 articles I found, and I review them in the groups below. Group one is related to the impact of instructional technology, specifically of certain devices on instructional practices. Group two is teacher perception of technology integration for instruction.

Impact of Instructional Technology

The first group of articles reviewed contains research on the impact of specific types of electronic devices. One general type is portable, handheld electronic devices. “Mobile learning,” according to Joan (2013) is a kind of learning that occurs as a result of using portable handheld electronic devices. Joan (2013) uses a survey method to examine the “progress of mobile learning as a learning style” (p. 29) among 100 student teachers from a college of education in southern India. For this study, the researcher used a Mobile Learning Questionnaire and Personal data sheet to obtain data. The major findings from this study demonstrate that there is a “significant difference between mobile phone users and others in academic achievement” (p. 34). This finding supports the idea that mobile learning devices can help students to “participate whole heartedly in their learning” (p. 36). The researcher also finds that this is a “significant difference” (p. 36) between mobile phone users and others in terms of mobile learning as a learning style. Participants who were mobile users seemed to have a better understanding of mobile learning as a learning style. Overall, Joan (2013) concludes that the findings from this study demonstrate that mobile learning devices may perform a “consequential role” (p. 36) in
increasing teaching and learning.

Another handheld device that can be integrated into instruction is Clicker technology, which is a tool-related student response system that has numbered and lettered buttons on a small handheld device that students can push to enter their answers to a question. Roush and Song (2013) examine the impact from both the students’ and teachers’ perspectives of using Clickers technology in classrooms. The researchers investigated multiple questions, including how Clickers impact students’ learning and how Clickers impact students’ participation. Both quantitative and qualitative data were collected from 99 students and 17 teachers, from six different elementary and high schools, using survey and interview methods. In-depth analyses were conducted on the data to generate comprehensive findings. Roush and Song (2013) find that most students agreed that the use of Clickers helped improve their knowledge of class materials and helped them understand more in class. Data analysis identified Clickers as helping students “become aware” (p. 28) of their understanding of the lesson that was taught. The teacher participants agreed that “students’ knowledge of class materials was improved” (p. 28) by using Clickers, and Clickers provided a “new approach” (p. 28) for students to learn and increase student engagement. Student participants agreed with the teachers’ perceptions and identified Clickers as helping to increase “focus on the subject matter” (p. 28) on the subject matter during instruction. A finding from this study is that teacher participants agreed that their students were “more engaged, interested, and had a greater sense of participation” (Roush & Song, 2013, p. 29) during class when they used Clickers.

Mobile computing devices are portable, handheld computers with a touch screen and built in keyboard. Swan, Hooft, and Kratcoski (2005) explore students’ use of mobile computing devices and their effect on student motivation to learn, on engagement in learning activities, and on support for the learning process. The researchers of this study used mixed methodology to collect data from elementary and middle school students and teachers, from six different classes, in Northeast Ohio. Data collected from these six classes include lesson plans, usage data, work samples, interviews, and classroom observations. After analyzing the data, the researchers find that students’ motivation in learning activities was “improved” (p. 106) by their use of the mobile computing devices, “especially their motivation to complete written assignments” (p. 108). Students stated that they preferred using the mobile computing devices for writing assignments because it made the work “easier and more fun” (p. 107). Many of the students also
stated that they enjoyed being able to share their writing with their friends. Although there are negatives to using any type of technology, the students believed that the benefits “outweighed” (p. 107) the difficulties. Data analysis of student interviews identifies that the students “particularly noted” (p. 109) that the mobile computing device kept their work organized, while assisting in taking notes, test review, and doing calculations. Overall, the researchers found that the use of mobile computing devices can “enhance student learning processes” (p. 109), especially related to writing assignments.

Laptops are another portable device that can be integrated into instruction. Solhaug (2009) conducted a study that compare students’ critical reflections in two different technological environments in six upper secondary Norwegian schools. Both technology environments had access to a computer and the Internet for each student; however, the first environment was the “traditional computer room” (p. 415) with stationary computers connected to the Internet, and the second environment had laptop computers with a wireless connection to the Internet. Both environments had ITS-Learning (ITL) software, which enables communication, management of different tasks, and collaborative learning practices. This study used a quasi-experimental design to understand what type of computer accesses critical reflection. The data in this study came from 719 student responses to a survey questionnaire. The results from this study show that there is a “significant difference” (p. 417) in critical practices between the two technology environments. The student interviews strongly support the finding that, while environments supported critical practices, the laptop schools had more critical reflective practices than the computer room. The students seemed to feel “empowered” (p. 417) in the classroom situation, especially during the dialogues or discussion, but also in their school work in general. Solhaug (2009) also find that students participated on more equal terms in technology-rich classrooms because these classrooms, like the laptop schools, offered interesting options for student participation and discussion. Overall, this study shows that digital access “has an effect on critical reflection” (p. 420) and may empower students’ participation.

Another electronic device, but one that is not handheld, is the Interactive Whiteboard, or IWB. This is a touch-sensitive screen that works in conjunction with a computer and a projector. Shenton and Pagett (2007) examine the ways IWBs are being used in the context of literacy teaching. For this study, the researchers used structured classroom observations and taped interviews to collect data from teachers and students in six primary schools in south-west
England. Through the observations, the researchers noted that the teachers in this study “use pre-prepared screens to scaffold writing, use ‘smart tools’ to highlight text, and magnify text” (p. 131). The researchers also noted that the IWB appeared to be a “powerful resource” that teachers used to “support their teaching” (p. 132). While teachers focused on the ways in which IWBs can support their teaching of writing and reading, the students focused on the impact an IWB has on “subjects across the curriculum” (p.133). The findings demonstrate that IWBs appear to be beneficial for the teaching of literacy skills, as well as all content area subjects. Analysis of the data also shows that IWBs can have a “motivational effect” (p. 133) on student learning. Shenton and Paget (2007) conclude that IWBs can offer a multimodal approach to teaching literacy, which increases students’ motivation.

A type software that can be accessed through various electronic devices is Electronic books or e-books. Because e-books have been gaining popularity for personal reading, Jones and Brown (2011) attempt to understand the effects of electronic books on third grade students’ reading engagement. For this study, 22 third grade students completed satisfaction surveys and reading comprehension tests on three different reading sessions: some containing traditional print and others containing e-books. The researchers used a website, called Raz-Kids.com, to obtain e-books for this study. This website had access to approximately 100 e-book titles, grouped by grade level. Jones and Brown found that this wide variety of titles was a “strong motivator for engagement” (p. 11). Many of the students indicated that they were impressed with both the wide variety of e-book titles, but also the various features that this website presented. This study shows that features such as pop-up windows with definitions and word pronunciation are “motivational for children” (p.16). The findings from Survey 1 show that more students responded at a “higher level of enjoyment” (p. 15) for the e-book, rather than the print book. The students also responded favorably to other features, such as the pop-up windows with definitions and word pronunciation, which were reported to have “positive effects on learning” (p. 16). Although the scores were “nearly identical” (p. 14) between the comprehension level of traditional print and e-books, this study demonstrates that features provided by e-books presented on the Raz-Kids.com website increase student motivation to read.
Teacher Perception of Technology Integration For Instruction

The second group of articles reviewed contains research on teacher perceptions of technology integration. Baylor and Ritchie (2002) collected quantitative data to investigate the impact of various factors related to school technology, to answer the question: what actions can school personnel take that most effectively lead to their desired results regarding the integration of technology in schools? Through purposeful sampling, a total of 94 elementary, middle, and high school teachers from 12 different schools were the participants in this study. Data were collected through structured interviews, teacher surveys, and examination of school technology use plans (Baylor & Ritchie, 2002). The primary means for analyzing the data was through “stepwise regression analyses” (p. 406), which identifies what combination of independent variables predicted the result of a dependent variable. The regression analyses identified that different independent variables could predict each of the five dependent variables: technology impact on student content acquisition, higher-order thinking skills, teacher morale, teacher technology competency, and teacher integration. The findings presented by Baylor and Ritchie (2002) provide evidence that strong technology leadership can influence student content acquisition in various ways. Strong technology leaders tend to “promote technology” (p. 409) in a way that reinforces the importance of technology to students and staff. The researchers also find that the impact of technology on higher-order thinking was predicted by the amount of technology use by students and the level of constructivist modes of technology. The factor of “teacher openness to change” (p. 399) was “repeatedly found to be a critical variable” (p. 412) throughout the study. This demonstrates that teacher openness to change has shown to have an important influence on teacher technology competency and higher-order thinking skills related to the integration of technology. Another variable with “high predictive influence” (p. 412) was the level of technology leadership and support for professional development. Baylor and Ritchie (2002) explain that administrators who wish to “nurture a technology culture” (p. 412) would benefit from joining in on the integration of technology. Overall, Baylor and Ritchie (2002) identify various factors that influence technology integration.

While some studies focus on effective integration of a type of technology, Erişti, Kurt, and Dindar (2012) examine technology integration by classroom teachers in general. Their focus for this study is on what problems teachers are encountering regarding technology integration
and what activities could be used to provide teachers with support for technology integration. The researchers obtained data from 21 male and female teachers working at Tepebasi Resat Benli Elementary School in the city of Eskisehir in Turkey. The qualitative research method revealed the views of elementary teachers and field teachers related to effective integration of technology and problems they encounter in the process. The researchers obtained data through focus-group interviews, observations, and the researchers’ journals. Thematic analysis was used to analyze the data in three phases to create an “in-depth” (p. 33) understanding of the data.

Erişti, Kurt, and Dindar (2012) state that teachers agreed that keeping up with technology was a “responsibility and necessity” (p. 35); however, they also stressed that other responsibilities expected from them “limited their interest” (p. 35) in this area. The researchers also found that time lost in making technology available to use led to “decreasing motivation and ineffective use of technology” (p. 35). The researchers stated that some problems that occurred were due to the Internet connection. These two findings reflect on negative environment factors that affect technology integration. Erişti, Kurt, and Dindar (2012) also found that teachers had positive and effective experiences related to “ready-made programs and materials” (p. 38). The teachers explained that these ready-made programs were easier and available with fewer complications. Based on their various perspectives of technology, teachers found that one way to avoid complications with technology was training students and assigning duties regarding technology. Many of the teachers agreed that this was a positive solution to the many negative aspects of technology.

A study by Ertmer, Ottenbreit-Leftwich, Sadlik, Sendurur, and Sendurur (2012) also focuses on multiple situations of technology integration. The researchers used multiple case-studies to answer the question, “how do the pedagogical beliefs and classroom technology practices of teachers recognized for their technology usage align?” (p. 117). For this multiple case-study approach, the researchers purposefully selected twelve Kindergarten through Twelfth grade teachers for their “award-winning technology practices” (p. 426). A preliminary analysis was completed on the websites of the twelve teachers. Afterward, the teachers were interviewed, and the data were analyzed using a “constant comparison method” (p. 428). Analysis suggests that “external barriers” (p. 423), such as support, money, access, and time are “more impactful” (p. 423) than internal factors. The “strongest barriers” (p. 423) preventing other teachers from using technology appear to be their existing attitudes and beliefs towards technology as well as
their level of knowledge and skills. Findings suggest that some teachers may not have sufficient knowledge and skills related to technology, thereby negatively affecting their attitudes and beliefs, and more pointedly their integration of technology into class instruction. The researchers also found that eleven of the twelve teachers’ beliefs were strongly correlated to their use of technology. In this study, six teachers used technology to “complement or enrich the current curriculum” (p. 430); others used technology to help students learn content and skills, and in transformative ways. The final major finding from the study was that all twelve teachers were using Web 2.0 tools to “engage student into the curricula” (p. 432).

Other research on technology integration and perceptions of classroom teachers is by Gorder (2008) who examines the various ways that teachers use and integrate technology into teaching and learning in the classroom and the various factors that may influence the extent of integration. A survey was completed by 174 kindergarten through twelfth grade South Dakota teachers. The Technology Integration Configuration Matrix (TICM) is a survey that determines how teachers are integrating technology into their classrooms by examining instructional uses of technology in a classroom and organizing these findings along a continuum. Of the 35 survey questions, the first 18 addressed technology integration in the classroom. Data show that most teachers “agreed most strongly” (p. 68) that they use technology resources to provide instruction that promotes critical thinking; however, data also show that teachers rarely develop electronic portfolios to engage learners. The remaining survey questions focused on teachers’ use of technology during teaching and learning. Data show that the most common technology software applications used were word processing programs, Internet browsers, presentation software, digital cameras, and graphic programs. The least common technology software were video web-based collaboration programs and blogs/podcasts. For factors influencing integration, Gorder found that there are “no significant differences” (p. 71) between technology integration and teachers’ gender, age, teaching experience, content area, and education level. Although no significant differences were found between technology integration and personal or demographic characteristics, data show that teachers in grades 9-12 appear to integrate technology “to a greater degree” (p. 72) than K-5 teachers. These findings indicate that the teacher appears to be an “important factor for success when using and integrating technology” (p. 73).

Kurt (2010) focused on a slightly different method of technology research. He conducted a case study to examine teachers’ use of available technologies. For this study, 29 teachers from
a Turkish elementary school completed a survey. At this school, 14 interviews were conducted with teachers and administrators, and observations were completed in classrooms and computer labs. All of this qualitative data was analyzed to determine patterns and themes related to the integration of technology. Findings indicate that technologies in this school are used for instruction in the use of technology, administrative tasks, instructional purposes, and non-educational purposes. Kurt finds that computer technologies are employed for instructional purposes at a “limited level” (p. 73). The majority of teachers revealed that they were frequently using televisions and videos as instructional tools. The research also shows that teachers tend to “use simpler technologies” (p. 74) rather than ones that may be relevant or more useful. Out of the many teachers that were observed, the two teachers that were using educational technologies the most also demonstrated their “interest in educational technologies” (p. 72). This finding demonstrates that teachers’ interest may play an important role in the integration of technology. The findings from this study also support the idea that appropriate teacher training is essential to the appropriate use of technology in the classroom.

The category of teacher perceptions of technology integration continues in a study by Liu (2010) that aims to identify differences between pedagogical beliefs of teachers and teaching activities related to technology integration. In this study, 1,120 elementary school teachers, representing 517 schools in Taiwan, completed a questionnaire that collected data related to teacher pedagogy, teaching activities, and factors associated with the integration of technology. Only teachers who “implemented technology” (p. 1015) were asked to complete the questionnaire. The data from the questionnaires were analyzed using the chi-square test and two-way analysis of variances (ANOVA). The researcher begins by identifying the relationship between teachers’ beliefs and teaching activities. Liu indicates that of all the participants, there were “significantly more” (p. 1018) teachers who held a learner-centered belief, rather than teacher-centered. Of the teachers who held a learner-centered belief, 28.2% implemented constructivist teaching activities, while 71.8% lectured. This demonstrates that although the teachers may have learner-centered beliefs, their beliefs do not necessarily impact the type of teaching activities they implement. This discrepancy may be related to the teachers’ lack of understanding related to technology integration, which would lead to the absence of constructivist teaching activities. Therefore, findings support the idea that teachers may need to “internalize an innovative and active perspective for technology use” (p. 1019) and adjust their
teacher beliefs and practices base on “external expectations and student achievement” (p. 1019).

Similar to other studies on teacher technology perceptions, some research has been done about the specific factors of teacher perceptions that affect technology integration. Miranda and Russel (2012) focus on this area of research and identify factors that affect teacher-directed student use of technology (TDS) in elementary classrooms by analyzing data from the Use, Support and Effect of Instructional Technology (USEIT) study. The researchers used data from a convenience sample of 1,040 kindergarten through sixth grade teachers, from 81 schools in Massachusetts. Miranda and Russel used Structural Equation Modeling (SEM) to “examine relationships” (p. 663) among teacher-level factors that may affect a teacher’s instructional use of technology. The study started with correlation analyses, which examined the relationships between TDS and the USEIT scale results to provide possible predictors of TDS. Next, the researchers used the findings from the correlation analyses and prior research to create a hypothetical path model for teacher-level TDS. The final teacher-level TDS model consisted of eight variables, five of which were “modeled as having a direct effect on TDS” (p. 659). These variables are obstacles integrating technology, teacher’s experience with technology, perceived importance of computers, perceived pressure to use technology, and beliefs about technology benefits. Findings show “perceived need for professional development” (p. 656) and teachers’ confidence using technology had “indirect effects” (p. 660) associated with TDS. Based on the final teacher-level TDS model, Miranda and Russel found a “noteworthy relationship” (p. 662) between the teachers’ experience with computers and perceived importance of technology. Another association found between teachers’ experience with computers and teachers’ confidence using technology was that as a teacher’s experience with computers increases, his or her perceived importance of technology and confidence with technology increases. Furthermore, teachers who perceive technology as important and have confidence with technology are more likely to “direct their students to use technology in the classroom” (p. 663). Despite the positive effects of most variables studied here on TDS, obstacles to integrating technology appear to have a “detrimental effect on technology use” (p. 663).

Moore-Hayes (2011) conducted a study to identify teacher perceptions using a method of Likert-scaled interview questions. This study aimed to identify how teachers feel about their own integration of technology. In this study, a quantitative, descriptive research model was used to analyze 350 pre-service and in-service teachers’ efficacy related to technology. The participants
completed an online survey with open-ended questions. Data show that both pre-service and in-service teachers had perceived self-efficacy levels of “less than adequate” (p. 8) when it came to technology, and there was “no significant difference” (p. 8) between pre-service and in-service teachers’ self-efficacy perceptions. The findings suggest that both groups of teachers believed themselves to be less than adequately prepared to effectively integrate technology into their classroom. Findings also suggest that the low levels of teacher-efficacy were related to the teachers’ ability to evaluate and select software to support teaching and learning, and possibly also related to the extent to which the teachers felt prepared to select and utilize technologies to support teaching and learning. Moore-Hayes states that 40% of the respondents indicated that they felt “not at all prepared” (p. 9) for technology integration in their classroom. One open-ended question asked teachers to identify specific examples from their practice that they felt positively impacted their perceptions related to technology integration; results revealed that teachers believed completing at least a portion of their practicum in a “technologically-advanced classroom” (p. 10) and being mentored by a teacher who was experienced in technology impacted their perceptions of technology integration.

Mueller, Wood, Wiloughby, Ross, and Specht (2008) conducted a study to identify variables that best discriminate between teachers who do, and do not integrate computer technology into their classrooms. The final sample from the study included 185 elementary teachers and 204 secondary teachers, representing 110 schools from a midsized Canadian city. These participants completed a survey that examined nine different components. Univariate group comparisons were conducted using one-way ANOVA’s on “each construct of interest” (p. 1529). Researchers determined that there were “many significant construct variables” that showed differences between “high integrators” and “low integrators” (p. 1529). Strong correlations were identified for the elementary groups including positive experience, teacher’s comfort, specific beliefs related to technology, teacher’s use of computers, and training. Findings show that experience with computer technology and attitudes toward technology had an important impact on successful integration of computer technology. Mueller et al. identify six variables that predict integration among elementary teachers, with four of these variables being related to “computer-related experiences” (p. 1532). This finding demonstrates that teachers are apt to integrate technology if they have had extensive experiences related to technology. Attitudes towards technology and training with computers were also important variables at the
elementary level, which also shows that having experience related to technology increases the likelihood of integration in the classroom. Although there were many variables that differed between the high and low integration groups, teachers’ gender, years of experience, technical problems they had experienced, or the enjoyment and motivation for their work had “no significant impact” (p. 1533). Based on the findings from this study, researchers recommend that professional development address the attitudes of teachers and present these teachers with opportunities for positive technology experiences “within the content of their instruction” (p. 1534).

A study by Inan and Lowther (2012) focuses on the factors that affect teachers’ integration of laptops into classroom instruction. The researchers specifically inquire about factors related to teacher readiness and beliefs, and school factors. Data were gathered from a total of 379 Kindergarten through twelfth grade teachers, from 195 public and private Michigan schools. The Freedom to Learn Teacher Technology Questionnaire (FTL-TTQ) was adapted from a 20 item validated Teacher Technology Questionnaire (TTQ) by using more specific terms such as “FTL laptop computers” (p. 940). A type of ordinary least-square procedure called “path analysis” (p. 939) was used to analyze the data in this study. Based on the analysis of the data, Inan and Lowther find that teacher readiness and beliefs indicate a “significant positive direct effect” (p. 940) on laptop integration. The researchers also find that school-level factors, such as professional development, “indirectly influenced” (p. 941) teachers’ laptop integration and positively influenced teacher readiness and beliefs. These findings demonstrate that school-level factors do affect teachers’ readiness and beliefs related to the integration of technology, which influences teachers’ laptop integration; therefore, if teachers receive professional development related to the integration of technology, their readiness to integrate laptops may increase.

Ipods and MP3 players are shown to be effective classroom aids in a study conducted by Murphrey, Miller, and Roberts (2009). The purpose of this study is to determine the effectiveness of using Ipods and MP3 players in the classroom and the teachers’ perceptions of this implementation. The participants in this study were 149 teachers of varying subjects in Texas. Data collection was a questionnaire that included two open-ended questions. The researchers compiled a list of all of the responses and opinions from the teachers about the use and application of Ipods and MP3 players. All features that had at least 20% agreement rates from all of the teachers were added to this list. Findings indicate that the features shown to
increase student achievement and have positive teacher perception levels are using this type of technology for lectures, showing videos, using supplemental material, reviewing for tests, providing lesson follow-up, and individualizing instruction. Conversely, findings indicate that barriers to using this type of technology in the classroom are that teachers may “need more information” (p. 114) about using this type of technology and there is a high “temptation for students to be off task” (p. 114) with the technology. Researchers state that overall, teachers are “generally happy” (p. 107) with the implementation of Ipods and MP3 players; therefore, school districts could benefit from providing “professional development, in-service training, or downloadable podcasts for teachers to test-drive before committing to the cost and time of creating their own lesson tools” (p. 117). Researchers also suggest that “teachers who are supportive of the use of these technologies will actually put them to use with their students” (p. 117) and this may result in more successful rates of implementation and high student achievement.

A study by Pan and Franklin (2011) provides insight into the barriers related to technology integration by in-service teachers. This study identifies factors that predict the utilization of Web 2.0 tools in classroom instruction. For this study, Web 2.0 tools include blogs, wikis, social networking sites, image sharing sites, and course management systems. Pan and Franklin used a “nationwide stratified sample frame” (p. 28) to collect quantitative data through a web survey. A total of 559 in-service teachers responded to this research invitation; however, due to a lack of knowledge related to web 2.0 tools, only 243 participants were able to submit responses. Findings indicate a “very low frequency” (p. 32) of using web 2.0 tools, and few participants reported using Web 2.0 tools everyday. Further findings determine that teachers’ self-efficacy tended to be “neutral” (p. 33), which shows that these teachers were unsure if they had enough confidence to use these tools. Results suggest that teachers’ efficacy is a “strong predictor” (p. 33) of the integration of Web 2.0 tools in the classroom. Other variables such as professional development, access to Web 2.0 tools, and school administrative support, all had a “medium effect” (p. 34) on the integration of these tools. Overall, this research presented findings that relate to the idea that teachers’ self-efficacy and confidence related to technology play a critical role in the integration of technology.

This next study focuses on a type of technology curriculum that has also been shown to increase student learning gains in addition to teacher perceptions of effective inclusion. PictoPal
is the name of a curriculum that is used in some Dutch kindergartens that focuses on being rich in technology while focusing on emergent literacy. Cviko, McKenney, and Voogt (2012) examined the effectiveness of the “technology-based innovations” (p. 31) and the teachers’ perceptions of the effectiveness of the PictoPal curriculum. Participants were four Kindergarten teachers and 91 Kindergarten students that experienced PictoPal. This study took place over two years in the Netherlands with junior and senior Kindergartners from ages four to six years. Data collection included teacher interviews, an observation checklist, and a pre and post emergent literacy test. The PictoPal activities were “designed to teach children about the communicative functions of written language” (p. 35), with one major component of PictoPal being word processing software with voice output called “Clicker”. While this program is used by the students, “the connection between the computer activities and the classroom activities is made by teachers” (p. 36). One major finding for this study is the different approaches to literacy instruction used by the participants. One of the four classroom teachers used PictoPal as a developmental approach tying computer activities to specific developmentally appropriate activities which “set conditions for learning” (p. 49). This teacher showed a high level of technology integration and a positive perception towards technology; however, that did not translate into significantly higher learning gains for her students. Two teachers used PictoPal as a facilitative approach, “providing children with the tasks and tools to elicit autonomous activity” (p. 51). This approach provided minimal teacher involvement in the students’ technological activities and resulted in “high pupil learning gains” (p. 52) in students’ emergent literacy skills. Teachers’ willingness to learn new classroom technology did not appear to have an impact on student learning gains. Another finding is that the senior Kindergarten students “engage more in [computer] activities” (p. 51) than the junior Kindergarten students; researchers speculate this may be explained by developmental differences in Kindergarteners.

The specific form of technology that Sangrà and González-Sanmamed (2010) focus on for their study is integration and communication technologies (ICT). The researchers analyzed the use of ICT and examined teachers’ perceptions related to these technologies. This multiple case-study methodology involved 1,222 teachers from 35 different schools in Spain. Each participant completed a questionnaire. Responses were analyzed to determine how teachers’ beliefs about ICT contribute to the development of teaching and learning, and determine differences between teachers from different “school levels” (p. 52) as determined by the amount
of ICT access and support a school provided. Sangrà and González-Sanmamed find that teachers have a “high expectation level” (p. 53) with respect to ICT and a “positive estimation” (p. 53) of its impact on learning. Another finding is that while most teacher understood the potential of ICT on student learning, some teachers had not yet discovered or understood those possibilities, and were thus “less confident” (p. 54) about using ICT to promote the development of more complex teaching and learning strategies. Results suggests “a relationship” (p. 54) between teachers’ perceptions and the equipment use and innovative integration of ICT. Finally, results shows that teachers in schools with school levels where ICE is considered a “key innovation factor” have a “more homogenous view” (p. 54) of the importance of ICT.

A study conducted by Hutchison and Reinking (2011) also focused on teachers’ perceptions of integrating Information Communication Technologies (ICTs) (p. 312) into their literacy instruction. This study aimed to find possible factors hindering technology integration. Participants were all members of the International Reading Association (IRA); they completed an online survey administered through “IRA channels” (p. 316). Findings indicate that two “predominant” (p. 327) factors were “access to equipment and lack of technical support” (p. 327). Many participants explained that they did not have access to “useful” (p. 327) technology or digital equipment in their schools and classrooms. On this survey, 87% of participants stated that they did have access to the Internet in their classrooms, but the technology to effectively utilize this Internet access was not also present. While results show access and support as factors hindering the integration of technology, they also show literacy teachers value the use of technology and continue to try to find means to integrate technology.

The next three studies demonstrate the success of technology integration into teaching practices. For literacy instruction, Dalton (2012) explains that “multimodal composition” (p. 334) is a way for students to write in school by using technology to increase achievement scores and motivation. Dalton focuses her work on digital literacies and how her digital designer’s workshop can help teachers to use students’ digital literacies to strengthen their writing skills. One reason her workshop “works” for teachers appears to be because it allows students to “display their work, describe design decisions, get feedback from classmates, and showcase final products” (p. 336). Another reason for success appears to be because multimodal composition includes a “notion of design” (p. 334) for the students, allowing the student to self-design and thus reducing teacher scaffolding which might have inhibited student creativity. Dalton feels that
“scaffolding can limit growth and actually cause students to disengage if it is too constraining” (p. 337).

Mishra and Koehler (2006) conducted a study about a framework for teacher integration of technology. In this study, they propose their theory and give three empirical “examples” (p. 1036) of the theory as practice and the resulting data. Mishra and Koehler developed a framework of teacher knowledge known as TPCK; this stands for Technological Pedagogical Content Knowledge. This framework proposes the theory that knowledge of technology, subject matter, and pedagogy can be all inter-related. They test this theory in three examples. The researchers state that “productive technology integration in teaching needs to consider all three issues not in isolation” (p. 1029). The first example consisted of a nine credit sequence of classes taught in a master’s program. The sequence involved educational technology with a goal of having teachers learn “concrete advanced technology skills” (p. 1036). The researchers find that from this sequence of classes, the students learned how to use many different types of technology effectively in classrooms. The next example was through a graduate course that was offered to practicing K-12 teachers. The course was about web-based technologies and had the participants focus on redesign of web resources to follow the TPCK framework. This example was a “success” at teaching participants how to successfully integrate technology because the course had participants “seriously study the complex relationships between technology and education” (p. 1038). The third example was another graduate course for six teachers to practice developing an online course about a topic that was most relevant to them. The teachers all explained in course evaluations that this course was very successful for them because it had them experience using educational technology through “novel experience” (p. 1039). This “authentic design” (p. 1039) led to a deeper understanding of TPCK and the ability to integrate technology into instruction.

Combining knowledge of technology integration with knowledge of pedagogy is also in a study by Safar and AlKhezzi (2013). They conducted a study about integration of Information and Communication Technology (ICT) tools and their impact on academic achievement. The participants were 128 undergraduate students enrolled in a “computing in education” (p. 620) course at Kuwait University. The 64 participants in the control group had the computing class taught to them through traditional means, i.e. face-to-face instruction and lectures. The 64 participants in the experimental group had the class taught to them through a “blended approach”
EFFECTIVE p 20

(p. 625) of online instruction, face-to-face meetings, and usage of educational software and materials. Data collection included “interviews, observations, traditional tests, [and] Internet/computer-based assessments (p. 620). The researchers find that the students in the experimental group were “significantly outscoring their peers in the control group” (p. 624). The experimental group also submitted projects with a higher level of quality on average and had lower absence rates. The reasons for this success are likely because using a blended approach emphasized the “theoretical perspectives of the constructivism philosophy” (p. 625). This blended approach that incorporates technology in terms of assessment and instruction is what, according to Safar and AlKheezi, creates a “significant impact” (p. 624) on academic achievement.

Summary of Literature Review

The research question for this literature review is what types of technology are teachers actually using and integrating into their instruction and delivery of the Common Core Module based curriculum of New York State in order to increase student achievement? A total of 24 studies have been found that address components of this research questions. The categories emerging from the review of literature are impact of instructional technology and teacher perception of technology integration for instruction. One major finding from this literature review is that the incorporating and implementing of instructional technology generally led to an increase in student achievement (Joan, 2013; Swan, Hooft, & Kratcoski, 2005; Solhaug, 2009; Sangrà & González-Sanmamed, 2010; Safar & AlKheezi, 2013; Dalton, 2012). Another major finding is that students that were exposed to technology during lessons were more engaged in the lesson and learning (Roush & Song, 2013; Swan, Hooft, & Kratcoski, 2005; Shenton & Paget, 2007; Jones & Brown, 2011; Cviko, McKenney, & Voogt, 2012). Still another finding about technology integration is that training and support from administration and other professionals led to an increase in technology integration by classroom teachers (Baylor & Ritchie, 2002; Erişti, Kurt, & Dindar, 2012; Kurt, 2010; Miranda & Russel, 2012; Moore-Hayes, 2011; Inan & Lowther, 2012; Murphrey, Miller, & Roberts, 2009; Mishra & Koehler, 2006). One major finding related to teacher perception of technology integration is that the teachers’ beliefs and perceptions have a direct impact on the amount of technology integration in a classroom (Ertmer,
Ottenbreit-Leftwich, Sadlik, E. Sendurur, & P. Sendurur, 2012; Gorder, 2008; Liu, 2010; Hutchison & Reinking, 2011; Miranda & Russel, 2012; Mueller, Wood, Wiloughby, Ross, & Specht, 2008; Pan & Franklin, 2011). These studies serve as the research background and source of ideas for this empirical study.
Chapter 3: Methodology

Overview of Methodology

The goal of this empirical research is to discover how teachers are integrating technology into their literacy instruction with Common Core Modules for New York State. Participants for this mixed methodology study are selected from a pool produced by contacting principals of elementary schools in the region of western New York State that are known to be adapting or adopting the Common Core Modules, asking for their nomination of a maximum of three teachers from their school whom they believe are successfully integrating technology into the Module-based curriculum. From this pool, final selection of three participants has been made based on grade level taught and willingness to participate in this research. Data collection consists of interviews and classroom observations with each participant. Data analysis includes a comparative analysis of the qualitative data from the interviews and quantitative data from the observations. The remainder of this chapter details this methodology.

Design of Study

Participants.

The principal investigator recruited participants from the pool produced by contacting principals of elementary schools in the region of western New York State that are known to be either adapting or adopting the Common Core Modules, asking for their nomination of a maximum of three teachers from their school whom they believe are successfully integrating technology into the Module-based curriculum. For the final selection, three participants were chosen from the Fredonia Central School District. These three participants each taught a different grade level and expressed willingness to participate in this research. The participants were all females, ranging from ages 30 to 55 years, teaching Kindergarten, third grade, and fourth grade. The demographics of the participants was not a determining factor for participant selection in this study.
Procedure.

This research study began with the creation of a participant pool produced by contacting principals of elementary schools known to be adapting or adopting Common Core Modules curriculum, asking for their nomination of a maximum of three teachers from their school whom they believe are successfully integrating technology into the Module-based curriculum. From this pool, three participants from the Fredonia Central School District were selected based on grade taught and willingness to participate in this research. The principal investigator then scheduled dates and times, at the participants’ convenience, for the interviews and class observations. The procedure was to conduct an initial interview, make three classroom teaching observation with correlating reflection interviews, and conduct a final interview.

The initial interview with each of the three elementary teacher participants lasted about 20 minutes (see Appendix A for Interview Questions). Observations of the participants were made as they taught an English Language Arts Module-based curriculum lesson and integrated technology into their teaching practice. Each observation was conducted for a minimum of 30 minutes; each participant was observed three times. After each lesson was completed, the principal investigator met with the teacher to conduct a correlating reflection interview to discuss how the lesson went. When the three observations were completed, the principal investigator conducted a final interview wherein the principal investigator and elementary teacher discussed the overall research process and the data analysis to date. Once data collection was complete for each participant, the researcher began the cross grade level data analysis.

Data Collection.

Data collection consists of an initial interview and classroom observations with correlating reflection interviews of each participant. All three teacher participants were interviewed before observations began, regarding their perceptions of technology integration. This initial interview (see Appendix A for questions) was used to understand teacher perceptions of how they are able to successfully integrate technology into the English Language Arts Module-based curriculum. Questions in the reflection interviews grew out of the data collected during the observations, while the final interview provided an opportunity for additional
participant input or explanation. All interviews were audio-recorded on a digital voice recorder, then downloaded to a computer for data analysis. The audio recordings were then transferred to a CD disk for secure storage. Data collection during observations was made using the Technology Integration Observation Sheet (see Appendix B). This observation sheet was created by the principal investigator based on information obtained from the literature review.

**Data Analysis**

Data analysis was an ongoing process as each new set of data was gathered; data were continuously compared with each individual teacher to find the relationship between the observations and that teachers’ perceptions of technology integration. After the analysis for the individual participants, results were compared across the participants for patterns, commonalities, or grade-specific results (see Figure 1). Cross-participant analysis started by finding the percentage of time each hardware or software technology was used during each English Language Arts Module-based lesson. These percentages were then compared between each teacher to find similarities or differences.

Analysis of the individual participants reveals that the Kindergarten teacher was observed three times, for a total of 105 minutes. During the observations, this teacher used the Interactive Whiteboard (IWB) 57% of the time; the IWB was used for topic introduction, providing information, modeling a skill, and student practice. While on the IWB, the teacher used software programs such as Adobe Reader 38% and SMART Notebook for 20% of the Module lesson. Adobe reader was used for topic introduction, providing information, modeling a skill, student practice and group work; while, SMART Notebook was used for modeling a skill, student practice, and group work. This teacher’s IWB was connected to her desktop computer in her classroom; therefore, the teacher’s desktop computer was also used 57% of the observed time. This teacher also used the IWB to present graphics 29% of the observed time. Data show that this teacher always used technology for whole group instruction. Throughout her instruction, this Kindergarten teacher demonstrated an excellent understanding of the technology being used during the Module-based lessons. Observation data were continuously compared to reflection data in order to determine a relationship between the two data sets. For the relationship between technology usage time and teacher perception of usage time, the teacher explained that she tries
to choose “appropriate times” to use technology for her young students. This relationship indicates that this teacher understands the cognitive development of her students and chooses to incorporate technology only when she feels it will enhance a lesson. Another finding is that although this teacher was identified as a model of “successful” technology integration, she is still trying, as she says, to “find new ways to integrate technology, especially in the Module curriculum.” This statement implies that this “successful” teacher is one who is eager to learn to use technology in ways that will benefit her students. Analysis concludes that this teacher’s knowledge about technology, instruction, and developmentally appropriate pedagogy seemed to connect in the teacher’s practice to successfully integrate technology.

Analysis of the individual participants reveals that the third grade teacher was observed three times, for a total of 105 minutes. During the observations, this teacher used the Interactive Whiteboard (IWB) for 100% of the time; the IWB was used for topic introduction, providing information, modeling a skill, student practice, student response, and group work. In this classroom, the teacher’s IWB is connected to her laptop; therefore, her laptop was also used 100% of the time during observations. This teacher also used the software program Microsoft PowerPoint 95% of the observation time. This software program was used for topic introduction, providing information, modeling a skill, and student practice. In addition, the teacher was often using technology to state directions and objectives, and provide structure within the Module lesson. For the relationship between technology usage time and teacher perception of usage time, the third grade teacher explained that she uses the IWB “in many ways” throughout the lesson: “I kept myself and the children on task and provided fantastic models.” In addition, the teacher stated that she “often created interactive PowerPoints that correlated with the Module lesson plan,” and she found resources related to the Module on a www.teacherspayteachers.com. This teacher appeared very comfortable and confident when integrating technology into the ELA Module-based curriculum. She appeared to be using instructional technology related to her students’ needs, as a means to create structure within the lesson and to keep the students and herself on track throughout the lesson. She clearly stated that she felt her “use of technology was successful.” Analysis concludes that this teacher’s knowledge about technology, student-centered instruction, and subject content seemed to connect in the teacher’s practice to successfully integrate technology into the Module lessons.

Analysis of the individual participants reveals that the fourth grade teacher was observed
twice, for a total of 70 minutes. During the observations, this teacher used the Interactive Whiteboard (IWB) 86% of the time; the IWB was used for providing information, student practice, and student response. This teacher also used handheld Clickers 50% of the observed time. During one observation the teacher simultaneously and equally used the IWB and Clickers.

During this lesson, the teacher’s desktop computer was connected to her IWB, and 50% of the time she ran a software program called 2know! which worked with the Clickers to graph the students’ responses. This teacher also used Internet Explorer 26% of the observed time, to locate an interactive website, www.proprofs.com. Every Module lesson plan that was observed had technology integrated for the purposes of student practice and student response. Data show that this teacher had a “basic” understanding of the technology being used in the lesson; in each observed lesson she asked her students, at least two times, to help her use the technology appropriately. For the relationship between technology usage time and teacher perception of usage time, this fourth grade teacher explained that integrating technology into Module lessons was a “fun and interactive way to practice comprehension skills,” and made her “think of unique ways to use the Clickers for ELA purposes.” In her initial interview, she also stated she is “still in the learning process” of how to integrate technology into the Modules due to the “absence of technology integration in the Modules.” Analysis concludes that this teacher’s knowledge about technology, instruction, subject content, and her students’ technology knowledge seemed to connect in the teacher’s practice to successfully integrate technology into the Module lessons.

Figure 1 represents a synthesis of the data for the individual teachers. The data show some commonality in hardware use and purpose of technology integration. All three teachers used the Interactive Whiteboard (IWB) for student practice and student response. The Kindergarten and third grade teacher also used the IWB for introducing a topic, providing information, and modeling a skill. The Kindergarten and third grade teacher also used graphics software to introduce a topic. Figure 1 also reveals that when the third grade teacher integrated either hardware or software technology, it was used for multiple purposes. The data also shows that the fourth grade teacher primarily uses technology integration for student practice and student response.
Figure 1: Purpose of Technology Integration

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<tr>
<th>HARDWARE</th>
<th>LAPTOP</th>
<th>DESKTOP COMPUTER</th>
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<th>DIGITAL/VIDEO CAMERA</th>
<th>TABLET OR HANDHELD</th>
<th>CLICKERS</th>
<th>AUDIO RECORDERS</th>
<th>WEB BROWSER</th>
<th>WORD PROCESSING</th>
<th>POWERPOINT PRESENTATION</th>
<th>GRAPHICS</th>
<th>APPLICATIONS (APPS)</th>
<th>SIMULATIONS/GAMES</th>
<th>SMART NOTEBOOK</th>
<th>2KNOW!</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: K- Kindergarten, 3- Third Grade, 4- Fourth Grade

Regarding the time factors, Figure 2 shows time use and percentage by all three teachers.

Figure 2: Duration of Technology Integration

<table>
<thead>
<tr>
<th>HARDWARE</th>
<th>LAPTOP</th>
<th>DESKTOP COMPUTER</th>
<th>INTERACTIVE WHITEBOARD</th>
<th>CLICKERS</th>
<th>WEB BROWSER</th>
<th>WORD PROCESSING</th>
<th>POWERPOINT PRESENTATION</th>
<th>GRAPHICS</th>
<th>SIMULATIONS/GAMES</th>
<th>SMART NOTEBOOK</th>
<th>2KNOW!</th>
<th>ADOBE READER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
<td>Duration of Integration (minutes)</td>
<td>% of integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop</td>
<td>3</td>
<td>105</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desktop Computer</td>
<td>K</td>
<td>60</td>
<td>57%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactive Whiteboard</td>
<td>K</td>
<td>60</td>
<td>57%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clickers</td>
<td>4</td>
<td>35</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web Browser</td>
<td>4</td>
<td>25</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>3</td>
<td>100</td>
<td>95%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphics</td>
<td>K 3</td>
<td>30</td>
<td>29%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMART Notebook</td>
<td>K</td>
<td>20</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Know!</td>
<td>4</td>
<td>35</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adobe Reader</td>
<td>K</td>
<td>40</td>
<td>38%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: K- Kindergarten, 3- Third Grade, 4- Fourth Grade
The data reveal a commonality of each teacher’s duration of integration time of Interactive Whiteboards and desktop or laptop.

Cross participant analysis reveals that all three teachers in this school understood the concept of “instructional technology.” When asked about how these teachers have built their knowledge of instructional technology, two teachers (third and fourth grade) similarly felt that this knowledge had been built through the constant practice of integrating technology into their lessons. The third grade teacher reported that she also read multiple resources related to this topic, and the Kindergarten and third grade teacher both admitted that they have attended “many” workshops related to technology integration. In addition, the Kindergarten teacher admitted she felt that she had acquired her knowledge of instructional technology through “trial and error.” Similarly, the fourth grade teacher stated that she is still in the “learning process” of how to integrate technology. The fourth grade teacher stated that “other teachers and the technology department” within her district have helped her build her knowledge of technology integration.

Each teacher was asked what she felt made her appear to the school principal as a “successful” integrator of technology into Module-based curriculum. The Kindergarten and third grade teachers both believed that their constant practice and use of technology made them an exemplary user because it built their knowledge of technology through experience. The fourth grade teacher stated, “I am constantly thinking of unique ways to integrate technology into the Module. I believe that the combination of knowing what works best for my students and understanding which technologies work best in certain lessons makes me exemplary.”

A grade level data comparison reveals that all 3 teachers used technology at least 57% of the Module-based lesson time: the Kindergarten teacher 57%, the third grade teacher 100% of the time, and the fourth grade teacher 86%. The Kindergarten and fourth grade teachers both felt that it was not beneficial to them or their students to use technology during the entire lesson. While the third grade teacher integrates technology into her ELA Module-based curriculum 100% of the lesson time by keeping her IWB running for the entire lesson, she does so to keep both herself and her students “on track.” Therefore, she appears to be using integrating technology as a management tool as well as an instructional tool.

Cross participant analysis also reveals that although two of the teachers stated that they obtained their knowledge through various technology-related workshops, while all three teachers
admit that they use a trial and error strategy to understand which technologies work best with the ELA Module-based curriculum. Teacher knowledge and approach to teaching can impact the subjective trial and error method. Analysis reveals a slightly different approach for each teacher, possibly based on the age and developmental stage of their students. All three teachers exhibit strong knowledge about instructional technology and about instruction generally. However, the Kindergarten teacher appears to combine those with her knowledge of developmentally appropriate pedagogy; the third grade teachers appears to combine them with student-centered instruction; and the fourth grade teacher appears to combine those knowledges with her knowledge of her students’ technology knowledge in order to successfully integrate technology into the Module lessons.
Chapter 4: Results and Interpretation

Results

This empirical study examined the integration of technology into Module-based curriculum by three elementary teachers identified by their school principal as being successful integrators of technology. The three teachers were Kindergarten, grade three, and grade four teachers. Data for this study were collected from initial and final interviews with each teacher as well as reflective interviews during the classroom observations and constant comparative data analysis. Quantitative data were also collected during classroom lesson observations using a researcher-design observation sheet. Findings show that individual teacher use of technology ranged from 57% of the lesson time to 100% of the lesson time, and the most common functions for integrating were for topic introduction, providing information, modeling a skill, and student practice. The most common technology devices were the Interactive White Board (IWB), with Clickers and teacher computers (laptops and desktops) second. The most commonly used software was word processing and PowerPoint. Results also show that successful teachers have received professional development specifically on integrating technology into instruction, but are also confident or curious enough to engage in trial and error learning on their own. In addition to finding that these successful teachers combine strong knowledge about instructional technology and about instruction generally, results show that technology integration also depends on the focus of the individual teachers. Some focus on what is developmentally appropriate, some on student-centered instruction, and some on knowing students’ existing knowledge in order to successfully integrate technology into the Module lessons.

Reliability of Data

Data for this research consist of qualitative interviews and quantitative observations. This study contains an observation sheet that was created using the findings from the literature review. These findings contributed to what seems to be the important aspects about technology integration. Because the observation sheet is based on previous research findings, the resulting data from this study becomes more reliable and valuable. To ensure further reliability of the data,
multiple observation sessions were conducted with each teacher. Further, a continuing comparison analysis was conducted using the qualitative data with the interviews

**Interpretation of Data**

The data indicated that teachers are using Interactive Whiteboards, desktops or laptops, and Clickers as hardware devices to integrate technology into the Module based curriculum. Along with these hardware devices, teachers are using software programs such as Internet Explorer, SMART Notebook, Adobe Reader, and Microsoft PowerPoint to integrate technology into the Module lessons. The findings demonstrate that these hardware and software devices were mainly used during the Module based lessons for introducing a topic, providing information, and monitoring student response. This information can help elementary teachers and reading specialists because it allows teachers to understand what other teachers are using, so they can experiment with the technology to see what integration of technology works best for their students. The findings also indicate that the participants from this research were using a trial and error strategy to find ways to successfully integrate technology. This finding demonstrates that teachers should not be afraid to use technology; they should integrate technology and evaluate the success of that technology to in order to integrate technology effectively into the Module based curriculum taught to their particular students.
Chapter 5: Discussion and Conclusion

Overview of Study Findings

This empirical study began with the question of what types of technology are teachers actually using and integrating into their instruction and delivery of the Common Core Module based curriculum of New York State, in order to increase student achievement? A mixed methodology was used in this observation study. Participants were three elementary school teachers all female, all white, all in the same western New York school, and all recognized by their principal as being “successful” integrators of technology into a Module-based curriculum. Data were collected from individual interviews and from classroom observations of Module lesson teaching using an observation sheet designed by this researcher. Results show that individual teacher use of technology ranged from 57% of the lesson time to 100% of the lesson time, and the most common functions for integrating were for topic introduction, providing information, modeling a skill, and student practice. The most common technology devices were the Interactive White Board (IWB), with Clickers and teacher computers (laptops and desktops) second. The most commonly used software was word processing and PowerPoint. Results also show that successful teachers have received professional development specifically on integrating technology into instruction, but are also confident or curious enough to engage in trial and error learning on their own. In addition to finding that these successful teachers combine strong knowledge about instructional technology and about instruction generally, results show that technology integration also depends on the focus of the individual teachers. Some focus on what is developmentally appropriate, some on student-centered instruction, and some on knowing students’ existing knowledge in order to successfully integrate technology into the Module lessons.

Significance of Findings

These findings present various ways in which teachers are successful at integrating instructional technology into Module-based curriculum. Because the Modules themselves provide no included methods of how to perform technology integration, the success of
technology integration becomes significant to classroom teachers. These findings are significant to the classroom teachers because they offer some specific information on what hardware and software technology may be successfully integrated into the Modules by elementary teachers. This knowledge is beneficial for teachers because it gives them suggestions on what technology may be used with the Modules to enhance student achievement. In addition, these findings are significant to the field of literacy because there appears to be no existing research on this topic of technology in Module-based curriculums.

Limitations of the Findings

For this Master’s Thesis Capstone Project, there was a limited amount of time to complete the research. Because research time was limited, the actual number of selected participants was reduced, as was the available time for observation. Originally, teachers from various districts were to be observed, but due to time constraints only one district was chosen. Ideally, each school would have participants at the same grade level to make cross-school comparison possible; instead, the comparisons had to be made across grade levels. Also, due to the time constraints, each teacher was not observed for the same number of times or in similar content lessons. Also, the observations for each teacher were completed over a two week period; given that a Module in intended for teaching in usually two weeks, the use of technology was repetitive, based on the Module lesson. In addition, findings are limited because of the methodology; because there appears to be no existing research on this topic of technology in Module-based curriculums, there are few models to follow for use of methodology.

Conclusion

This empirical study began with the question of what types of technology are teachers actually using and integrating into their instruction and delivery of the Common Core Module based curriculum of New York State, in order to increase student achievement? A mixed methodology empirical study was conducted to address this question. Findings indicate that a possible answer to this question is that teachers are using Interactive Whiteboards and Clickers as hardware devices to incorporate into the Module based curriculum. Along with these hardware
devices, teachers are using software programs such as Internet Explorer, SMART Notebook, Adobe Reader, and Microsoft PowerPoint to integrate into the Module lessons. The findings demonstrate that these hardware and software devices were mainly used during the Module based lessons for introducing a topic, providing information, and monitor student response.

**Recommendations for Future Research**

Currently, there appears to be little or no research pertaining to technology integration into Module-based curriculum. Due to this shortage of research, I recommend that this study be replicated but with a larger sample size, to obtain more comprehensive data, and with a longer period of time for observation and data collection. Because the Common Core Module provide no included methods for technology integration, this makes the success of technology integration even more significant because it becomes the sole responsibility of the school and the teacher. Research that can provide some evidence for how and to what extent teachers are integrating technology is significant for teachers that are also responsible for their class’s technology.


Appendix A

INITIAL INTERVIEW QUESTIONS

Teacher: _____________________________________________ Date: _____________

1. Could you Please explain to me how you see the role of the CCSS Modules in your lesson?

2. How would you define instructional technology? What does it mean to you?

3. The most common technologies are interactive whiteboards, laptops, touch screen tables, projects, and digital cameras. Are all of these technologies available to you, at your school? Are there others that you have access to or maybe have purchased yourself?

4. Do you find yourself frequently using the same technologies in your lesson? Or are these some technologies that you prefer to use more often or more frequently than others?

5. How have you built your knowledge of instructional technologies?

6. Are there maybe specific resources that have helped you to successfully integrate technology?

7. You were identified as an exemplary user of technology with the CCSS Modules. What do you think makes you exemplary?

8. How do you choose the technology you use with the Modules? Do you have a set procedure on how to choose the technology or do you maybe go with what feels right to you and your knowledge of your students?
Appendix B

TECHNOLOGY INTEGRATION OBSERVATION SHEET

Teacher: ___________________________  Grade Level: _____  Observation Length: ________

For each category, check all that apply.

TECHNOLOGY IN THE CLASSROOM

<table>
<thead>
<tr>
<th>Hardware:</th>
<th>Software:</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Laptop</td>
<td>___ Web Browser</td>
</tr>
<tr>
<td>___ Desktop Computer</td>
<td>___ Word Processing</td>
</tr>
<tr>
<td>___ Video Camera</td>
<td>___ Presentation</td>
</tr>
<tr>
<td>___ Tablet or Handheld</td>
<td>___ Blog / Wiki</td>
</tr>
<tr>
<td>___ Other: ____________________________</td>
<td>___ Graphics</td>
</tr>
<tr>
<td></td>
<td>___ Applications (apps)</td>
</tr>
<tr>
<td></td>
<td>___ Simulation / games</td>
</tr>
<tr>
<td></td>
<td>___ Other: ____________________________</td>
</tr>
</tbody>
</table>

Other School-wide Hardware/Software:

ENVIRONMENT

<table>
<thead>
<tr>
<th>Content Area(s):</th>
<th>Setting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Language Arts</td>
<td>___ Individual</td>
</tr>
<tr>
<td>___ Mathematics</td>
<td>___ Pairs / Small Group</td>
</tr>
<tr>
<td>___ Social Studies</td>
<td>___ Whole Group</td>
</tr>
<tr>
<td>___ Science</td>
<td>___ Student Presentations</td>
</tr>
<tr>
<td>___ Health</td>
<td>___ Teacher Presentation</td>
</tr>
<tr>
<td>___ Art</td>
<td>___ Lecture</td>
</tr>
<tr>
<td>___ Other: ___________</td>
<td>___ Other: ___________</td>
</tr>
</tbody>
</table>

Location:

<table>
<thead>
<tr>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Classroom</td>
</tr>
<tr>
<td>___ Computer Lab</td>
</tr>
<tr>
<td>___ Other: ____________________________</td>
</tr>
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</table>

Comments:

LESSON

<table>
<thead>
<tr>
<th>Activity:</th>
<th>Choice:</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Research</td>
<td>___ Required for all students</td>
</tr>
<tr>
<td>___ Reading</td>
<td>___ Teacher recommendation</td>
</tr>
<tr>
<td>___ Writing</td>
<td>___ Choice available</td>
</tr>
<tr>
<td>___ Other: ____________________________</td>
<td>___ Unrestricted</td>
</tr>
</tbody>
</table>

Description: ____________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Scaffolding:

<table>
<thead>
<tr>
<th>Scaffolding:</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Yes</td>
</tr>
<tr>
<td>___ No</td>
</tr>
</tbody>
</table>
### TECHNOLOGY INTEGRATION

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic Intro</td>
<td>Provide Info</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### HARDWARE
- Laptop
- Desktop Computer
- Interactive Whiteboard
- Digital Camera
- Video Camera
- Tablet or Handheld
- Clickers
- Audio Recorders

#### SOFTWARE
- Web Browser
- Word Processing
- Blogs/Wiki
- Graphics
- Applications (apps)
- Simulations/Games
- Audio Recording
- Assessment

#### OTHER

1. The directions and objectives were clearly stated to the students.
2. Routines, structure, and deadlines were provided.
3. The students were allowed to choose the technologies appropriate to their learning.
4. There were discussions related to definitions of unfamiliar “technology vocabulary”.
5. The students produced and created work with the assistance of technology.
6. Problem solving and higher order thinking was evident during the lesson.
7. During group work, the teacher reinforced the idea of collaboration between students.
8. The teacher’s knowledge about technology, pedagogy, and content seemed to connect, to successfully integrate technology.
9. The teacher seemed to have basic understanding of the technology being used in this lesson.
10. The teacher seemed to use a range of tools, in order to meet the needs of each student.