12-1-2014

# The Impact of the Gradual Release of Responsibility on Graduate Teacher Education Candidates' Self-Efficacy with iPads

Wendy L. Loewenstein
*University of Nebraska at Omaha*

# THE IMPACT OF THE GRADUAL RELEASE OF RESPONSIBILITY ON GRADUATE TEACHER EDUCATION CANDIDATES' SELF-EFFICACY WITH IPADS

by

Wendy L. Loewenstein

A DISSERTATION

Presented to the Faculty of

The Graduate College of the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

Major: Educational Administration

Under the Supervision of

Kay A. Keiser

Omaha, Nebraska

December, 2014

Supervisory Committee:

Kay A. Keiser, Ed.D., Chair

Peter J. Smith, Ed.D.

Jeanne L. Surface, Ed.D.

R.J. Pasco, Ph.D.




Abstract

THE IMPACT OF THE GRADUAL RELEASE OF RESPONSIBILITY ON GRADUATE TEACHER EDUCATION CANDIDATES' SELF-EFFICACY WITH IPADS

Wendy L. Loewenstein, Ed.D.

University of Nebraska, 2014

Advisor: Dr. Kay A. Keiser

Keeping up with technological innovations is a challenge for educational intuitions as they strive to prepare students to be competitive in a future workforce. This is an overwhelming task for educational leaders that extends beyond which technological device to purchase. This study examines the barriers to iPad integration in education and how the gradual release of responsibility method of instruction can be used to increase participants' self-efficacy with iPads. The participants ($N = 41$) were teacher education graduate candidates enrolled in a Children's Literature course in which they were provided access to iPads.

Survey results revealed that candidates' efficacy prior to the course was relatively high at above the midpoint on the 5-point likert scale with 5 being the highest score ($M = 3.51$, $SD = 0.86$). Even with a fairly high efficacy with iPads at the beginning of the study, the post-test espoused efficacy showed significant growth ($M = 4.27$, $SD = 0.53$).

The results of the pre-test indicated a clear divide between the level of experiences with iPads. Based on this division, a two-way ANOVA was run to analyze how the group of candidates with low experience with iPads grew in efficacy in comparison to the group of candidates with a high level of experience with iPads. The repeated measures two-way ANOVA indicated that there was a significant difference amongst candidates' espoused experience with iPads on the pre-test. In addition, both groups experienced significant growth throughout the course as demonstrated by the post-test scores for time $F(1, 38)$, $p < .01$, $\eta^2 = 0.49$. However, the gap between the groups' espoused experience levels started to close by the end of the course, as indicated by the interaction between time and experience $F(1, 39) = 10.32$, $p < .01$, $\eta^2 = 0.21$. Even though the lower experienced candidates did not reach the espoused level of experience that the higher experienced candidates $F(1, 39) = 52.64$, $p < .01$, $\eta^2 = 0.57$, their growth was encouraging. These results support the benefits of eliminating barriers to technology integration in order for the use of technology to take place in classrooms at all levels. Study conclusions demonstrate the benefit of the implementation of carefully planned, research-based technology integration professional learning for teachers at all levels of education in order to increase student engagement and preparation for a 21st century workforce.

## ACKNOWLEDGEMENTS

The completion of this degree would not be possible without my family. My husband Jim stepped up when I was taking classes during the week and writing during the weekends. He pushed me when I needed it and most importantly, he knew when I needed a break! My son, Cooper and step-daughter, Olivia may not quite comprehend what I have been doing or what I have accomplished, but I hope that one day they will strive to continue their education and push the limits of their abilities as I have. My mom, Shirley Simmonds, proofread many pages of this document with short notice and has encouraged me throughout. My dad, Fred Brdicko, and stepdad, Jim Simmonds, have been at various presentations and listened to me with patience and support. I love you all and am so blessed to have you in my life. Thank you!

This is my third degree from the University of Nebraska at Omaha and just like the two prior I have been lucky to learn from the most wonderful educators. I will always hold these professionals in high esteem and close to my heart. Kay Keiser, my advisor, has pushed me and guided me throughout the writing process with poise and professionalism. Her insight on the research process and depth of knowledge on leadership and theory is impressive (and extends well beyond the bookshelves in her office). Peter Smith has walked me through SPSS and data analysis numerous times and has always welcomed me with a smile. I am appreciative of the rest of the Educational Leadership faculty who have supported me along the way are: Dr. Karen Hayes, Dr. Jeanne Surface, and Dr. Richard Christie. Dr. Becky Pasco has been a mentor who has guided me throughout my career. The whole College of Education is full of amazing supporters who have cheered me on and guided me through this journey, Dr. Nancy Edick, Dr. David Conway, Dr. Connie Schaffer, Dr. Kelly Welsh, Dr. Sandra Rodriguez-

Arroyo, Dr. Elliott Ostler, Dr. Sarah Edwards, and so many more! Thank you for making my workplace stimulating and challenging. My staff of student workers and graduate assistants in the IDEAS Room have supported me throughout this journey and helped me with various tasks, even stuffing envelopes. Thank you all for your help, especially Jen Grobeck and Tessa Miller who organized, coded, and collected data for me during my study. Last, but not least, my peers throughout this program have been a wonderful support system. Abby Burke, Cindy Copich, and Bridget Kratt have always been there for advice, celebration, and periodic sanity checks. I would not have been able to push through the writing blocks, stress, or stats without this cohort of professional women.

Throughout my career I have always pushed myself to improve my teaching practices and to keep learning. This doctoral journey has been a challenge, but in the end the ultimate outcome is that I have gained insight on sound teaching practices that will improve my performance in the classroom. I only hope it will help others' as well. I am so grateful for this experience and for the amazing support system that helped me get through it!

**Table of Contents**

## List Of Tables

# Chapter 1

## Introduction

Preparing students for a future that we cannot imagine is not a new problem. In 1920, John Dewey said: “We don’t know what kids will need to know in 1944” (as cited by McCann, 2013, p. 3). Dewey acknowledged the ongoing challenge of education, which is to prepare students for a future that is constantly being altered by technological advancements. Unfortunately, due to the rapid evolution of technology and various systems barriers, classrooms around the country are struggling to reflect the 21st century world, much less conceptualizing the potential of future technologies. As a result, schools have been unsuccessful in leveraging new technologies in order to engage the digital learners who fill the seats in classrooms everyday.

The mission statement for the Partnership for 21st Century Skills (2013) acknowledges that, “There is a profound gap between the knowledge and skills most students learn in school and the knowledge and skills they need in typical 21st century communities and workplaces” (para. 3). Being in the second decade of the 21st century, this gap includes some fundamental disconnects between students and the schools that serve them. Today’s students do not know a world without the Internet. The lecture style, “sage on the stage” approach of education does not provide quick access to information to students who have "Googled” their way through childhood. Sheninger (2014) articulates this concern, “The learning styles of these active, digital learners conflict with traditional teaching styles and preferences of educators” (p. 15). By acknowledging this gap and accommodating students’ learning styles, P-12 education can start working towards creating 21st century learning environments that promote critical thinking,

communication, collaboration, and creativity. Because, even in the mid-twentieth century Dewey (1944) warned, "If we teach today as we did yesterday, we rob our children of tomorrow" (p. 167).

Mobile technology- tablets, laptops, smartphones- that support learning has been a topic in education for years, especially since the introduction of the iPad in 2010. It has become apparent that this is a trend that is not going away. According to the New Media Consortium Horizon Report for K-12 (2013) mobile technology has become, "too capable, too ubiquitous, and too useful to ignore" (p. 17). Whether districts are implementing Bring Your Own Device (BYOD) or 1:1 mobile device initiatives, there is no denying that they have made their mark on education. Mobile devices have caused an onslaught of interest on how these devices can effectively engage 21st century learners. However, despite the rapid ubiquity of mobile technology, integrating them as learning devices in schools has been a difficult task.

Technology, mobile or otherwise, is underutilized in P-12 education. Rosen (2010) recognizes that schools have the technology to provide a good motivating education for children, but it is not used effectively. This can be attributed to the lack of preparation of teachers to use technology effectively in their classrooms (Hew & Brush, 2007). Most educators are aware of the available technologies that enhance teaching and learning, but struggle with the integration of technology in the classroom. Researchers have identified various barriers that prevent educators from creating technology-rich learning environments such as access, resources, attitudes, and beliefs (Compeau & Higgins, 1995; Ertmer, 1999; Kellenberger & Hendricks, 2003; Hew & Brush, 2007).

Ertmer (1999) further clarifies the barriers that block technology implementation efforts in the classroom into two categories, first-order barriers and second-order barriers.

First-order barriers are extrinsic and include a lack of access to technology, insufficient time to plan, and inadequate technical and administrative support. Since first-order barriers (access, support, and time) are external, they seem manageable to address and overcome. Ertmer (1999) asserts, "even if every first-order barrier were removed, teachers would not automatically use technology to achieve the kind of meaningful outcomes advocated" (p. 51). In order for technology integration to be embraced for a sustainable change in teaching practices, the deeply ingrained, second-order barriers must be confronted. Second-order barriers are intrinsic and include teachers' beliefs about teaching, computers, classroom practices, and confidence in skills with technology. If teachers do not feel comfortable or confident with technology, they will not utilize it in their classroom. Pajares (1992) noted that "there is a strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices" (p. 326). Teacher beliefs are a powerful indicator of why some utilize technology and others don't. Previous studies have identified teachers' self-efficacy with technology as a determinant for technology integration in the classroom (Tschannen-Moran & Woolfolk Hoy, 2001). If teachers are confident (efficacious) in their skills with technology, then they are more likely to utilize it in their teaching. However, research does not identify how teachers' self-efficacy with technology can change over time.

**Theoretical Framework**

The theoretical foundation of self-efficacy is grounded in social cognitive theory and is defined by Bandura (1997) as one's belief in their abilities to organize and execute the courses of action required to produce significant outcomes. Furthermore, one's perceived self-efficacy is based on his/her own judgment of their personal capacity. If one believes he/she can do something then they will act upon that belief. In other words, without skills, performance isn't possible; yet without self-efficacy performance may not even be attempted. Thus making self-efficacy an effective predictor of behavior.

Teachers who are more efficacious are more likely to take the risks necessary to use technology in their classrooms (Ivers, 2002). Therefore, it is imperative for professional learning opportunities to be developed with an understanding of how to identify and raise teachers' efficacy with technology in order for teaching practices to change. In addition, determining what factors impact teachers' self-efficacy with technology will increase the effectiveness of technology professional learning and create sustainable change with technology integration in the classroom.

**Problem Statement**

Effective technology integration in P-12 curriculum is integral in creating learning environments that will engage 21st century learners and better prepare them for their future. Harnessing the technology that students have access to in their daily lives and leveraging them as learning tools will help bridge the gap between the students who roam the halls and the teachers who teach "the way we've always done it." Sheninger (2014) warns that, "The longer this disconnect continues, the more meaningless and irrelevant our schools become to our students" (p. 5). Effective technology integration must occur

in today's classrooms and this requires a paradigm shift in teaching practices and beliefs. Brown, Holcomb and Lima (2010) contend that, "technology self-efficacy has come to play a crucial role in the preparation and implementation of educators who can successfully use educational technology to enhance student learning" (p. 121). It is essential to address teachers' technology self-efficacy and identify ways in which it can be influenced. The purpose of this quantitative pre-post survey study was to explore factors that may impact graduate teacher candidates' efficacy with mobile technology, more specifically, with iPads.

**Research Questions**

1. What is graduate candidates' espoused efficacy with iPad integration?
2. Is there a significant difference between graduate candidates' pre-test and post-test responses on the Mobile Technology Integration Survey regarding their iPad capabilities and strategies (factor 1)?
3. Is there a significant difference between graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey regarding their external influences of iPad uses (factor 2)?
4. What impact did the gradual release of responsibility method of instruction have on graduate candidates' total self-efficacy scores on the Mobile Technology Integration Survey?
5. Is there a significant difference between high experienced and low experienced graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey?

## Definition of Terms

**Digital Divide.** The division that occurs between students or schools when unequal access to technology is apparent between rural, urban, and suburban schools; large and small schools; and affluent and poor schools (Schrum & Levin, 2009).

**Gradual Release of Responsibility.** A method of instruction in which an instructor models a skill, provides guided practice, and gives an opportunity to independently practice and apply the skill (Fisher & Frey, 2008).

**Mobile device**. Mobile devices are technological devices that can be utilized anytime, anywhere in order to communicate or gain knowledge (Sharples, Taylor, & Vavoula, 2007). Types of mobile devices include, but are not limited to, iPod Touches, iPads, mobile phones, and laptops.

**Mobile learning.** Learning that occurs when one engages in content, "across multiple contexts, through social and content interactions, using personal electronic devices" (Berge, 2013, p. 83).

**Professional learning.** Learning that takes place when professionals engage in continuous and sustained education in the setting and context in which they work to improve their practices or performance. (Elmore, 2004; Fullan, Hill, & Crevola, 2006).

**Self-Efficacy.** One's belief in their abilities to organize and execute the courses of action required in order to produce significant outcomes (Bandura, 1986).

**Teacher self-efficacy**. A teacher's judgment that his or her abilities are capable to bring about desired outcomes of student engagement and learning (Tschannen-Moran & Woolfolk Hoy, 2001).

**Technology integration**. Integration of technology occurs when technology is utilized throughout the teaching and learning process (Bebell, Russell, & O'Dwyer, 2004).

## Assumptions

The participants in this study were teaching in K-12 classrooms or had K-12 classroom teaching experience. The graduate students in the course were candidates of the various College of Education Masters programs, such as: Elementary Education, Literacy Education, Secondary Education, and Library Science Education. It was assumed that they responded honestly to the surveys. The survey was not tied to candidates' grades. Surveys were coded and handled anonymously to avoid bias.

## Limitations

The intervention in this study was the course that candidates were enrolled in that was taught by the researcher. The researcher/professor of this course had a strong background in iPad integration, which may make it difficult to replicate or generalize this study. The survey instrument measured efficacy but did not identify factors that influence efficacy. The survey data was self-reported based on participants' perceptions, however efficacy is a perception. There were no criteria of prior experience with technology for enrollment in this course. Therefore, participants offered a wide range of technology and teaching abilities and backgrounds.

**Delimitations**

Certain delimitations existed due to the nature of the population chosen. This study at one Midwestern metropolitan university was delimited to graduate candidates enrolled in the children's literature courses. It is likely that the results of this study may not be an appropriate generalization of graduate teacher education candidates or P-12 in-service teachers.

**Significance of the Study**

Innovations occur in educational technology everyday. These technological innovations, if integrated in classrooms, allow teachers to take advantage of students' interests and ease with technology (Sharples et al., 2007). Mobile technology has the potential to bridge the digital divide between 21st century students and the teachers who are given the charge to engage them in learning. In order to do so, teachers need to feel efficacious with the application of mobile devices in the classroom. Teacher self-efficacy is just one barrier to technology integration that stands in the way of powerful mobile learning environments. These barriers to technology integration need to be addressed during professional learning. Otherwise, dollars spent on mobile devices are all for naught. "The major challenge to supporting school learning with technology lies not with technology but with the professional development of educators" (Fisher, Dwyer, & Yocam, 1996, p. 7). Having a professional learning plan in place that addresses barriers and builds teacher efficacy proves to be a consideration that is just as important as what device to put in the hands of students and teachers. Otherwise technology will go untouched and underutilized in P-12 classrooms.

# Chapter 2

## Review of Literature

Educators around the globe are charged with creating engaging experiences that prepare students for the 21st century world they will encounter upon graduation. Technology has quickly become an integral part of the 21st century workforce. The education sector and the federal government have responded by spending significant funds on technological devices and infrastructures to create environments in which communication, collaboration, creativity, and critical thinking thrive. While access to technology and infrastructure are necessary, it is essential to teach teachers how to facilitate learning with technology. Teachers' 21st century technological skills are vital to creating a paradigm shift in which technology is just as imperative to instruction as a teachers' manual. Without building teachers' confidence in their skills to integrate technology, this shift will never occur; thus, extending the ineffective practices of the industrial age-style of teaching and the comfort of "doing things the way we always have done them."

This chapter provides a review of the literature regarding 21st century learning skills, technology integration, mobile technology, technology integration barriers, and how the theoretical framework of self-efficacy relates to professional learning for technology integration in the classroom.

### 21st Century Learning Skills

Trilling and Fadel (2009) attribute the 21st century shift from the Industrial Age to the Knowledge Age to technological advances in communication, collaboration, and learning. These advances have altered the skill set that is required and valued in every

aspect of our society. In response to this shift, the Partnership for 21st Century Skills (P21) was formed in 2002, as an effort to bring together business leaders, policy makers, and educators to advocate for 21st century career readiness for every child. The P21 created a framework for integrating 21st century skills in education. This initiative has worked to support the United States' education system in developing students who can thrive and compete in the 21st century workforce. The P21 Framework (2009) includes the skills and knowledge students must master to succeed in work and life. The framework combines content knowledge (math, English, reading, science, etc.), skills (creativity, critical thinking, communication, and collaboration), and literacies (information, media, and technology). The support systems that P21 identify in order to build these skills and knowledge consist of standards and assessments, curriculum and instruction, professional development, and learning environments (P21, 2009). Pressure is increasing on educational systems to graduate students who will thrive in the 21st century. The P21 framework was meant to be a guide for P-12 educators and administrators to infuse these skills throughout curricula.

Recently, the National Education Association (2014), a founding organization of P21, has simplified the framework and identified the 4C's (creativity, critical thinking, communication, and collaboration) as the most important skills for educators to focus on when preparing students for the 21st century workforce. In his remarks delivered at the release of the Pathways to Prosperity Report from the Harvard Graduate School of Education (February 2, 2011), United States Secretary of Education, Arne Duncan, further emphasized the necessity of these skills when he said: "A career-ready student must have the knowledge and skills that employers need from day one. That means

having critical thinking and problem-solving skills, an ability to synthesize information, solid communication skills, and the ability to work well on a team." It is the charge of educators to build this essential skill set so students can compete in and contribute to the global society in which they will soon enter. This skill set–the 4C's–can be accomplished in schools in a variety of different ways, but not without considering the needs of the 21st century learner.

**21st Century Learners**

Today's learners have grown up with vast amounts of information, entertainment, and social connectivity readily available at their fingertips. The digital prowess of this generation is apparent in the many names that are used to identify them: iGeneration, Net Generation, and Digital Natives (Prensky, 2012; Rosen, 2010; Sheninger, 2014; Trilling & Fadel, 2009). The high-tech society in which this generation has been raised has changed how they are wired, how they learn, and what they expect from education. Students have changed so immensely that they no longer reflect the students whom our educational system was designed to teach (Prensky, 2012; Rosen, 2010; Sheninger, 2014; Trilling & Fadel, 2009).

Since the majority of teachers in schools today are not from the Net Generation, awareness of the characteristics that are inherent in the generation of students that they are teaching is imperative. If not, the gap between schools and the students they serve will only continue to increase. Tapscott (2009) identifies eight norms that characterize the attitudes and behaviors of the Net Generation (N-Geners). Four of these should be taken into consideration while planning instructional activities for N-Geners:

> Independent—N-Geners thrive in an environment of choice and autonomy. The Internet has bred independence with a variety of choices on where to purchase, learn, listen, and play.
>
> Collaborative—N-Geners are collaborative as a product of their participation in social media, chat groups, and online gaming systems. This instantaneous connectivity to others is utilized in most aspects of their lives.
>
> Innovative—N-Geners are comfortable with new ideas and technology and are quick to adopt the latest and greatest product available.
>
> Immediacy—N-Geners live in a fast-paced world in which they expect instantaneous information and action. (Tapscott, 2009)

In consideration of the characteristics of today's learners, education needs to shift from less lecture to more interactive; less teacher-centered to more learner-centered; and less instruction-oriented to more discovery-oriented in order to engage this generation of students in learning. As Tapscott (2009) states, "If you understand the Net Generation, you will understand the future. You will also understand how our institutions and society need to change today" (p. 11). Technological innovations are what have led to these inherent attributes of today's learners. Education would be amiss if it did not leverage the power of technology in order to meet the learning styles of N-Geners, especially when most of them already have mobile devices in their pockets.

**Mobile learning**

Mobile learning (mlearning) can occur anytime, anywhere, and fosters communication, collaboration, and personalized learning (Shuler, 2009). These capabilities and affordances provide educators a gateway to engage N-Geners through the

use of mobile devices. These devices allow for the **"**just in time, just enough, and just for me learning" that meets their needs and learning preferences (Peters, 2007, p. 130). Since the inception and adoption of mobile devices in education, numerous studies have reported improved student engagement and achievement (Dixon, 2007; Naismith, Lonsdale, Vavoula, & Sharples, 2004; Ng & Nicholas, 2009; Roschelle, Penuel, Yarnall, Shechtman, & Tatar, 2005; Vess, 2006).

The release of the iPad in spring 2010 introduced a new mobile technology—the tablet. Thus sparking a tablet revolution in which newer versions of the iPad were released amongst various others (Google Nexus, Kindle Fire, Windows Surface, etc.). The portability, large screen size, and ease of use are attractive features of tablet devices. Emerging research points to increased student motivation, student engagement, collaboration, productivity, and digital literacy when using iPads in K-12 classrooms (Chou, Block, & Jesness, 2012; Henderson & Yeow, 2012; Hutchinson, Beschorner, & Schmidt-Crawford, 2012; Pegrum, Oakley, & Faulkner, 2013). This research posits that tablets are capable of bridging the gap between schools and the N-Geners they serve, so long as they are integrated throughout the curriculum and instruction in a manner that encourages the 4C's of 21st century learning (collaboration, creativity, critical thinking, and communication). Even though existing research demonstrates the effectiveness of mobile technology in K-12 education, schools still struggle with the barriers that stand in the way of wide-scale integration of mobile devices in classrooms.

**Barriers to Technology Integration**

Barriers to any change are the extrinsic and intrinsic factors that affect a teacher's innovation implementation efforts. First-order barriers to technology integration are

extrinsic and include a lack of access to technology, insufficient time to plan, and inadequate technical and administrative support. In contrast, second-order barriers are intrinsic and include beliefs about technology, beliefs about teaching, and classroom practices. While providing access and increased support can eliminate many first-order barriers, second-order barriers involve confronting deeply rooted beliefs and practices. Researchers for the Apple Classrooms of Tomorrow (Sandholtz, Ringstaff, & Dwyer, 1990) noted how the reduction or elimination of first-order barriers allowed second-order barriers or issues to surface: "In many ways, the massive introduction of technology forced teachers back into a first-year-teacher mode, starting all over again with issues of classroom management, discipline, role definition, and lesson development" (p. xvi). The feeling of discomfort and uneasiness (second-order barrier) that access to technology (first-order barrier) evokes makes it apparent that both barriers need to be addressed simultaneously in order for effective technology integration to occur in classrooms. Unfortunately, most school leaders focus solely on the procurement of devices and expect effective technology integration to follow. This is made evident in the increased access to and money spent on technology in education.

**Mobile technology access.** In the past, access to technology has been the most common first order (external) barrier to technology integration. However, as we progress further into the 21st century, access seems to be less of a problem. Teachers and students have more access to technology than previously thought. The presence of tablets in education is increasing at all educational levels. Universities such as Oklahoma State, Creighton, and Buena Vista are amongst several universities around the nation that have started mobile device initiatives involving faculty and students (Educause, 2012). Further

evidence of the presence of iPads in higher education was when Apple boasted in a February 2013 press release that iTunes U content downloads have surpassed the one billion mark (Muller, 2013). In response to the increase of mobile devices in higher education, many P-12 school districts have begun to implement initiatives that will put technology in the hands of students in order to prepare them for these high-tech learning environments. It is apparent that mobile technology, especially the iPad, is the choice for the education sector.

The New Media Consortium (2013) reported that, "the iPad sold more than 85 million units in 2013; of these 85 million, 4.5 million iPads have been sold to United States educational institutions" (p. 15). The affordability of tablets versus laptops may be why education leaders are deciding on tablets for their districts. According to the J.D. Power & Associates, U.S. Tablet Satisfaction Study (2014), the average purchase price of a tablet has decreased by $53 ($337 in 2014 vs. $390 in 2012). The decrease in cost cannot be ignored. Especially when this year alone, schools are projected to spend almost $10 billion on education technology, a $240-million increase from 2013 (Barshay, 2014).

However, schools providing access to mobile devices to students does not solve the issue of the lack of access to the Internet at home, which can lead to the digital divide. This divide refers to the unfair connectivity advantages that middle/upper class and urban students have over lower class and rural students. In a June 2013, White House press release, President Obama shared his ConnectED initiative in hopes to decrease this divide by connecting 99% of America's students to broadband and high-speed wireless in their schools and public libraries. Broadband will also be expanded in rural areas by creating a more expansive infrastructure in these areas. Recent results from Pew Research shows a

rapid adoption of the Internet and indicates the digital divide may be slowly closing on its own. In 1995, only 14% of adults polled were users of the Internet. In 2014 that number grew to 87%. Even more staggering is that 97% of young adults (ages 18-29) utilize the Internet today (Fox & Rainie, 2014). According to a study released by Nielsen (2013), 70% of teens (ages 13-17) own a smartphone. For a frame of reference on the rapid increase of smartphone adoption amongst this age group, 58% of American teens owned a smartphone in 2012, and 36% in 2011 (Kerr, 2012). Students are regularly accessing the Internet at home and on the go, utilizing various mobile devices for entertainment and communication.

However, just because students have access to technology doesn't necessarily mean that they know how to utilize it for learning. Sheninger (2014) asserts that this is the responsibility of schools. Educators must model and facilitate the proper use of technology as a learning tool. It is apparent that the first-order barrier of access to technology is becoming less of a barrier. As with any other technological advances, McCombs and Liu (2011) state that the impact of tablets on education is dependent upon teachers' comfort level and confidence (second-order barriers) with the device, which will influence their pedagogical decisions and integration of this technology in classrooms.

**Teacher self-efficacy.** Bandura (1997) defines self-efficacy as the belief about one's capability to learn or perform actions at certain levels. Richardson-Kemp & Yan (2003) expanded on this definition and urged that attitudes and beliefs drive a person's actions. Thus making one's self-efficacy a predictor of future actions. Pajares (1992) believes that capitalizing on this connection will gain an understanding of teachers'

attitudes and beliefs that could lead to a better understanding of their instructional decisions, classroom practices, and ways of interacting with students. In exploring this construct further, numerous researchers have analyzed teachers' technology usage and found that their attitudes and beliefs toward technology played a key role (Abbott & Faris, 2000; Ertmer, 1999; Palak, 2005; Richardson–Kemp & Yan, 2003).

Beliefs have been defined as the lenses through which an individual looks when interpreting the world and affect the way one interacts with the world (Philipp, 2007). Teacher beliefs influence professional practice, which is why confronting these beliefs, is an integral step in integrating new technologies in the classroom. Bandura (1997) emphasizes that self-efficacy is not based solely on an individual's skill-level, but on the belief that one can complete a task. Integrating technology requires more than believing one can complete a task. It also requires technological skills and knowledge. This makes self-efficacy a predicament for technology integration, in that if a teacher believes he/she can accomplish technology integration then he/she will attempt it. However, if the teacher does not have the skills to do so, then he/she is not likely to even try it. A 2010, Science, Technology, Engineering and Mathematics report to the President captures this predicament of technology integration, "Some teachers who are early [technology] adopters do this routinely. They select technology that fits their students' needs and their own instructional goals and preferences. But most teachers lack the time, confidence, content knowledge, and inclination to do so" (President's Council of Advisors on Science and Technology, p. 80). Based on what is known about self-efficacy and its impact on decision-making, it is clear that effective technology integration professional learning

must focus on increasing teachers' self-efficacy with technology integration. In order to do so, there must be an understanding of how self-efficacy is developed.

Bandura (1986) attributed the development of self-efficacy to four primary sources: mastery experiences, vicarious experiences, social persuasion, and physiological factors. Many researchers have confirmed Bandura's social cognitive theory that mastery experiences have a significant impact on efficacy (Compeau & Higgins, 1995; Putman, 2012; Tschannen-Moran & Woolfolk Hoy, 2007) in that the more successful interactions individuals have, the more likely they are to develop high self-efficacy. This has strong implications with respect to professional learning experiences with technology. Hands-on practice with technology during professional learning would lead to more of a mastery experience with the technology during the training, thus a higher likelihood that the teacher would apply technology after training. The second source of self-efficacy is through vicarious experiences (behavior modeling), which involves the observation of someone else performing the behavior in a similar environment, or scenario, in which the observer will experience. Putman (2012) emphasizes that a behavior modeling approach to training can enhance self-efficacy perceptions and performance during teacher training. Social persuasion is the act of reassuring teacher learners that they are capable of mastering technology successfully during technology training, which will boost their confidence. Finally, the physiological factors, especially feelings of anxiety, can affect teachers' levels of self-efficacy with technology. Bandura (1986) argues that individuals sometime interpret their feelings of anxiety to a lack of ability. Thus, if a teacher feels anxious when using mobile technology he or she may decide that the reason for the feelings of anxiety is a lack of ability, which lowers the individual's self-efficacy. These

four factors need to be considered when delivering mobile technology integration professional learning for teachers. It is apparent that without developing strong teacher self-efficacy, mobile technology integration will not be effective in classrooms.

**Professional Learning Strategies to Increase Teacher Technology Self-Efficacy**

While N-Geners assimilate technology because they grew up with it, adults have had to adapt to it, which elicits a much different type of learning process. Tapscott (2009) captures this difference well when he stated: "The assimilation of technology for kids is like breathing-- it's natural, this is not the same for adult learners" (p. 18). This is why technology integration professional learning should meet and challenge teachers at their current level of skill and comfort, so not to intimidate or frustrate them. A scaffolded method of instruction during technology professional learning may accomplish this type of learning environment for teacher learners. Scaffolding provides flexible support that adapts to teachers' increasing ability in the skills being taught while building on the skills they already have.

An effective method of scaffolded instruction is Pearson and Gallagher's (1983) gradual release of responsibility (GRR). Fisher & Frey (2008) describes the GRR as a method of instruction in which an instructor models a skill, provides guided practice, and gives an opportunity to independently practice and apply the skill. This method of instruction gradually releases new learning from the teacher to the students and is often described as the *"I do, we do, you do"* process. The model, which has been applied to students' literacy learning for over 30 years, (Clark and Graves, 2005; Dole, Brown, & Trathen, 1996; Duffy et al., 1986) has potential for adult learning as well, specifically teacher instruction and professional learning (Carrier, 1980; Sweeney, 2003). It is

important to note that the four components of the GRR method of scaffolding embody the four primary sources of self-efficacy (see Figure A). Therefore, the application of the GRR during mobile technology integration professional learning should lead to increased teacher self-efficacy. The four components of GRR are: focus lessons, guided instruction, collaborative learning, and independent work.

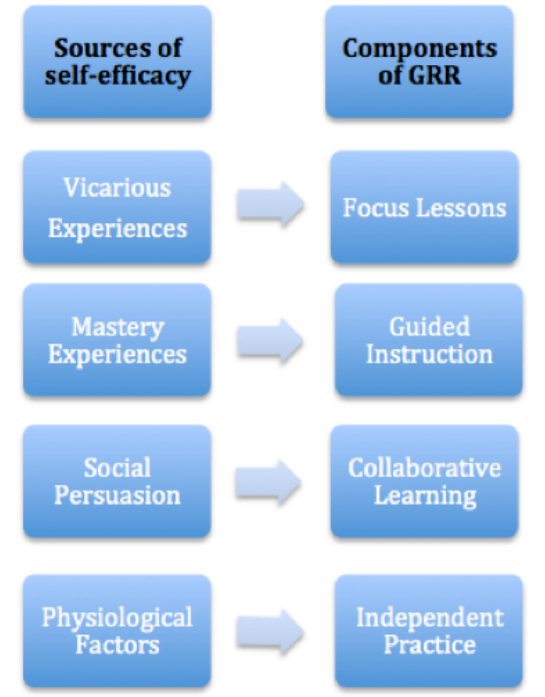


*Figure A.* The four primary sources of self-efficacy aligned to the four components of the Gradual Release of Responsibility method of scaffolding.

Focus lessons are when the teacher models the skill that meets the needs of a goal or objective. This also builds or activates prior knowledge of the skill or content being taught (Fisher & Frey, 2008). Vicarious learning, or learning through watching others successfully complete a task with technology, can increase self-efficacy (Bandura, 1997; Wang, Ertmer, & Newby, 2004). Implementing modeling throughout mobile technology integration training helps teachers conceptualize and experience teaching practices that

they have not themselves experienced as a learner, because the technology didn't exist when they were learners. In order for teachers to feel efficacious in applying effective uses of mobile technology, they need to experience it first hand through modeling during mobile technology professional learning. Elmore, Peterson, and McCarthey (1996) assert that teachers' practices will not change unless they have exposure to what teaching looks like when it's being done differently. Observing the successful experiences of others might increase teachers' perceived need for change as well as assure them that the required changes are possible to accomplish. Wang, Ertmer, and Newby (2004) confirmed previous research on the effect of vicarious learning experiences in their research with pre-service teachers. Their study participants experienced significantly greater increases in self-efficacy with technology integration following a successful vicarious experience with technology integration. After vicarious experiences, teachers need personal experience with guided instruction and social-cultural influences in order to further change beliefs and increase self-efficacy (Nespor, 1987; Rokeach, 1968).

Guided instruction is when "teachers prompt, question, facilitate, or lead students through tasks that increase their understanding of the content" (Fisher & Frey, 2008, p. 2). As applied to mobile technology professional learning, teachers need to be guided through the use of an iPad application within the context that is applicable to the environments in which they teach. During guided instruction, teacher learners practice new technology in a supported environment where they can take risks. Ertmer (2005) asserts that practice changes beliefs and helping teachers adopt new practices that are successful will lead to increased self-efficacy. This supports Bandura's (1997) assertion that building self-efficacy can be done through successful experiences. Guided

instruction, facilitated by a professional with more expertise with the technology is effective when learning and exploring is done in small groups of professionals through collaborative learning.

Collaborative learning gives learners the opportunity to work with peers to problem solve and apply what they have learned; thus, moving to the next step of gradually releasing the responsibility of learning from the professional learning facilitator to the teacher learners. This collaborative learning environment allows participants to work together on a common goal while immersed in the new skill or strategy. A collaborative culture of learning is necessary in order for technology professional development to be successful (Colbert, Brown, Choi, & Thomas, 2008; Harwell, 2003; Pierson & Borthwick, 2010). Establishing this culture gives teacher learners the opportunity to share their expertise and take ownership of their learning to ensure their efficacy in the area of technology integration. Borthwick and Risberg (2008) acknowledge that creating a "climate of trust, collaboration, and professionalism" is necessary when "technology-related risk taking" is an expectation (p. 39). This collaborative environment provides a supportive environment for learning and influences teachers' decision-making when left to their own devices to implement technology.

Independent practice is when the learner applies new knowledge independently. Albion (2008) suggested "the best way for teachers to learn *about* Web 2.0 may be through learning *with* Web 2.0 as authentic practice that can inform their planning and implementation of learning activities" (p. 195, author's emphasis). The same applies to the use of any technology tool. The last step in the gradual release of responsibility requires the teacher learner to independently apply an iPad application to the content

area(s) in which he/she teaches. Throughout the steps of the gradual release of responsibility, the teacher learner progressively becomes independent with iPad integration. The gradual release of responsibility model ensures that teachers feel supported in their acquisition of the skills and strategies necessary for successful implementation in their own teaching environment. This supportive method of professional learning lessens the physiological factors (sweaty palms, shaking, nerves) that one experiences when trying something new. Although Bandura (1986) states that physiological factors are the least influential of the four sources of self-efficacy, it is important to note that if one is more at ease with the task at hand they will feel more capable and have higher beliefs of self-efficacy.

**Implementation of the Gradual Release of Responsibility in a Graduate Teacher Education Course**

The four components of the GRR as applied to technology integration with iPads (See Figure B) contain research-based instructional methods that increase teacher self-efficacy. As the researcher and instructor of the courses in this study, I utilized the GRR whenever introducing a new application (app) to graduate candidates during class sessions. I would explicitly model the use of an iPad app during instruction and then guide candidates through the exploration of the app during an informal formative assessment (this was usually done in collaborative groups). Then candidates would work independently on the app in order to complete a course assessment. This process was repeated throughout the duration of the courses with a variety of different apps and assessments.

Through experiencing the gradual release of responsibility model, candidates learned about iPad integration and the content of the course in a comfortable, supported environment. They experienced iPads as *students* before they would consider how to use them as *teachers*. This modeling and guidance was valuable for graduate teacher candidates as the goal was for them to be able to emulate these practices in their classrooms in order to meet the needs of *their* 21st century learners.

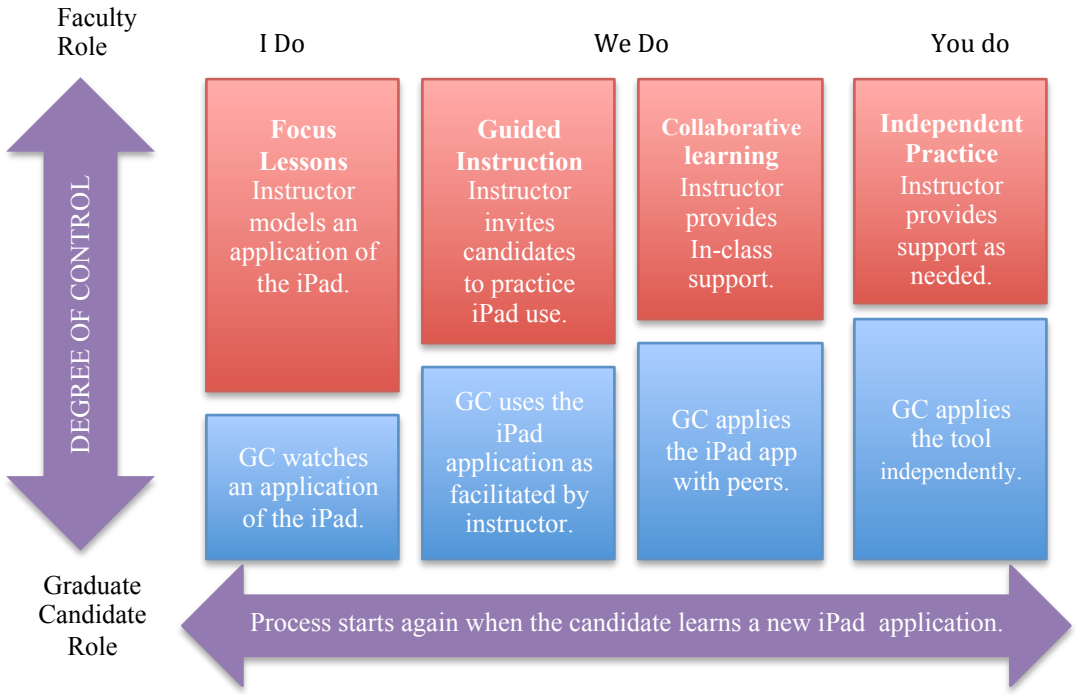


*Figure B.* The four components of the gradual release of responsibility model applied to iPad integration in the graduate course

**Summary**

Technology plays an essential role in the world today. It is the charge of education to prepare students for skills they will need when they join the 21st century work force. When integrated and used appropriately, mobile technology has potential to dramatically improve learning and teaching (Chou et al., 2012; Henderson & Yeow,

2012; Hutchinson et al., 2012; Pegrum et al., 2013). In recent years, multiple entities have put forth resources towards building technologically advanced educational facilities and providing technological devices at all educational levels in the hopes of creating students who can thrive in a tech-infused, global workforce. However, this technology is virtually useless unless teachers can facilitate effective integration of these devices in order to create engaging learning environments for students. School districts need to think beyond providing access to devices and ensure that professional learning increases teacher self-efficacy with mobile technology. In order to do so, it first must be understood what types of professional learning models will increase teacher self-efficacy. This study investigates one model of professional learning and explores the impact of the gradual release of responsibility model on teacher self-efficacy with iPad integration.

# Chapter 3

## Methodology

The purpose of this study was to determine the effect of the Gradual Release of Responsibility method of instruction on graduate teacher education candidates' efficacy with iPads. This chapter describes the participants, research design, data collection procedures, instrumentation, research questions, and data analysis of the study.

### Participants

A nonprobability convenience sample was used for this pre-post test survey research. Creswell (2012) recommends using nonprobability sampling when subjects are convenient and are representative of the characteristics in which the researcher intends to study. Study participants were graduate teacher education candidates in the spring and summer children's literature courses that were taught by the researcher. This sample consisted of in-service teachers from a variety of districts, who teach a variety of different grade levels and content areas. This sample was representative of the teacher population based on the diversity of districts, grade level, content areas, and experience of the candidates enrolled in the courses. The graduate children literature course is a requirement for the graduate reading specialist program, library science program, and is an elective for the elementary and secondary graduate programs. In addition, in-service teachers take this course to renew their teaching certificates with the state. The sample size was 41 candidates ($N = 41$). Of the total number of subjects ($N = 41$), 39 (95%) were female and 2 (4 %) were male. Study participants consisted of 17 (41%) from the ages of 20-29 and 24 (59%) were 30-59 years of age.

**Research Design**

An exploratory, quantitative survey research design was used to complete this study. Creswell (2012) states that survey designs identify trends in attitudes, opinions, behaviors, or characteristics with the idea of explaining a trend in order to establish an overall tendency amongst the sample of a population. The focus of this research, the concept of self-efficacy, is defined as the attitudes or beliefs that can predict behaviors. Therefore, a survey method was selected to gather data from the sample in order to describe tendencies amongst the population.

This pretest-posttest study measured the significance of the impact of the gradual release of responsibility method of instruction on graduate candidates' self-efficacy with iPads. The study design is displayed in the following notation:

$X_1 \quad O_1 \quad Y_1 \quad O_2$

$X_2 \quad O_1 \quad Y_1 \quad O_2$

$X_1$= graduate candidates in the College of Education espousing high experience with iPads

X2 = graduate candidates in the College of Education espousing low experience with iPads.

$Y_1$= independent variable. All study participants experienced the Gradual Release of Responsibility method of instruction from the same instructor.

$O_1$=study pretest dependent variable. The participants completed a pre-survey prior to the start of the course to measure their efficacy with iPads

$O_2$=study posttest dependent variable. The participants completed a post-survey at the conclusion of the course to measure their efficacy with iPads.

**Instrumentation**

The survey used for this study was the Computer Technology Integration Survey (Wang et al., 2004), which determines one's confidence level with integrating technology into the classroom. This survey was used to measure graduate teacher candidates' self-efficacy with iPad integration. It contains 21 statements that are consistently worded with the stem of "I feel confident that…", and uses a five-point Likert scale ranging from 1, SD (Strongly Disagree) to 5, SA (Strongly Agree). The survey instrument developer granted permission for the use and modification of the CTI so it could be applied to iPads. The researcher added an additional question to the survey in which participants were to rate their experience with iPads. On this question, a zero-rating equated to "no experience" up to a rating of three, which equated a "High" level of experience with iPads in personal and professional settings. Candidates that indicated ratings of 0 and 1 were grouped into group 1 (low experience) and candidates that indicated their experience at a level 2 and 3 were grouped into group 2 (high experience). This survey can be found in the Appendix.

Wang et al. (2004) states that the survey was reviewed for construct and content validity. The content validity was reached after a panel of experts reviewed and rated the questions on the instrument. Appropriate revisions were made following this extensive review process. The construct validity was empirical in nature (Wang et al., 2004). A factor analysis was conducted on pre-post data from the survey in order to identify factors. Two factors were identified in doing so, computer technology capabilities and strategies (intrinsic) and external influences of computer technology (extrinsic). After the factor analysis, Wang et al. (2004) found the instrument to be a valid instrument for

measuring the constructs measured in the survey. In that same study, "Cronbach alpha coefficients were calculated for both pre-survey data and post-survey data to determine the reliability of the instrument" (Wang et al., p. 236). The Alpha coefficients of .94 and .96 proved that the survey instrument was reliable and demonstrates that it will be useful for future research.

**Data Collection Procedures**

The University of Nebraska at Omaha's Institutional Review Board granted approval to modify the use of the survey used in a pilot study. The survey that was utilized for the pilot study was created by the researcher and was not a valid instrument. Therefore, the researcher was granted permission to modify and use the already validated Computer Technology Integration Survey (Wang et al., 2004) for the pre-post survey instrument. Prior to mailing the surveys out, a graduate assistant coded the surveys by giving each teacher education candidate enrolled in the class a random number and putting the corresponding number on the survey to ensure participant anonymity. Two weeks prior to the first day of class, graduate teacher candidates were mailed a cover letter, a survey and a self-addressed, stamped envelope. Dillman (2008) calls the inclusion of the self-addressed, stamped envelope as a goodwill gesture and encourages respondents to complete the survey. Potential participants were also given the opportunity to turn in the completed survey at the first class session. Shortly after the cover letter and survey were mailed, an email was sent to all candidates in the course indicating that a survey would be arriving in the mail. Thus incorporating a mixed-mode survey method. One mode of communication was used to contact participants (mail) and another to encourage them to respond (e-mail) (Dillman, 2008). The implementation of a mixed-

mode survey was selected in the hopes of increasing survey response rates. Creswell (2012) states that a high response rate creates a stronger claim in generalizing results from the sample to the population. During the last week of class, a similar method of survey distribution was used. A graduate assistant coded the post-surveys to correspond with the pre-surveys and mailed out a cover letter, post-survey, and a self-addressed, stamped envelope. Again, participants were emailed a notice that the surveys had been mailed and were given the option to turn in their surveys during the last class session. Since this study collected data amongst the same population over a semester's time, this was a longitudinal survey design (Creswell, 2012).

**Research Questions and Data Analysis**

The goal of this quantitative study was to explore factors influencing graduate teacher candidates' self-efficacy with iPad integration. Five research questions supported this goal to determine what factors impact graduate teacher candidates' efficacy with iPad integration:

1. What is graduate candidates' espoused efficacy with iPad integration?

   Analysis. Means and standard deviations were calculated for each factor (factor 1: internal influences-capabilities and strategies, factor 2: external influences of iPad perceptions, and total score).
2. Is there a significant difference between graduate candidates' pre-test and post-test responses on the Mobile Technology Integration Survey regarding their iPad capabilities and strategies (factor 1)?

3. Is there a significant difference between graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey regarding their external influences of iPad uses (factor 2)?
4. What impact did the gradual release of responsibility method of instruction have on graduate candidates' total self-efficacy scores on the Mobile Technology Integration Survey?

Analysis. Repeated measures *t*-tests were used to examine the significance of the difference between the pre and post scores. Since multiple statistical tests were conducted, a 1-tailed, .01 alpha level were used to help control for type 1 errors.

5. Is there a significant difference between high experienced and low experienced graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey?

Analysis. A repeated measures two-way ANOVA was conducted to measure the growth amongst the two groups (low and high experience).

# Chapter 4

# Results

## Purpose of the Study

Technological innovations have the potential of revolutionizing education for K-12 students. Mobile technology is the latest innovation that educational institutions are working on effectively integrating into classrooms (New Media Consortium, 2013). Teachers are on the frontlines of technology integration in the classroom, which makes their efficacy with mobile devices an integral aspect of the effectiveness of any mobile technology initiative. Such initiatives need to go beyond providing access to teachers and students, and address how to increase teacher efficacy with mobile devices. All participants in this study were provided access to iPads and were taught using the gradual release of responsibility method of instruction in order to measure the impact of this teaching strategy on graduate teacher candidates' efficacy with iPad integration.

This chapter presents an analysis of the pre and post survey data collected to determine if graduate teacher education candidates' self-efficacy with iPads increased after the completion of a graduate teacher education course. The survey instrument, the modified Computer Technology Integration Survey (Wang et al.), included two factors among the survey items, factor 1 being internal influences of technology uses (personal technology capabilities and strategies) and factor 2 was the external influences of technology uses (system restraints and opposition) (2004). These factors coincide with the internal and external barriers to technology integration that occur in the classroom (Ertmer, 1999).

Data was collected during the spring semester and summer semester. There were 25 candidates enrolled in both the spring semester and summer semester courses, for a total of 50 candidates. Participation in the survey study was optional and 41 candidates responded to the pre-post surveys for a response rate of 82%. A survey response rate of 50% is considered adequate for most survey studies (Creswell, 2012).

**Research Question #1**

What is graduate candidates' espoused efficacy with iPad integration?

Tables 1 and 2 display the pre- and post-test results for each question on the survey. Table 1 includes questions from the survey that pertain to the internal influences (factor 1) and Table 2 includes questions that pertain to the external influences (factor 2) that impact candidates' iPad integration efficacy. The mean and standard deviation of each survey question is present in these tables. Overall, participants' espoused efficacy with iPad integration prior to the graduate course was positive ($M = 3.51$, $SD = 0.86$) with the exception of responses to question #16 ($M = 2.90$, $SD = 1.07$). This question states, "I feel confident about using technology resources to collect and analyze data in order to improve instruction." Post-test results indicate that all participants had a positive espoused efficacy with iPad integration after taking the graduate course ($M = 4.27$, $SD = 0.53$).

**Research Question #2**

Is there a significant difference between graduate candidates' pre-test and post-test responses on the Mobile Technology Integration Survey regarding their iPad capabilities and strategies (factor 1)?

In comparing the pre-test data ($M = 3.45$, $SD = 0.90$) to the post-test data ($M = 4.27$, $SD = 0.52$), there was a significant difference. The post test was significantly higher and had a large effect size ($t(41) = 7.07$, $p < .01$, $d = 1.11$, one-tail). This data is displayed in Table 3.

**Research Question #3**

Is there a significant difference between graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey regarding their external influences of iPad uses (factor 2)?

A comparison of the pre test ($M = 3.69$, $SD = 0.76$) to the post-test data ($M = 4.30$, $SD = 0.58$) indicates that there was a significant difference. The post test was significantly higher and had a large effect size ($t(41) = 6.00$, $p < .01$, $d = 0.94$, one-tail). This data is displayed in Table 4.

**Research Question #4**

What impact did the gradual release of responsibility method of instruction have on graduate candidates' total self-efficacy scores on the Mobile Technology Integration Survey?

Table 5 displays the overall impact of the gradual release of responsibility method of instruction on the graduate candidates' self-efficacy with iPad integration. A comparison of candidates' pre-test scores on self-efficacy with iPad integration prior to the course ($M = 3.51$, $SD = 0.86$) as compared to after the completion of the course ($M = 4.27$, $SD = 0.53$) indicates that there was a significant difference. The post test was significantly higher and had a large effect size ($t(41) = 6.86$, $p > .01$, $d = 1.09$, one tailed).

**Research Question #5**

Is there a significant difference between high experienced and low experienced graduate candidates' pre-test and post-test efficacy levels on the Mobile Technology Integration Survey?

There was a main effect for time $F(1, 38)$, $p < .01$, . $\eta^2 = 0.49$, indicating candidates grew from pre-test ($M = 2.05$, $SD = 0.77$) to post test ($M = 2.61$, $SD = 0.63$). There was a main effect for experience, $F(1, 39) = 52.64$, $p < .01$, $\eta^2 = 0.57$, indicating high experienced candidates' ($M = 2.75$ , $SD = 0.44$ ) espoused greater efficacy than low experienced candidates' ($M = 2.11$, $SD = 0.93$) on the post test. There was an interaction between time and experience $F(1, 39) = 10.32$, $p < .01$, $\eta^2 = 0.21$, indicating that the low experienced candidates grew at a higher rate than the high experienced candidates. Means and standard deviations are displayed in Table 6 and the ANOVA is displayed in Table 7.

Table 1

*Graduate Candidates' Espoused Efficacy with iPad Integration-Internal Factors*

| | Pretest | | Posttest | |
|---|---|---|---|---|
| Question | *M* | *SD* | *M* | *SD* |
| #1 I feel confident that I understand the capabilities of iPads in order to maximize them in my classroom. | 3.34 | 1.11 | 4.29 | 0.72 |
| #2 I feel confident that I have the skills necessary to use an iPad for instruction | 3.61 | 1.14 | 4.29 | 0.68 |
| #3 I feel confident that I can successfully teach content with the appropriate use of iPads. | 3.44 | 1.07 | 4.32 | 0.69 |
| #4 I feel confident in my ability to evaluate iPad apps for teaching and learning. | 3.61 | 1.05 | 4.22 | 0.65 |
| #5 I feel confident that I can use correct terminology when directing my students. | 3.40 | 1.22 | 4.20 | 0.64 |
| #6 I feel confident that I can help students when they have difficulty using the iPad | 3.63 | 1.02 | 4.22 | 0.72 |
| #7 I feel confident that I can effectively monitor students' iPad use for project development. | 3.49 | 1.05 | 4.22 | 0.69 |
| #8 I feel confident that I can motivate my students to participate in iPad-based projects. | 3.80 | 1.01 | 4.63 | 0.49 |
| #9 I feel confident that I can model educational uses of iPads during instruction. | 3.66 | 1.09 | 4.51 | 0.55 |
| #10 I feel confident that I can consistently use iPads in effective ways. | 3.46 | 1.14 | 4.27 | 0.81 |
| #11 I feel confident that I can provide appropriate feedback to students using the iPad. | 3.25 | 1.13 | 4.15 | 0.73 |

Table 1 (Continued)

*Graduate Candidates' Espoused Efficacy with iPad Integration-Internal Factors*

| | Pretest | | Posttest | |
|---|---|---|---|---|
| Question | *M* | *SD* | *M* | *SD* |
| #12 I feel confident that I can regularly incorporate iPads into my lessons. | 3.24 | 1.16 | 4.29 | 0.64 |
| #13 I feel confident about selecting appropriate iPad apps for instruction based on curriculum standards. | 3.34 | 1.00 | 4.27 | 0.59 |
| #14 I feel confident assessing students' iPad-based projects. | 3.24 | 1.04 | 4.15 | 0.65 |
| #16 I feel confident about using technology resources to collect and analyze data in order to improve instruction. | 2.90 | 1.07 | 3.83 | 0.86 |
| #18 I feel confident that I can be responsive to students‘ needs during iPad use. | 3.51 | 0.98 | 4.46 | 0.50 |
| Total Internal Factor | 3.45 | 0.90 | 4.27 | 0.52 |

Table 2

*Graduate Candidates' Espoused Efficacy with iPad Integration-External Factors*

| | Pretest | | Posttest | |
|---|---|---|---|---|
| Question | *M* | *SD* | *M* | *SD* |
| #15 I feel confident about keeping curricular goals and iPad uses in mind when selecting an ideal way to assess student learning. | 3.24 | 1.07 | 4.32 | 0.72 |
| #17 I feel confident that I will be comfortable using iPads in my teaching. | 3.54 | 1.07 | 4.24 | 0.73 |
| #19 I feel confident that my ability to address my students' iPad needs will continue to improve. | 4.32 | 0.72 | 4.73 | 0.45 |
| #20 I feel confident that I can develop creative ways to cope with system constraints and continue to teach effectively with iPads | 3.49 | 1.03 | 3.93 | 1.01 |
| #21 I feel confident that I can carry out iPad-based projects even when skeptical colleagues oppose me. | 3.88 | 0.90 | 4.29 | 0.64 |
| Total External Factor | 3.69 | 0.76 | 4.30 | 0.58 |

Table 3

*Internal Influences Of Graduate Candidates' Efficacy*

| | Pretest | | Posttest | | | | |
|---|---|---|---|---|---|---|---|
| Internal Influences | *M* | *SD* | *M* | *SD* | *t* | *p* | *d* |
| | 3.45 | 0.90 | 4.27 | 0.52 | 7.07 | < .01 | 1.11 |

Table 4

*External Influences Of Graduate Candidates' Efficacy*

| | Pretest | | Posttest | | | | |
|---|---|---|---|---|---|---|---|
| External influences | *M* | *SD* | *M* | *SD* | *t* | *p* | *d* |
| | 3.69 | 0.76 | 4.30 | 0.58 | 6.00 | < .01 | 0.94 |

Table 5

*Overall Impact Of Gradual Release Of Responsibility On Graduate Candidates' Self-Efficacy Scores*

| | Pretest | | Posttest | | | | |
|---|---|---|---|---|---|---|---|
| Overall Impact | *M* | *SD* | *M* | *SD* | *t* | *p* | *d* |
| | 3.51 | 0.86 | 4.27 | 0.53 | 6.86 | < .01 | 1.09 |

Table 6

*Descriptive Statistics for Candidates Perceived Experience with iPads*

| | Pretest | | Posttest | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Low Experienced (group 1) | | | | |
| *n* = 9 | 0.89 | 0.33 | 2.11 | *0.93* |
| High Experienced (group 2) | | | | |
| *n* = 32 | 2.38 | 0.49 | 2.75 | 0.44 |
| Total | | | | |
| *n*= 41 | 2.05 | 0.77 | 2.61 | 0.63 |

Table 7

*ANOVA for Candidates Perceived Experience with IPads-Pre and Post Test*

| Source of Variation | *df* | *MS* | *F* | *p* | $\eta^2$ |
|---|---|---|---|---|---|
| Within Subjects | | | | | |
| Time | 1 | 8.96 | 36.68 | <.01 | 0.49 |
| Time*Exp | 1 | 2.52 | 10.32 | < .01 | 0.21 |
| Error | 39 | 0.24 | | | |
| Between Subjects | | | | | |
| Exp | 1 | 15.86 | 52.64 | <.01 | 0.57 |
| Error | 39 | 0.30 | | | |

# Chapter 5

## Conclusions and Discussion

Mobile technology is not going away. In fact, it seems that most users of the Internet are moving from desktop access to mobile access. An article in *The Economist* (Standage, 2013), boldly states that the Internet is on its way to becoming a mostly mobile medium—that there will be more mobile users than desktop users. A recent Pew Research report supports this statement: "One in four teens are 'cell-mostly' Internet users" (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). The shift has implications for how these mobile device-using students are taught. This is why schools must be armed with teachers who are efficacious with mobile technology integration.

The purpose of this study is to explore factors that impact graduate teacher education candidates' efficacy with iPads. The instructional method for this study was the Gradual Release of Responsibility. The pre-post test data measured study participants' espoused efficacy with iPads, internal and external factors effect on efficacy with iPads, and the impact of the Gradual Release of Responsibility method of instruction on candidates' efficacy with iPads, prior to the and at the completion of the course.

### Conclusions

### Research Question #1 Conclusion

The purpose of research question #1 was to determine graduate candidates' espoused efficacy with iPad integration. Overall, candidates espoused efficacy on the pre-test started high at above the midpoint on the 5-point likert scale with 5 being the highest score ($M = 3.51$, $SD = 0.86$). Possible factors contributing to this high-espoused efficacy with iPads prior to the course is candidates' access to iPads and the prevalence of iPads in educational environments.

Candidates indicated on the pre-test as to whether or not they had access to iPads prior to this class. Responses to this question showed that 30 candidates (73%) had access to an iPad prior to class and 11 (27%) did not. This can also explain the growth in espoused efficacy on the post-test ($M = 4.27$, $SD = 0.53$) in that all candidates were provided with access to iPads throughout the duration of the course and those without access to iPads prior to the course could have attributed to the growth in efficacy. All candidates enrolled in the course were in-service teachers and may have encountered or utilized iPads in their teaching environments prior to the study.

**Research Question #2 Conclusion**

There was a statistically significant difference in the internal influences (factor 1) of graduate candidates' efficacy with iPad integration when comparing the pre-test scores ($M = 3.45$, $SD = 0.90$) to the post-test scores ($M = 4.27$, $SD = 0.52$). In addition, Cohen's $d$ indicated that the effect size was large ($d = 0.94$). This increase in candidates' internal influences, or the growth of their capabilities and strategies for iPad integration, demonstrates an increase in their efficacy to integrate iPads in their current P-12 teaching environment.

The high score on the pre-test for question # 8 ($M = 3.80$, $SD = 1.01$) that states, "I feel confident that I can motivate my students to participate in iPad-based projects," shows a possible projection of candidates' awareness of iPads' potential to motivate and engage P-12 students. The growth on candidates' efficacy on the post-test for this question ($M = 4.63$, $SD = 0.49$) may indicate that their experiences in the course increased their skills and motivation to utilize iPads during instruction.

**Research Question #3 Conclusion**

There was a significant difference when comparing the pre-test scores ($M = 3.69$, $SD = 0.76$) to the post-test scores ($M = 4.30$, $SD = 0.58$) of graduate candidates' external influences (factor 2) on their efficacy with iPad integration. The effect size was large, as reflected by Cohen's $d$ ($d = 0.94$). The substantial increase in candidate's efficacy in relation to the external influences (co-workers, system restraints, and access) demonstrates an increase in their efficacy to integrate iPads in their current classroom, regardless of the impact external factors.

It is worthy to note that the total pre-test scores were high at the beginning of the course and continued to rise after the completion of this course; especially, the pre-test responses to survey question #19 ($M = 4.32$, $SD = 0.72$). This question states, "I feel confident that my ability to address my students' iPad needs will continue to improve." This high level of efficacy prior to the class shows that candidates in this course are willing to improve their knowledge in the area of iPad integration and even more so after the completion of the course based on the post-test results of this question ($M = 4.73$, $SD = 0.45$).

**Research Question #4 Conclusion**

There was a significant difference in the comparison of pre-test scores ($M = 3.51$, $SD = 0.86$) to post test scores ($SD = 4.27$, $M = 0.53$) regarding the impact of the gradual release of responsibility method of instruction on graduate candidates' self-efficacy with iPads. The effect size was large as indicated by Cohen's $d$ ($d = 1.09$). The data shows that the impact of the gradual release of responsibility method of instruction increased graduate candidates' self-efficacy with iPad integration. This method of instruction

consists of four stages: focus lessons, guided instruction, collaborative learning, and independent work. Although the data shows an increase of self-efficacy, this study did not determine which stage of instruction was the most effective in raising self-efficacy.

**Research Question #5 Conclusion**

Candidates were divided into two groups (low experience and high experience) based on their espoused experience with iPads. The repeated measures two-way ANOVA indicated that there was a significant difference amongst candidates' espoused experience with iPads on the pre-test and both groups experienced significant growth throughout the course as demonstrated by the post-test scores for time $F(1, 38)$, $p < .01$, . $\eta^2 = 0.49$. However, the gap between the groups' espoused experience levels started to close by the end of the course, as indicated by the interaction between time and experience $F(1, 39) = 10.32$, $p < .01$, $\eta^2 = 0.21$. Even though the lower experienced candidates did not reach the espoused level of experience that the higher experienced candidates $F(1, 39) = 52.64$, $p < .01$, $\eta^2 = 0.57$, their growth was encouraging.

**Discussion**

Barriers to change are the extrinsic and intrinsic factors that affect a teacher's innovation implementation efforts" (Ertmer, 1999, p. 2). First order barriers are extrinsic, on the surface level, and relatively easy to overcome and measure. These are typically the focus of technology integration efforts, e.g. procuring devices, accessories, bandwidth, etc. The assumption is made that once there is access, integration will automatically occur in classrooms. However, this is not the case. This approach to technology integration ignores the complexity of the human capacity to change and is why most technology integration efforts tend to fail. In order for effective technology integration to

occur in today's classrooms, a paradigm shift in current teaching practices and beliefs must occur. This is why technology integration efforts need to extend beyond first-order barriers of access and also confront intrinsic, second-order barriers. Teachers' belief systems and routines begin to shift only when second order barriers are addressed. This involves redefining what learning and engagement look like and what behaviors define "teaching" (Fullan & Stiegelbauer, 1991). The results of this study indicate that the gradual release of responsibility (GRR) method can create changes in teaching practices that are necessary for technology integration to be implemented in classrooms.

Bandura's Social Cognitive Theory (1986) has been the focus of several technology integration studies because of the impact self-efficacy has on behavior. Bandura (1997) states "perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Self-efficacy influences actions. If people believe they have the ability to produce results, then they will attempt to do so. Furthermore, Berman and McLaughlin's research (1977) emphasized that teachers' sense of efficacy is one of the best predictors of their willingness to adopt new educational practices. The predictive nature of self-efficacy is what makes it such an important component of the change process.

Since all candidates who participated in this study experienced significant growth in their self-efficacy with iPads, regardless of their experience or efficacy with iPads prior to the course, one can conclude that the GRR is an effective method of increasing self-efficacy. Although these results do not provide definitive answers as to which aspects of the GRR method are most effective, there are several implications on how this method aligns with change theory in order to create sustainable change in regards

technology integration.

**Gradual Release of Responsibility and Change Theory**

The results of this study indicate that the GRR method of instruction led to a second-order change in candidates' espoused self-efficacy with iPads. Technology integration requires a paradigm shift in past and present teaching practices that have relied heavily upon the teacher and the textbook as the sole source of information. Technological innovations have dramatically altered this type of educational environment, thus thrusting change upon an American institution that has proved itself to be seemingly unchangeable. Kelly, McCain, and Jukes (2009) describe the situation in education as "TTWWADI – That's The Way We've Always Done It" (p. 3). Schools have operated this way for so long that educators don't really know the reasons why they do the things they do. These deep-seeded cultures and systems are what make change initiatives in education a daunting task. Leaders and teachers who are driving and enacting change must acknowledge the process that is necessary for sustainable change in classroom practices to occur. This process should be approached with methods that will respect current teaching practices while gradually introducing change, which is exactly what the GRR method of instruction accomplished in this study. This research brought to the surface the alignment between the GRR method, the sources of self-efficacy, and the six sources of the Influencer Change Model developed by Patterson, Grenny, Maxfield, McMillan, and Switzler, (2008) as demonstrated in Figure C.

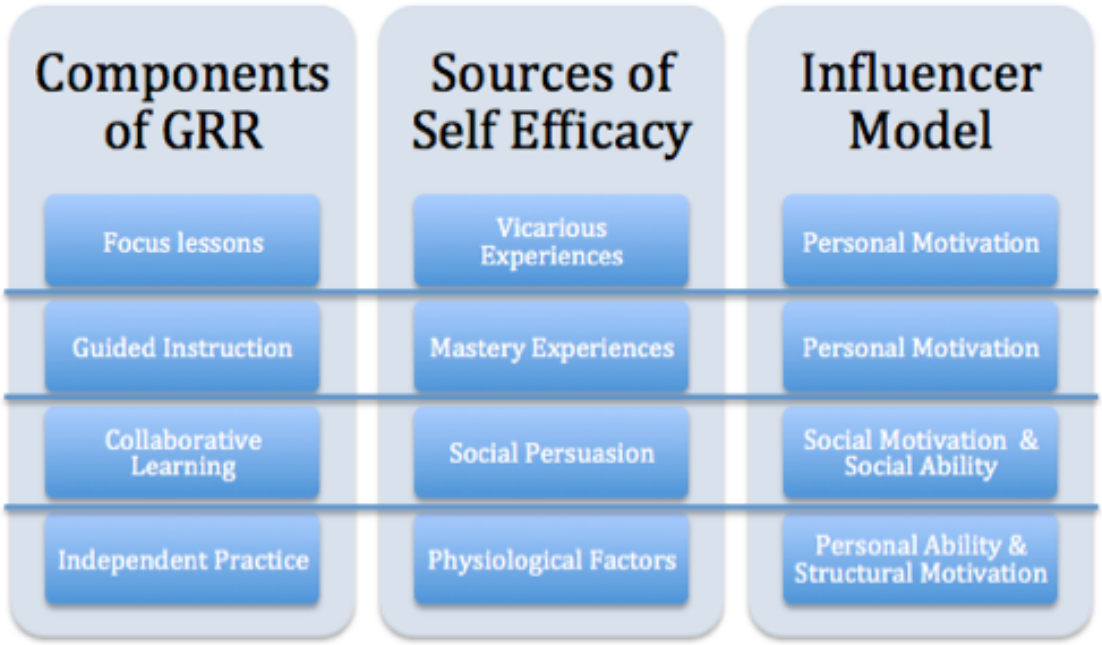


*Figure C.* The alignment between the GRR method, the sources of self-efficacy, and the six sources of the Influencer Model

**Influencer Model**

**Personal Motivation.** According to Patterson et al. (2008) moral, intrinsic satisfaction is a key factor to accomplishing change. In order to create sustainable change in the instructional practices of the graduate candidates, the researcher had to find a way to make technology integration intrinsically satisfying. By nature, teachers have a strong moral purpose. Fullan (1993) affirmed this when he said, "Teaching at its core is a moral profession. Scratch a good teacher and you will find a moral purpose" (p. 12). When encouraging technology integration with educators, engaging their intrinsic motivation will appeal to their desire to enhance their teaching practices. Teachers have a powerful desire to do what's right. In order to break away from "the way we've always done it," Patterson et al. (2008) recommends "harnessing this intrinsic desire as it is a far more

powerful influence tool than using extrinsic rewards or exacting punishment" (p. 109). Showing teachers that technology infused classrooms can create 21st Century learning environments that will engage students can accomplish this.

Bandura (1997) notes that successful vicarious experiences are an effective tool for promoting a sense of personal efficacy. Seeing someone successfully model a new behavior is a powerful influencer for individuals considering change. "Sometimes people loathe the very thought of a new behavior because they lack adequate information to judge it correctly" (Patterson et al., p. 89). Their perceptions of the new behavior are negative, which can only change if they experience it. In the environment of this study, candidates experienced iPad integration vicariously through the GRR stage of focus lessons. For example, an iPad application (app) was modeled to the class within the content of the course. In this scenario, candidates were engaged with an app as learners. Successful vicarious experiences increase intrinsic motivation to learn how to replicate this scenario (Bandura, 1997). Once candidates experienced their own engaged learning through the use of iPad apps, they wanted to replicate that experience for their students. Feedback from a candidate in the course re-emphasized the importance of these vicarious experiences. "After this class, I am much more excited about the possibility of using them [iPads] than I was before, simply because I have now seen and used them for educational purposes." The combination of providing personal motivation (Influencer change theory) through vicarious experiences (social cognitive theory) from the focus lessons (GRR) increases efficacy, which leads to changes in behavior. To further scaffold this experience and build self-efficacy with iPads, candidates need to replicate the experience by creating a similar learning environment. This leads to the next step in the GRR model: guided

instruction.

**Personal ability.** Guided instruction occurs when the skills and knowledge begin to shift from the teacher to the learner (Refer to Figure B). Fisher and Frey (2008) identify this stage as the point when the teacher's role changes and the learner is applying the new learning. During guided instruction, candidates were expected to utilize the app from the perspective of a teacher. Candidates were able to refer to their experiences with the app as a learner and apply the app as a teacher by replicating the vicarious learning that they had just experienced in the focus lesson. Candidates were supported through this guided instruction experience by their classmates and the researcher/instructor. This learning experience incorporates mastery experiences because candidates are able to experience success with the application of the iPad app in a supportive environment. This stage exemplifies the strongest entity of Bandura's sources of self-efficacy, guided mastery, because they experienced success with a new behavior. A successful guided mastery experience increases candidates' perceptions of their personal ability, which is necessary to build intrinsic motivation to change. The impact of this stage of the GRR model was made apparent by this candidate's quote regarding risk-taking and support: "I felt like I was willing to take more risks during class time because I felt supported by my peers and instructor." Another candidate was able to directly relate her experiences to her classroom. "I have access to iPads at my school so the guidance in this class, the ideas and modeling helped me gain confidence in my iPad usage at school." These statements confirm the results of the study by demonstrating how mastery experiences through guided instruction increased motivation and self-efficacy with iPads.

**Social motivation and social ability.** Bandura (1997) asserts that social persuasion is a means of strengthening people's beliefs that they possess the abilities to accomplish desired tasks. Likewise, collective participation from a group of teachers is an important design feature of professional learning, especially when participants have opportunities to discuss implementation successes and challenges. A support network encourages group members to problem solve and plan together and strive for continuous improvement (National Staff Development Council, 2009). In fact, Windschitl and Sahl (2002) found that when teachers were introduced to new technologies in a training session, they were more likely to integrate technology when they were engaged in informal conversations and collaborative planning sessions.

Candidates in the course worked regularly with their peers when applying their new knowledge during class time and outside of class time. This professional learning network occurred naturally and regularly throughout the duration of the course. Fisher and Frey (2008) identify several examples of collaborative teaching strategies. Those that were used during this class were literature circles, jigsaw article reading, skills practice, and regular formative assessments throughout instruction. During this study, the social motivation and social ability aspects of the Influencer model (Patterson et. al, 2008) aligned with the social persuasion source of self-efficacy (Bandura, 1997) that are embedded in the collaborative learning stage of the GRR model (Fisher & Frey, 2008). The alignment of the collaborative components of all of these models is demonstrated in Figure C. The results of this study showed that this collaborative and social environment increased candidates' efficacy with iPads. This is made apparent by a quote from one of the candidates: "I enjoyed having time to explore the different instructional apps with

others in class. This opportunity allowed me to expand my ideas and others." The collaborative nature of this stage in the GRR model was influential, however, the impact of candidates' access to iPads cannot be ignored.

**Structural ability**. Structural ability in the Influencer model pertains to the environment and not to human influence (Patterson et al., 2008). In this study, the element of candidates' environment that was impacted was that they were all provided access to iPads. By adding this external factor, candidates' learning environment changed because they were able to independently practice with the iPad outside of class time. Independent practice is the last stage of the GRR model. Fisher and Frey (2008) emphasize that independent practice must provide opportunities to apply and build on learning from the previous steps in the GRR (focus lessons, guided instruction, and collaborative learning) in order for learners to become self-directed and engaged. During this study, candidates completed formative and summative assessments independently, which provided such opportunities. The combination of independent practice and access to iPads are likely to have impacted candidates' physiological states, which is the last source of self-efficacy.

Compeau and Higgins (1995) state that physiological states, or feelings of anxiety can lower one's self-efficacy because these feelings are interpreted as a lack of ability. As applied to technology integration, a teacher feels nervous while integrating technology. He or she may decide that these feelings are attributed to a lack of ability. This lowers self-efficacy and decreases the willingness to take risks with technology. The results of this study show an increase in candidates' efficacy, which implies that the combination of providing access and the use of the GRR lowered candidates' anxiety related to iPad

integration. The results of this study also support the concept of propinquity that Patterson et al. (2008) emphasizes, because candidates were given complete access to iPads throughout the duration of the course. This shifted candidates' behavior because it made iPads accessible to explore. A candidate in the course supports this by stating: "The time I could spend at home, since we were all given iPads, increased the amount of time I could practice. This boosted my confidence with iPads." However, it is important to note that the structural motivation of the course was an environmental influencer of change as well.

**Structural motivation**. Structural motivation pertains to extrinsic rewards and accountability (Patterson et al, 2008). Since this study took place in the context of graduate level teacher education courses, the reward was feedback and grades on independent practice assessments. All candidates enrolled in the classes passed the course. All candidates experienced a growth in their self-efficacy with iPads based on the research data. During this study, grades were an extrinsic reward that was a required component of the course. This is important to note since all activities that candidates completed resulted in a performance grade, which extrinsically motivated to succeed. However, one cannot ignore the fact that these candidates have willingly enrolled in masters' programs to increase their teaching performance so their intrinsic motivation is assumed. Patterson, et al. (2008) recognized that "the most powerful incentive known to humankind is our own evaluation of our behavior and accomplishments. When people are able to meet their personal standards, they feel validated and fulfilled. They also feel as if they're living up to the image of who they want to be" (p. 94). The candidates in these courses were intrinsically motivated to improve their teaching practices, which is why

they enrolled in a graduate course. However, earning grades provided extrinsic motivation to perform tasks at a certain level.

The majority of candidates were inspired to take action after the completion of this course in order to apply their new self-efficacy in their current teaching environments. “I have talked to my principal about wanting more access to iPads so that I can better incorporate their use in my classroom.” This quote from a candidate demonstrates increased efficacy and the motivation to change instructional behaviors, which is the goal of any graduate course or professional learning opportunity.

**Implications for Further Research**

“There is evidence that when people err in their self-judgments, their efficacy beliefs typically exceed their behavior” (Bandura, 1997, p. 46). In this study there is a potential discrepancy between candidates’ espoused self-efficacy and enacted behavior. Therefore, it is recommended that future research include a post-post survey or observation of the study participants to see if espoused efficacy truly equates to enacted efficacy with iPad integration in their current teaching environment. This study was completed within the confines of a semester long, graduate level teacher education course. Since the participants were all in-service teachers, the replication of this study is possible in a K-12 environment within a district on a more long-term basis. In addition, since this study is focused specifically on iPads, future research efforts should attempt to apply GRR to any professional learning opportunity for teachers that require a change in teaching practices.

## Conclusion

Technological innovations will continue to impact education at all levels. Mobile technology is the most current innovation that educational leaders are leveraging in order to create meaningful, engaging learning environments for 21st century learners. Providing teachers access to mobile devices does not automatically create such environments, but increasing teacher self-efficacy will improve the likelihood of this change to occur. This study shows that scaffolding methods of instruction that acknowledge the change process throughout, such as the gradual release of responsibility, can increase efficacy. Therefore, similar professional learning methods of instruction should be applied in order to prepare educators for P-12+ mobile technology integration initiatives.

## References

Abbott, J. A., & Faris, S. E. (2000). Integrating technology into pre-service literacy instruction: A survey of elementary education students' attitudes toward computers. *Journal of Research on Computing in Education*, *33*(2), 149–161.

Albion, P. (2008). Web 2.0 in teacher education: Two imperatives for action. *Computers in the Schools, 25*(3/4), 181-198.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W.H. Freeman.

Barshay, J. (2014). Why a New Jersey school district decided giving laptops to students is a terrible idea. Retrieved from http://hechingerreport.org/content/new-jersey-school district-decided-giving-laptops-students-terrible-idea_16866/

Bebell, D., Russell, M., & O'Dwyer, L. (2004). Measuring teachers' technology uses: Why multiple-measures are more revealing. Journal of Research on Technology in Education, 37(1), 45-63.

Berge, Z. L. (2013). *Handbook of Mobile Education*. New York: Taylor & Francis.

Berman, P., & McLaughlin, M.W. (1977). *Federal programs supporting educational change. Vol. 7, Factors affecting implementation and continuation.* Santa Monica, CA: Rand Corporation.

Borthwick, A., & Risberg, C. (2008). Establishing an organizational climate for successful professional development: What should we do? In A. Borthwick & M. Pierson (Eds.), *Transforming classroom practice: Professional development*

*strategies in educational technology* (pp. 35-48). Eugene, OR: International Society for Technology in Education.

Brown, S., Holcomb, L. & Lima, C. (2010). Assessing the impact of a performance-based assessment on educators' technology self-efficacy measures. *International Journal of Instructional Media*, 37(2), 121-132.

Carrier, C. (1980). Developmental environments for teachers. Theory into Practice 19(4), 240–247.

Chou, C.C., Block, L., & Jesness, R. (2012). A case study of mobile learning pilot project in K-12 schools. *Journal of Educational Technology Development and Exchange, 5*(2), 11-26.

Clark, K., & Graves, M. (2005). Scaffolding students' comprehension of text. *The Reading Teacher, 58*(6), 570–580.

Colbert, J.A., Brown, R.S., Choi, S, & Thomas, S. (2008). An investigation of the impacts of teacher-driven professional development on pedagogy and student learning. *Teacher Education Quarterly, 35*(20), 135-54.

Compeau, D. & Higgins, C. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, June, 189-211.

Creswell, J.W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* New York*:* Pearson.

Dewey, J. (1944). *Democracy and education.* New York: Macmillan Company.

Dillman, D.A., Smyth, J.D., & Christian, L.M. (2008). *Internet, mail, and mixed-mode surveys: The tailored design method.* (3rd ed.). New York: Wiley.

Dixon, A. (2007). Finding your way: GPS and geocaching. *Learning and Leading with Technology, 34*(8), 29-31.

Dole, J. A., Brown, K. J., & Trathen, W. (1996). The effects of strategy instruction on the comprehension performance of at-risk students. *Reading Research Quarterly, 31*(1), 62–88.

Duffy, G., Roehler, L., Meloth, M., Vavrus, L., Book, C., Putnam, J., & Wesselman, R. (1986). The relationship between explicit verbal explanations during reading skill instruction and studentawareness and achievement: A study of reading teacher effects. Reading Research Quarterly, 21(3), 237–252.

Educause. (2012). Tablets and iPads. Retrieved from http://www.educause.edu/library/tablets-and-ipads - tabs

Elmore, R. F. (2004). *School reform from the inside out: Policy, practice, and performance.* Cambridge, MA: Harvard Education Press.

Elmore, R., Peterson, P., & McCarthey, S. (1996). *Restructuring in the classroom.* San Francisco: Jossey-Bass.

Ertmer, P.A. (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

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

Fisher, C., Dwyer, D. C., & Yocam, K. (1996). *Education and Technology: Reflections on computing in classrooms.* San Francisco: Jossey Bass.

Fisher, D., & Frey, N. (2008). *Better learning through structured teaching: A framework for the gradual release of responsibility.* Association for Supervision and Curriculum Development: Alexandria, VA.

Fox, S., & Rainie, L. (2014, February 27). Pew Research Internet project: Summary of findings. Retrieved from http://www.pewinternet.org/2014/02/27/summary-of-findings-3/

Fullan, M.G. (1993). Why teachers must become change agents. *Educational Leadership. (50)*6, 12-18.

Fullan, M., Hill, P., Crevola, C. (2006). *Breakthrough.* Thousand Oaks, CA: Corwin Press.

Fullan, M., & Stiegelbauer, S.M. (1991). The new meaning of educational change. New York: Teachers College Press.

Harvard Graduate School of Education. (2011). *Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st Century.* Retrieved from http://www.gse.harvard.edu/news/11/02/pathways-prosperity-meeting-challenge-preparing-young-americans-21st-century

Harwell, S.H. (2003). *Teacher professional development: It's not an event, it's process.* Center for Occupational Research and Development. Retrieved from http://www.cord.org/uploadedfiles/HarwellPaper.pdf

Henderson, S., & Yeow, J. (2012). iPad in education: A case study of iPad adoption and use in a primary school. In *45th Hawaii International Conference on Systems Science Proceedings* (pp. 78-87). Maui, HI: IEEE Computer Society.

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*(3) 223-252.

Hutchinson, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15-23.

International Society for Technology in Education. (2008). *NET-S for teachers.* Retrieved from http://www.iste.org/docs/pdfs/nets-t-standards.pdf?sfvrsn=2

Ivers, K. S. (2002, April). Changing teachers' perceptions and use of technology in the classroom. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

JD Power & Associates. (7 May 2014). Overall tablet satisfaction declines as more value-priced brands vie for market share. Retreived from: http://www.jdpower.com/press-releases/2014-us-tablet-satisfaction-study%E2%80%94volume-1#sthash.AsZPPscZ.dpuf

Kellenberger, D. W., & Hendricks, S. (2003). Predicting teachers' computer use for own needs, teaching, and student learning. *Journal of Educational Computing Research, 16*(1), 53-64.

Kelly, F. S., McCain, T., & Jukes, I. (2009). *Teaching the digital generation: No more cookie-cutter high schools.* Thousand Oaks, CA: Corwin.

Kerr, D. (2012, September 10). Teens grab up smartphones faster than other age groups. Retrieved from http://www.cnet.com/news/teens-grab-up-smartphones-faster-than-other-age-groups/

Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). Teens and Technology. Retrieved from http://www.pewinternet.org/files/old-media//Files/Reports/2013/PIP_TeensandTechnology2013.pdf

McCann, B. (2013, February 19). The next generation of Westside Community Schools. Retrieved from http://www2.westside66.org/wcsblog/files/The_Next_Generation_of_WCS.pdf

McCombs, S. & Liu, Y. (2011). Channeling the channel: Can iPad meet the needs of today's M-Learner. In *Proceedings of Society for Information Technology & Teacher Education International Conference 2011* (pp. 522-526). Chesapeake, VA: AACE.

Muller, T. (2013). iTunes U content tops one billion downloads. [Press release]. Retrieved from https://www.apple.com/pr/library/2013/02/28iTunes-U-Content-Tops-One-Billion-Downloads.html

Naismith, L., Lonsdale, P., Vavoula, G. & Sharples, M. (2004). *Literature review in mobile technologies and learning.* A report for NESTA Futurelab. Retrieved from http://www.nfer.ac.uk/publications/FUTL15/FUTL15_home.cfm

National Education Association. (2014). *Preparing 21st century students for a global society: An educator's guide to the "four Cs."* Retrieved from http://www.nea.org/assets/docs/A-Guide-to-Four-Cs.pdf

National Staff Development Council. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad.* Retrieved from http://learningforward.org/docs/pdf/nsdcstudy2009.pdf

Nespor, J. (1987). The Role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*(4), 317-328.

New Media Consortium. (2013). *The NMC horizon report: 2013 K-12 edition.* Retrieved from http://www.nmc.org/pdf/2013-horizon-report-k12.pdf

The Nielsen Company. (2013, October 29). Pew Research Internet project. Retrieved from http://www.nielsen.com/us/en/newswire/2013/ring-the-bells-more-smartphones-in-students-hands-ahead-of-back.html

Ng, W., & Nicholas, H. (2009). Introducing pocket PC's in schools: Attitudes and beliefs in the first year. *Computers & Education, 52,* p. 470-480.

Pajares, F. (1992). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66,* 543-578.

Palak, D. (2005). Beliefs, attitudes, and practices of technology-using teachers. In C. Crawford et al. (Eds.), *Proceedings of the Society for Information Technology and Teacher Education International Conference 2005* (pp. 995–1000). Chesapeake, VA: Association for the Advancement of Computers in Education.

Partnership for 21st Century Skills. (2009). P21 framework definitions. Retrieved from http://www.p21.org/storage/documents/P21_Framework_Definitions.pdf

Partnership for 21st Century Skills. (2013). Mission statement. Retrieved from http://www.p21.org/about-us/our-mission

Pearson, P. D., & Gallagher, M.C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology, 8*, p. 317-344.

Pegrum, M., Oakley, G., & Faulkner, R. (2013). Schools going mobile: A study of the adoption of mobile and held technologies in Western Australian independent schools. *Australasian Journal of Educational Technology, 29*(1), 66.

Peters, K. (2007). M-learning: Positioning educators for a mobile, connected future. *International Review on Research in Open and Distance Learning, 8*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/350/914

Philipp, R. A. (2007). Mathematics teachers' beliefs and affect. In F. K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning.* (pp. 257-315). United States: Information Age Publishing.

Pierson, M., & Borthwick, A. (2010). Framing the assessment of educational technology professional development in a culture of learning. *Journal of Digital Learning in Teacher Education 26*(4), 126-131.

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

The President's Council of Advisors on Science and Technology. (2010). Prepare and inspire: K-12 education in science, technology, engineering, and math (STEM) for America's future. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-report.pdf

Putman, S.M. (2012). Investigating teacher efficacy: Comparing preservice and inservice teachers with different levels of experience. *Action in Teacher Education. 34*(1), 26-40.

Richardson–Kemp, C., & Yan, W. (2003). Urban school teachers' self-efficacy beliefs and practices, innovation practices, and related factors in integrating technology. In C. Crawford et al. (Eds.), *Proceedings of the Society for Information Technology and Teacher Education International Conference 2003* (p. 1073–1076). Chesapeake, VA: Association for the Advancement of Computing in Education.

Rokeach, M. (1986). *Belief, attitudes, and values: A theory of organization and change.* San Francisco: Jossey-Bass.

Roschelle, J., Penuel, W.R., Yarnall, L., Shechtman, N., & Tatar, D. (2005). Handheld tools that "informate" assessment of student learning in science: A requirements analysis. *Journal of Computer Assisted Learning, 21*(3), 190-203.

Rosen, L.D. (2010). *Rewired*: *Understanding the iGeneration and the way they learn.* Palgrave MacMillan: New York.

Sandholtz, J.H., Ringstaff, C., & Dwyer, D.C. (1990). Teaching in high tech environments: Classroom management revisited, first-fourth year findings. *Apple Classrooms of Tomorrow Research Report.* Retrieved from http://www.apple.com/euro/pdfs/acotlibrary/rpt10.pdf

Schrum, L., & Levin, B. B. (2009). *Leading 21st century schools: Harnessing technology for engagement and achievement.* Thousand Oaks, CA: Corwin.

Sharples, M., Taylor, J., & Vavoula, G. (2007). A theory of learning for the mobile age. In R. Andrews & C. Haythornthwaite (Eds.). *The Handbook of e-Learning Research*. (pp. 221-247). London: Sage.

Sheninger, Eric. (2014). *Digital leadership*. New York: Corwin Press.

Shuler, C. (2009). *Pockets of potential: Using mobile technologies to promote children's learning.* New York: Joan Ganz Cooney Center at Sesame Workshop.

Standage, T. (2013). Live and unplugged: In 2013 the Internet will become a mostly mobile medium. Who will be the winners and losers? *The Economist.* [Online]. Retrieved from http://www.economist.com/news/21566417-2013-internet-will-become-mostly-mobile-medium-who-will-be-winners-and-losers-live-and

Sweeney, D. (2003). *Learning along the way: Professional development by and for teachers.* Portland, ME: Stenhouse Publishers.

Tapscott, D. (2009). *Grown up digital: How the net generation is changing your world.* New York: McGraw Hill.

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times.* San Francisco, CA: Jossey-Bass.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education, 23*, 944-956.

Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.

Vess, D.L. (2006). History to go: Why iTeach with iPods? *The History Teacher, 39*(4), 479-492.

Wang, L., Ertmer, P. A., & Newby,T.J. (2004). Increasing preservice teachers' self efficacy beliefs for technology integration. *Journal of Research on Technology*

*in Education, 36*(3), 231-250. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=trh&AN=14599530&site=ehost-live

Windschitl, M. & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal, 39*(1), 165-205.

President Obama unveils ConnectED Initiative to bring America's students into digital age. [Whitehouse Press release, June 6, 2013]. Retrieved from http://www.whitehouse.gov/the-press-office/2013/06/06/president-obama-unveils-connected-initiative-bring-america-s-students-di

# Appendix

## MOBILE TECHNOLOGY INTERGRATION SURVEY

**Directions**: The purpose of this survey is to determine how you feel about integrating mobile technology into your teaching. For each statement below, indicate the strength of your agreement or disagreement by circling one of the five scales.

**SD**=Strongly Disagree, **D**=Disagree, **NA/ND**=Neither Agree nor Disagree, **A**=Agree, **SA**=Strongly Agree

| | | | | | |
|---|---|---|---|---|---|
| 1. I feel confident that I understand the capabilities of iPads well enough to maximize them in my classroom. | SD | D | NA/ND | A | SA |
| 2. I feel confident that I have the skills necessary to use an iPad for instruction. | SD | D | NA/ND | A | SA |
| 3. I feel confident that I can successfully teach relevant subject content with the appropriate use of iPads. | SD | D | NA/ND | A | SA |
| 4. I feel confident in my ability to evaluate iPad apps for teaching and learning. | SD | D | NA/ND | A | SA |
| 5. I feel confident that I can use correct terminology when directing my students' iPad use. | SD | D | NA/ND | A | SA |
| 6. I feel confident that I can help students when they have difficulty using/operating the iPad. | SD | D | NA/ND | A | SA |
| 7. I feel confident that I can effectively monitor students' iPad use for project development in my classroom. | SD | D | NA/ND | A | SA |
| 8. I feel confident that I can motivate my students to participate in iPad-based projects. | SD | D | NA/ND | A | SA |
| 9. I feel confident that I can model educational uses of iPads for students during instruction. | SD | D | NA/ND | A | SA |

| | | | | | |
|---|---|---|---|---|---|
| 10. I feel confident that I can consistently use iPads in effective ways. | SD | D | NA/ND | A | SA |
| 11. I feel confident that I can provide appropriate feedback to students using the iPad. | SD | D | NA/ND | A | SA |
| 12. I feel confident that I can regularly incorporate iPads into my lessons, when appropriate to student learning. | SD | D | NA/ND | A | SA |
| 13. I feel confident about selecting appropriate iPad apps for instruction based on curriculum standards. | SD | D | NA/ND | A | SA |
| 14. I feel confident assessing students' iPad-based projects. | SD | D | NA/ND | A | SA |
| 15. I feel confident about keeping curricular goals and iPad uses in mind when selecting an ideal way to assess student learning. | SD | D | NA/ND | A | SA |
| 16. I feel confident about using iPads to collect and analyze data from student tests and products to improve instructional practices. | SD | D | NA/ND | A | SA |
| 17. I feel confident that I will be comfortable using iPads in my teaching. | SD | D | NA/ND | A | SA |
| 18. I feel confident that I can be responsive to students‘ needs during iPad use. | SD | D | NA/ND | A | SA |
| 19. I feel confident that, as time goes by, my ability to address my students' iPad needs will continue to improve. | SD | D | NA/ND | A | SA |
| 20. I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts) and continue to teach effectively with iPads. | SD | D | NA/ND | A | SA |

| | | | | | |
|---|---|---|---|---|---|
| 21. I feel confident that I can carry out iPad-based projects even when skeptical colleagues oppose me. | SD | D | NA/ND | A | SA |

Survey adapted from: Wang, L., Ertmer, P. A., & Newby, T. J. (2004). Increasing Preservice Teachers' Self-Efficacy Beliefs for Technology Integration. *Journal of Research on Technology in Education, 36*(3), 231

**iPad Access & Experience**

22. Please rate your iPad experience by checking the box that most accurately describes your experiences on the continuum below:

| ☐ 0 - No Experience | ☐ 1- Minimal | ☐ 2 - Moderate | ☐ 3 - High |
|---|---|---|---|
| I have never used an iPad. | I have used an iPad a few times (less than once/week). | I have used the iPad for personal purposes: email, games, pictures, social networking, etc. | I have used the iPad for **personal** (email, games pictures, social networking) **and professional purposes** (as an instructional, organizational and teaching tool.) |

23. I currently have access to an iPad:
    - ☐ Yes-Please answer 23a
    - ☐ No

23a. If yes, please check the box that applies to you:
- ☐ This iPad was a personal purchase or gift.
- ☐ This iPad was provided through employer.
- ☐ Other (please specify):_____

**Demographics**

24. Sex:
    - ☐ Male
    - ☐ Female

25. Age range:
    - ☐ 20-29
    - ☐ 30-39
    - ☐ 40-49

- ☐ 50-59
- ☐ over 60

26. What is/are your current role(s) in education?
    - ☐ Graduate student
        -Please specify graduate program:_____
    - ☐ P-12 Educator
        -Please specify grade and content area:-
        _____
    - ☐ Other_____

27. How many years have you been in the teaching profession?
    - ☐ 0-5
    - ☐ 6-10
    - ☐ 11-15
    - ☐ 16-20
    - ☐ 21-25
    - ☐ 26+