PERCEPTIONS ON THE EFFECTIVENESS OF IPAD INTERGRATION

IN VOCATIONAL COLLEGE CLASSROOMS:

A MIXED-METHODS STUDY

A Dissertation

Presented in Partial Fulfillment of the Requirements for the

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by

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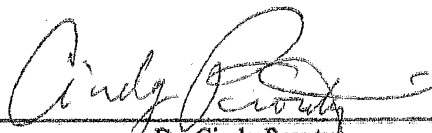Major Professor: Duane Slemmer, Ed.D.
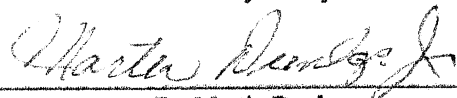
AUTHORIZATION TO SUBMIT

DISSERTATION

This dissertation of Robert Reed, submitted for the degree of Doctor of Philosophy in Education with a major in Educational Leadership and titled PERCEPTIONS ON THE EFFECTIVENESS OF IPAD INTEGRATION IN VOCATIONAL COLLEGE CLASSROOMS: A MIXED METHODS STUDY has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies.

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Dedication

This dissertation is dedicated to my late father, Wallace Reed, my late brother, Larry Reed, my late brother-in-law Teddy Congleton, my mother, Grace Langenfeld, and father-in-law Donald Langenfeld. Additionally, I dedicate this dissertation to my beautiful wife, Julie, and my three children, Isaac, Joshua (Joshy), and Abigail (Abby). Finally, I wish to dedicate this work to my friend, Jason White, and Dr. Robert Daniels, who helped shape my desire for learning and teaching when I was an undergraduate student many years ago.

Abstract

As technology continues to change, educators are tasked with the challenge of creating better methods to teach their students and help them learn. In the 21st century classroom, there is often a technology gap between instructors and their techno-savvy student counterparts. The purpose of this study was to utilize Prensky's assumptions of digital immigrants and digital natives to compare the perceptions between faculty and students regarding the use of iPads in vocational college classrooms. A survey was distributed to students and faculty at seven vocational colleges located in the western United States who have integrated iPads into their course curriculum. Both open-ended and close-ended questions were used to measure the perceptions between faculty and students on how effectively iPads are being used for instructional purposes. This study used a mixed-methods approach to gather data and add to the growing body of literature in this area of education. According to the results of the Mann Whitney U test, there was a statistically significant difference between faculty and student perceptions regarding iPad effectiveness and engagement. Compared to faculty, students believed iPads were more effective and better for engagement purposes in the classroom. Moreover, these conclusions were corroborated with findings from four open-ended questions used in the survey. Results from this study were useful for creating M-learning faculty training topics in vocational colleges that either use or plan to integrate M-learning devices within their institutions.

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Chapter I

Introduction

Modern educators contend with technologically savvy students and current technological trends in the classroom. Marc Prensky (2006), author of *Digital Natives, Digital Immigrants,* provides two very compelling quips about the status of education in the 21st century stating, "Schools are stuck in the 20th century. Students have rushed into the 21st century. How can schools catch up and provide students with a relevant education?" (p. 8). His second quip is equally compelling, arguing that, "Our students have changed radically. Today's students are no longer the people our educational system was designed to teach" (Prensky, 2001a, p. 1). Based on these two assumptions, it is clear a more effective method of utilizing and integrating newer technology in the classroom is needed (Geist, 2011; Rajasingham, 2011).

M-learning devices have the potential to improve the way students learn, but need to be aligned with pedagogical practices and curriculum development (Nguyen, Barton, & Nguyen, 2015; Rossing, 2012). Over the past 20 years, tablets and other M-learning devices have evolved from simple hand-held communication devices to sophisticated gadgets that offer instant, wireless Internet access with the availability of multiple applications for everyday use and utility (Boyinbode, Bagula, & Ngambi, 2011; DiVall & Zgarrick, 2014; Fabian & Maclean, 2014; Hargis, Cavanaugh, Kamali, & Soto, 2014; Mang & Wardley, 2012; 2013; Pegrum, Howitt, & Striepe, 2013; Raven, Qalawee, & Atroshi, 2016).

It has been this rapid evolution of portable wireless devices that has influenced widespread social change through much of the world; apps like Facebook and Twitter have initially transformed the way many young people think, communicate, and learn (Rajasingham, 2011) and more recent social networking sites that utilize apps like Vine, Instagram, and Kik

continue to influence young people. Today, M-learning devices differ substantially from laptops and desktop computers because of smaller size, lightweight portability, and slick design (Chaka & Govender, 2017; Pegrum et al., 2013; Raven et al., 2016). Prior to the release of the iPad in March 2010, personal digital assistants (PDAs) and Blackberries represented some of the earliest prototypes of tablet portable computers (PCs) (George, Dumenco, Doyle, & Dollase, 2013). Since the inception of the first generation iPad, other tablet manufacturers, including the Galaxy tablet and Android, have been in fierce competition with Apple to create the most user-friendly, all-in-one M-learning devices (Mang & Wardley, 2012). Despite the competition, Apple's iPad has remained one of the most popular devices, and has even been considered one of education's finest tools for teaching and learning (Mang & Wardley, 2012; Miller, 2012). As M-learning devices continue to emerge and evolve, educators have been trying to understand how to fully integrate them into the classroom (Gan & Balakrishnan, 2016; Nguyen et al., 2015; Rajasingham, 2011; Raven et al., 2016).

A number of studies have focused on the integration of M-learning devices in higher education and the need for educators to receive formalized training prior to implementation (Georgina & Hosford, 2009; Hargis et al., 2014; Mang & Wardley, 2012; McCoy, 2013; Miller, 2012; Nguyen et al., 2015; Parajuli, 2016; Psiropoulos et al., 2016; Rossing, 2012; Rossing, Miller, Cecil, & Stamper, 2012; Wakefield & Smith, 2012). Although such concerns are valid, many college-aged students today may be considered digital natives and are being taught by digital immigrants who may not understand how to successfully integrate mobile technologies in the classroom to meet students' needs. Because of the disparity between the two generations, educators typically fall short of properly integrating technology for educational purposes with which their students are familiar. Notwithstanding, these current digital natives want educators to

change current methods of pedagogy and curriculum to keep up with changing technologies (Prensky, 2001a; 2001b; 2006; 2010).

Statement of the Problem

Mobile technology, primarily in the form of iPads and tablets, is being utilized in college classrooms throughout the United States and around the world. In fact, Geer (2012) maintains that using tablets and iPads in K-12 and higher education is not only one of the biggest trends, but will continue whether or not faculty and administrators are ready for the transition. Faculty and educational leaders in all types of educational institutions will be tasked with not only learning how to teach using tablet technologies, but will also need to understand how to use M-learning devices more effectively. Designing curriculum and developing pedagogical strategies to meet the demands of many students who have grown up with iPad and tablet technology should be the goal of today's educators (Ally, Blazquez-Prieto, 2015; Dashti & Aldashti, 2015; Geist, 2011; Rajasingham, 2011).

The use of mobile technologies in the college classroom has yielded high student satisfaction scores when used for learning (Boyinbode et al., 2011; Deimer, Fernandez, & Streepey, 2012; Geist, 2011; Hargis et al., 2014; Haugn & Bussell, 2012; Jackson, 2013; Mang & Wardley, 2012; Psiropoulos et al., 2016; Rossing et al., 2012; and Williams, Lee, Link, & Ernst, 2014). However, gaps exist in the literature regarding student and faculty perceptions of iPad effectiveness in vocational college classrooms (Dashti & Adashsti, 2014). An additional need exists to further study Prensky's theory of digital immigrants and natives to determine its validity (Alvi, 2011; Corrin, Lockyer, & Bennett, 2010; Margaryan & Littlejohn, 2008; and Peluso, 2012).

Background

      M-learning devices such as the iPad have begun to revolutionize the way people make purchases, make decisions, design curriculum, and impact the way people think and learn. More importantly, people continue to rely on their M-learning devices for most daily tasks and as a main method of communication (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Brown, 2015; Geist, 2011; Geer, 2012). Alexander (2014) even predicts by the year 2024, taking courses and earning degrees will take place entirely on a mobile device loaded with the latest educational applications. Notwithstanding, a series of six predictions based on current mobile technological trends were recently made, which include the demand for more personalized learning, the need to hybridize learning platforms, and the need to access student meta-data for retention-related purposes (Brown, 2015). Moreover, Brown's six predictions include: (1) the continued use of M-learning devices for learning, (2) the use of e-books over textbooks, (3) continued reliance on more adaptive learning strategies, (4) continued transformation of learning spaces, (5) continued evolution of learning management systems (LMS), and (6) a move toward predictive student learning programs. Such trends will only continue as learners rely solely on their M-learning devices and find more affordable alternatives to textbooks, such as e-books (Geer, 2012; Gentile, 2012).

      Past research on M-learning devices in higher education has focused on many of the advantages associated with M-learning devices (Deimer et al., 2012; Fabian & Maclean, 2014; Hargis, et al., 2014; MacLeod, 2015; Mang & Wardley, 2013; Rossing et al., 2012). One of the main strengths associated with M-learning devices used in the classroom is that students can become collaborative partakers in their own learning (Eppard, Nasser, & Reddy, 2016; Fabian & Maclean, 2014; Hargis et al., 2014; MacLeod, 2015; Mang & Wardley, 2013; Rossing et al.,

2012). Past research has also revealed students are more engaged with their teacher when using M-learning devices in the classroom (Deimer et al., 2012; Eppard et al., 2016) and such devices promote more active, as opposed to passive, learning opportunities for students (Geist, 2011; Rosenthal & Eliason, 2015; Shih-hsien, 2012; Vaughn & Lawrence, 2013). One study even found students preferred having M-learning devices in the classroom so they could have instant access to e-textbooks, which are cheaper than regular textbooks (Geist, 2011).

While many studies have addressed the advantages of having M-learning devices in the classroom, other studies have documented several disadvantages of using such technologies (Jackson, 2013; Gong & Wallace, 2012; McCoy, 2013; Wakefield & Smith, 2012). Gong and Wallace (2012) found 60% of students surveyed believed technology could be used more for entertainment rather than learning during class time and 42% of students surveyed indicated M-learning devices were a distraction. Texting was also revealed as a major problem according to 86% of 777 students surveyed (McCoy, 2013). While some studies focused on the problems of texting during class, one study found students and educators could become too reliant on mobile technologies in the classroom (Wakefield & Smith, 2012). Jackson (2013) also found some mobile technologies are more distracting than others simply because of their cool design and better wireless capabilities.

Despite potential discrepancies with M-learning devices, educators and academic institutions are lagging behind their students due to their lack of technological understanding compared with younger learners (Hargis et al., 2014; Cheon, Crooks, & Song, 2012; Cochrane, 2010; 2014; Cochrane, Narayan, & Olfield, 2011; James, 2011; Mellhuish & Falloon, 2010; Murphy, 2011; Prensky, 2001a; 2001b; 2006; 2010; Psiropoulos et al., 2016; Rosenthal & Eliason, 2015; Werth & Werth, 2011; Tapscott, 2009). In a study on the perceptions and attitudes

of faculty toward the integration of iPads in the classroom from 17 universities in the United Arab Emirates, Hargis et al., (2014) found not all instructors knew how to successfully integrate the iPad or tablet PC in the classroom pedagogically. Cheon et al., (2012) found in their research that undergraduate students were less willing to use M-learning devices in the classroom when their instructors were not properly trained. A more recent study from Nepal revealed 55% of 161 undergraduate students surveyed indicated they did not receive any support from their institution to use any type of M-learning device for learning in their classes (Parajuli, 2016). This apparent technology gap between educators and students should be further examined to determine the types of training faculty departments might need to ensure a more effective integration of M-Learning devices for classroom use.

Higher education may also be unprepared for this mobile revolution as many academic institutions lack the essential pedagogical training needed to integrate M-learning devices into their curriculum (Ally & Blazquez-Prieto, 2014; Benham, Carvalho, & Cassens, 2014; Cavanaugh, Hargis, Kamali, & Soto; 2013; Dashti & Aldashti, 2015; Davison & Lazaros, 2015; Drouin, Vartanian, & Birk, 2014; Franklin, 2011; Georgina & Hosford, 2009; Raven et al., 2016). Additionally, academic institutions must be willing to update their technological infrastructure if iPads are to be used as part of academic curriculum (Cochrane, 2010; 2014; Cochrane et al., 2011). A new pedagogical approach is often needed when newer technologies are incorporated into classroom environments.

Arguments have been made claiming the current generation of young learners is so different from their older counterparts that higher education will simply fail to reach and teach this new group of students if traditional pedagogical practices are not changed (Prensky, 2001a; 2001b; 2006; 2010; Werth & Werth, 2011; Tapscott, 2009; James, 2011; Wong, 2014). A pilot

study was conducted for first-time iPad users at 17 colleges in the United Arab Emirates. In this study, only 63% of the 224 faculty surveyed felt comfortable using the tablet in the classroom, while 64% believed they received inadequate training prior to using the device as an educational tool (Hargis et al., 2014). If there is a technology gap between young learners and educators, it will be imperative for higher education to catch up and change existing pedagogical practices.

Although the research has begun analyzing the pros and cons of using mobile technologies, research has also noted several deficiencies in the literature. Such limitations include the need for more exploratory research with larger sample sizes that focus on effectiveness and best practice solutions for mobile learning and M-learners (Nguyen et al., 2015). This study seeks to add to the literature by exploring the perceptions and attitudes of using M-learning devices in vocational colleges. Two specific gaps in the literature were the focus of this dissertation. These gaps included:

1. Research that focuses on faculty and student perceptions of mobile learning effectiveness in vocational colleges to compare with other types of institutions in higher education (Dashti & Adashsti, 2015).

2. The need to further test Prensky's assumptions regarding digital natives and digital immigrants in terms of their use and perceptions of technology (Alvi, 2011; Corrin et al., 2010; Margaryan & Littlejohn, 2008; and Peluso, 2012).

These gaps were addressed by statistically examining perceived differences between students and instructors on the effectiveness of iPad use. The goal of this study was to provide best practice solutions on how to properly utilize iPad devices for not only the investigation sites, but also institutions that lack universal standards for using M-learning devices. Victory College (pseudonym), located in the western United States, was the vocational college used for this

study. This particular school was selected because iPads have recently been implemented at all of the college campuses as a pilot program. Using Prensky's theory of digital immigrants and digital natives, the purpose of this study was to examine faculty and student perceptions of the effectiveness of iPads in vocational college classrooms. Therefore, the researcher utilized Prensky's theory to provide assumptions regarding any differences perceived between students and faculty.

Research Questions

Research questions are commonly used to provide guidance and direction in research (Creswell, 2014). Two central research questions guided this study. The research questions included in this study seek to fill gaps that were found in the literature (Alden, 2012; Miller, 2012; & Rossing et al., 2012). Prensky's generational theory (2001) was used as a theoretical framework to make such comparisons and contrasts by characterizing students as digital natives and faculty as digital immigrants at the seven Victory college campuses used in this study. Because Prensky's birth dates related to digital natives and immigrants were somewhat nebulous, the researcher determined digital natives to be anyone born on or after 1990, while digital immigrants were those born before 1990.

The two research questions addressed this study include:

1. How do faculty and students differ in their perceptions of the effectiveness of iPad use in vocational college classrooms?

2. How do faculty and students differ in their perceptions of the appropriate use of iPads related to student engagement in course activities in vocational college classrooms?

Research Hypotheses

      Two alternate and null research hypotheses were constructed from the research questions above for further testing.

    1. H_o: There is no statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

    2. H_1: There is a statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

    3. H_o: There is no statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities in vocational college classrooms.

    4. H_1: There is a statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities in vocational college classrooms.

Description of Terms

      The language associated with technology frequently changes as new words and meanings are created; it is important for educators and researchers to recognize the clarity of these new words to understand how students and technology continue to change. For this research study, there were several technical words used to describe mobile learning and M-learning devices based on the literature review. In order to create a comprehensive and logical research study, it is imperative for researchers to define their own terms (Creswell, 2014; Bryant, 2004). It is also important to note M-learning devices will often be used interchangeably to describe smart phones, iPads, and tablets, unless otherwise specified. A description of terms has been provided.

App. An "application" used by consumers of hand-held tablets, computers, and all types of digital media (Murphy, 2011).

Digital Immigrants. A generational label describing a population of people who grew up without many of the newer technologies, used older computers or no computers at all, but have come to utilize and adapt them into their daily lives (Prensky, 2001a). For the sake of this study, the researcher determined the age of digital immigrants to be anyone born before 1990.

Digital Natives. A generational label describing a population of people who grew up with newer computer technology and hand-held devices (Prensky, 2001a). For the sake of this study, the researcher determined the age of digital natives to be anyone born on or after 1990.

Gen Y Learners. A generational label often used interchangeably with the term "Millennial" to describe a population of people who were born during the new millennia sometime in the 1990's and early part of 2000 (Menkhoff & Bengtsson, 2012).

iPad. Portable tablet computer made by Apple (Murphy, 2011).

Millennials. A generational label describing a population of people who became adults after the turn of the new millennia with actual birth years occurring sometime in the 1990's and early part of 2000 (Werth & Werth, 2011).

M-learning Projects. Projects or activities that have been successfully utilized in the classroom with the assistance of M-learning devices (Cochrane, 2014).

M-learning. Learning that can take place at any location and at any time thanks to the use of portable, M-learning devices (Franklin, 2011).

M-learning Devices. Any type of hand-held computer device that is light-weight, ubiquitous, and connects to the Internet (Franklin, 2011).

Net Generation. Anyone born between 1977 and 1997 (Tapscott, 2009).

Net Geners. A slang term used to describe anyone born between 1977 and 1997 (Tapscott, 2009).

Pedagogy. A method or practice of teaching information to students from the perspective of the teacher (Cochrane, 2014).

Tablet. A small, portable device used to access the Internet but not for making or receiving calls (Parajuli, 2016).

Significance of the Study

Findings from this study add to the growing body of literature on the use of tablets in college classrooms by focusing on the perceptions of the effectiveness of iPad integration in vocational college classrooms. Also, there is a need for faculty to keep up with the technological trends of so-called net geners when it comes to pedagogical practices (Geist, 2011; Prensky, 2001a; 2001b; 2006; 2010; Tapscott, 2009). The following gaps were addressed as they existed in the current literature: understanding how faculty and students use iPads effectively in the college classroom, perceptions of how iPad technologies should be regulated in the college classroom by faculty, and faculty and student perceptions and attitudes of maintaining active engagement with iPad use in college classrooms.

By studying faculty and student perceptions of iPads using a mixed-methods approach, educational leaders can gain a better understanding of training needs for faculty who have never used tablet devices as an educational tool. Moreover, educational leaders can gain insight on how to better align pedagogical practices with learning outcomes by gaining feedback from their own students (Franklin, 2011; Geist, 2011; Prensky, 2001a; 2001b; 2006; 2010; Tapscott, 2009; Vaughn & Lawrence, 2013). This study has the potential to offer suggestions to educators on how to use iPad devices more effectively for learning based on feedback from students and

educators. A prominent goal of this study was to provide data on how to best utilize iPads for classroom activities and assignments in Victory College classrooms. A second goal was to determine best practices based on testing Prensky's generational theory (2001a; 2001b; 2006; 2010). Therefore, this study was dualistic; to promote best practices and to further test the theoretical ideas of Prensky.

Theoretical Framework

Prensky's (2001a) theoretical assumptions of "Digital Natives" and "Digital Immigrants" represent the underlying suppositions for this study. Prensky (2010) argues today's educators are out of sync with today's students and educators could learn much by simply listening to the feedback and suggestions of current students. Moreover, educators often judge digital natives pejoratively for having limited attention spans and only being interested in surfing the web and listening to music (Franklin, 2011; Prensky, 2010). However, many of these presuppositions about digital natives are based on misunderstandings of today's educators in terms of how their own generation learned or behaved in a classroom (Prensky, 2001a; 2001b; 2006; 2010). Franklin (2011) asserts educators must: (1) adapt new pedagogies consistent with the needs of digital natives, (2) be able to maintain open dialogue and communication with them, and (3) ensure that institutions of higher education invest in efficient infrastructures to meet student expectations of staying current with the latest software and hardware capabilities. This framework will be utilized as the foundation for each of the research questions studied in this dissertation.

Overview of Research Methods

This study used a mixed-methods approach with a survey instrument developed by the researcher based upon previous studies that contained both closed and open-end questions

(Alden, 2012; Miller, 2012; Rossing et al., 2012). The survey was constructed and validated by pilot-testing to ensure internal reliability and validity (Babbie, 1990; Creswell, 2014). Moreover, the survey was based on the research questions that pertain to the theoretical framework. Before the survey was distributed to students and faculty at each campus, the researcher sought permission from Northwest Nazarene University's Human Research Review Committee (HRRC), and also obtained permission from each of the college campuses. Next, the researcher sought the assistance of the Director of Research for the entire Victory College system, as well as academic deans to assist in distributing the surveys at the end of pre-selected introductory level courses for the following programs: (1) criminal justice, (2) dental hygiene, (3) medical billing and coding, (4) dental assisting, (5) pharmacy technology, and (6) medical assisting. A Letter of Confidentiality and Informed Consent (see Appendix C), which stated the reason for the survey, accompanied each survey that was distributed.

The target population for this study was students and faculty from seven vocational college campuses located in the western United States with a total population of 4,287 students. Survey links were generated from Qualtrics after each survey was finalized. Program directors for each of the six programs were emailed survey links for students and faculty to complete. When the links were made available, participants were able to access the Qualtrics website to complete the survey. The researcher collected feedback from each respondent. After all data were returned, the data was entered into SPSS statistical software for computation based on both descriptive and inferential statistical information. The tabulation of all descriptive data was first entered into the SPSS spreadsheets and then analyzed.

Descriptive data collected included age of students and faculty, student academic major, and gender of students and faculty surveyed. Age was specifically used as a control variable for

each of the two research questions. Data were derived from the comparison of students and faculty according to the findings of the survey. This type of research required the Mann-Whitney *U* test, which compared the perceptions of two populations (Vogt, 2007).

Limitations

Any type of proposed or conducted research is bound by a set of limitations or problems (Creswell, 2014). Notwithstanding, research is typically limited by the method or design itself, while delimitations deal with the outcome of the study (Creswell, 2014; Vogt, 2007). The study was restricted to the seven campuses of Victory College located in the western United States. In addition, the number of student and faculty responses were limited to the amount of responses that were returned, which is known as the response rate (Babbie, 1990). Finally, with the many M-learning devices currently on the market, this study was limited to the use of the second generation iPad mini, which was given to students as part of their tuition as designated by the seven vocational college campuses.

Delimitations

In addition to the potential limitations in a research study, delimitations address many research aspects a researcher chooses not to study or examine (Creswell, 2014). There are several delimitations associated with this study. The first delimitation was the target population and vocational college under investigation. This study focused on the students and faculty at seven vocational campuses located in the western United States. These seven campuses may not be generalizable to a wider group or population. This study was also delimited by the type of iPad device being used at the time of the survey. More updated technologies and apps will inevitably be developed in the months and years after this study took place. Therefore, the study was delimited to a particular moment in time based upon the present mobile technology available.

Chapter II

Literature Review

Overview

This literature review provides a background and basis for the research questions. Additionally, the theoretical suppositions that provide the context for the research questions are based on Prensky's (2001a) concept of digital natives and digital immigrants. The literature has been organized in segments and each segment builds on the history and gaps of previous studies that construct a case for the study of this dissertation. It concludes with a brief discussion of the theoretical framework, which serves as the lens of the study. It is also important to note this literature review is international in scope. Studies were included from various colleges and universities around the world because these studies add to the breadth and depth of the discussion outlined in this chapter. The end of the literature review provides a detailed analysis of findings of each theme or segment arranged by the headings in this chapter.

Introduction

Technological innovations always precede change and the introduction of new mobile technology has begun to transform all aspects of higher education (Geist, 2011; Prensky, 2001a; 2001b; 2006; 2010; Tapscott, 2009; Raven et al., 2016; Werth & Werth 2011). Educators have been utilizing iPads since their introduction to the market in 2010. In fact, many Ivy League schools use mobile technology in the classrooms to save students money on textbooks and encourage faculty and students to work collaboratively on new e-learning applications (Geer, 2012). Since the introduction of iPods, iPads, and tablets in the consumer market, many studies have explored the advantages and disadvantages associated with using M-learning devices in college classrooms both nationally and internationally (Boyinbode et al., 2011; DiVall &

Zgarrick, 2014; Eppard et al., 2016; Gan & Balakrishnan, 2016; Hargis et al., 2014; Mang &

Wardley, 2012; 2013; Parajuli, 2016; Pegrum et al. 2013).

Educators must learn how to work with their technologically-savvy students in order to

understand and teach the individual needs of each student (Geist, 2011; Prensky, 2010; Tapscott,

2009). The literature review presented in this chapter examines mobile learning as a trend in

higher education and follows this order: (1) research and discussion on findings of M-learning

effectiveness, (2) research and discussion on findings of M-learning deficiencies, (3) Cochrane's

six successful M-learning strategies, and (4) the theoretical framework of this study. Figure 1

represents the order of subheadings that form the basis for the two research questions.

Figure 1

Components of the Literature Review
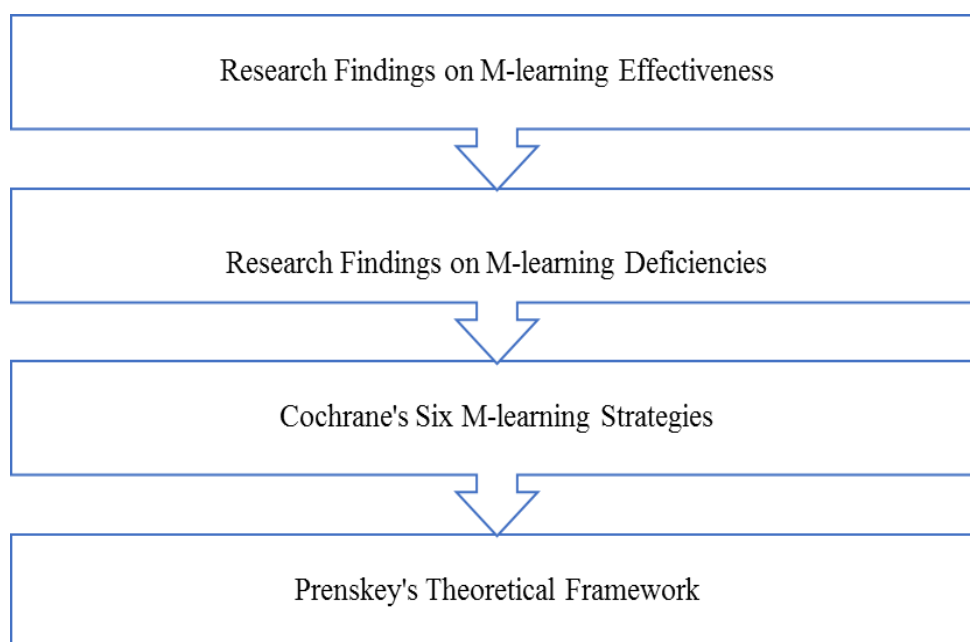
Research Findings on M-learning Effectiveness

Since the release of the Apple iPad in 2010, educators have been piloting the use of iPad

devices in post-secondary institutions in an attempt to test their usefulness and functionality as

potential learning tools (Backhouse, Wilson, & Mackley, 2014; Badwelan, Drew, & Bahaddad, 2016; Boyinbode et al., 2011; Cheon et al., 2012; Chen & Denoyelles, 2013; Dashti & Aldashti, 2015; Doddss & Callendar, 2012; Deimer et al., 2012; DiVall & Zgarrick, 2014; Enriquez, 2010; Gordon, Jackson, & Usher, 2014; Hargis, et al., 2014; Hashim, 2014; Irby & Strong, 2013; Macleod, 2015; Mango, 2015; Marmarelli & Ringle, 2011 Martin, McGill & Sudweeks, 2013; ; Mang & Wardley, 2012; Mang & Wardley, 2013; Pegrum et al., 2013; Rossing, 2012; Rossing et al., 2012; Shi-hsien, 2012; Sloan, 2013). Although M-learning efficiency can happen on M-learning devices other than iPads, the Apple iPad has been a leader among early mobile tablets and has represented a viable option for students to use as a classroom M-learning device (George et al., 2013; Hashim, 2014; Marmarelli & Ringle, 2011; Mellhuish & Falloon, 2010; Rosenthal & Eliason, 2015; Sheninger, 2014). In fact, by 2013, independent developers and those working with Apple created and maintained over 700,000 education-based apps for their iPad, which has made the device even more attractive as a popular educational tablet (Sheninger, 2014).

Since the iPad's initial release, several studies have focused on the advantages and characteristics of the iPad's capabilities and sleek design (George et al., 2013; Hashim, 2014; Marmarelli & Ringle, 2011; Mellhuish & Falloon, 2010). See Table (1) for a further list of iPad characteristics. Portability and design, however, are not the only reasons some students and faculty enjoy using M-learning devices in the classroom. Although many of these studies are dated, they represent some of the initial reasons for the iPad's success and advantages over competitors (Hashim, 2014). The use of M-learning devices in the classroom allows students to collaborate with others and have instant access to information (Eppard et al., 2016; Nerantzi,

Wilson, Munro, Lace-Costigan, & Currie, 2012; Rossing et al., 2012), and offer new methods of

incorporating active learning environments (Raven et al., 2016).

Table 1

Advantages of iPad Capabilities

Authors	Findings on iPads
George, et al. (2013)	- E-textbooks - More interactive with Power Point - Presentations and lecture notes - Less need for paper - Very user-friendly
Hashim (2014)	- Efficient touch screens - Portable and light weight - Large storage capacities
Marmarelli & Ringle (2011)	- Excellent readable graphics - Efficient touch screens - Portable and light weight - Long battery life
Mellhuish & Falloon (2010)	- Portable and light weight - Access information on the go - Ubiquitous wi-fi - Personalizable

Note: Information for this table was adapted from the research of George et al., 2013; Hashim, 2014; Marmarelli & Ringle, 2011; Mellhuish & Falloon, 2010.

In a study conducted at Indiana University-Purdue University in Indianapolis, 209

undergraduate students were loaned first generation iPads to determine student attitudes toward

its usability in the classroom (Rossing et al., 2012). Students were given open and closed-ended

surveys after the initial trial based on a 16-week semester. In addition, the researchers found

students were generally excited about using the new iPad for the following two reasons:

(1) to collaborate with other students while using the device in the classroom, and (2) to quickly

look up and access information and the possibility of being able to learn at any place and time

outside of the classroom. According to a focus group of students, James (2011) found one of the most important emergent themes from his research was students enjoyed using M-learning devices so they could collaborate with other learners.

With specialized training, more faculty may begin utilizing M-learning devices in the classroom to enhance student learning. A pilot study was conducted at a pharmacy college in Boston to determine the usefulness and practicality of giving iPads to pharmacy faculty for instruction and administrative purposes (DiVall & Zgarrick, 2014). Faculty members were first given the devices to learn how to use them before fully integrating them into their courses. Initially, several workshops were held to train participating faculty on how to use the device during the nine-month study. The faculty indicated a positive response to using the iPads and indicated that a majority of faculty used the iPads for teaching, classroom assessments, and for developing e-learning activities. Faculty and students using M-learning devices should receive extensive training prior to using the devices for academic purposes, which is consistent with findings by Hargis et al. (2014), Jackson, (2013), and Mang and Wardley (2012).

Using M-learning devices for learning is not unique to western academic institutions. Students all over the world have been using their M-learning devices for learning like their western counterparts. While several studies have been conducted to examine the usability of M-learning devices in U.S. college classrooms, numerous international institutions of higher education have also conducted studies to analyze the potential influence of M-learning devices in college classrooms (Chaka & Govender, 2017; Hargis et al., 2014; Kalissa & Picard, 2017; Macleod, 2015; Mang & Wardley, 2012; Mang & Wardley. 2013; Pegrum et al., 2013; Psiropoulos et al., 2016).

A nationwide study from the United Arab Emirates focused on the perceptions and attitudes of faculty towards the early implementation of iPad use in 17 colleges (Hargis et al., 2014). A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was created from the combined faculty survey and case study interviews on the advantages and disadvantages of using mobile technology in higher education. The following characteristics were identified: (1) Strengths – being able to design collaborative activities with the iPad, (2) Weaknesses – not all faculty understood how to operate the M-learning devices, (3) Opportunities – utilizing the latest educational learning "apps" for the classroom, and (4) Threats – creating wrong assessment techniques for e-learning assignments (Hargis et al., 2014).

In a recent study, 88% of students surveyed believed they could learn more efficiently and collaboratively with M-learning devices in the classroom (MacLeod, 2015). Likewise, students surveyed indicated up to 90% of the class time was spent using the mobile device for academic purposes. Similarly, Cheon et al. (2012) examined motivational factors for using M-learning devices in the classroom by students. The researchers found ease of use and the confidence that such devices make learning more efficient as primary motivators for students to use such devices. Students were also more likely to use M-learning devices if they believed they could master the device to achieve better grades (Irby & Strong, 2013). More recent research on the motivation of using M-learning devices in the classroom also suggests students were motivated by the idea they could be more creative and have fun with learning while using such devices (Badwelan et al., 2016).

Using M-learning devices in the classroom often motivates students to learn with more efficiency due to the instant access of educational applications and real-world applications (Kaliisa & Picard, 2017; MacLeod, 2015; Martin et al., 2013). The correlation between student

motivation and self-efficacy was also analyzed in a recent survey measuring student perceptions of iPad use (MacLeod, 2015). According to a survey of 19 undergraduate students, MacLeod (2015) found 88% of the students used iPad devices simply because they believed it made learning and memorizing information more efficient and also found a majority of iPad use in the classroom was academic in nature, not for entertainment purposes. Martin et al., (2013) also studied the primary motivators for students using M-learning devices. The results indicated: (1) 69% of students were motivated to use M-learning devices to gain information on the go, (2) 67% of students were motivated by having more access to educational resources from the course and the institution, and (3) 54% admitted they were motivated primarily for social networking purposes with family and friends. A more recent study also discovered a strong correlation between ease of use and the potential to increase grades as primary motivators for students and faculty to consider using M-learning devices in the classroom (Sarrab, Al Shibli, & Badursha, 2016).

The idea of accessing instructors from any mobile location with such a small and lightweight device was demonstrated to be an advantage over laptop computers (Mang & Wardley, 2013; Souleles, Savva, Watters, Annesley, & Bull, 2015). A study from the University of Capetown in South Africa found graduate students enjoyed using tablets in the classroom because they could access their professor from any remote location along with lecture notes and recordings of lectures (Boyinbode et al., 2011). A similar study at Texas A&M also revealed students enjoyed accessing their professors on the go, while 77% of the students surveyed thought the content on mobile tablets was an excellent supplement to classroom lectures (Doddsss, Callendar, & Henry, 2012).

Not only do many students find the use of M-learning devices beneficial for learning, but one study also focused on the issue of budget cuts and argued how money should be continuously spent on the development and implementation of M-learning devices (Alden, 2012). According to data from the National Defense University in Washington D.C., educators recorded the suggestions from a survey of 220 students on the two best strategies for how money should be spent on M-learning devices for the school (Alden, 2012). Of those surveyed, 61% believed the college should be allowed to choose and have the freedom to develop applications and functions administrators deem most efficient for their students. Moreover, 30% of students indicated administrators should develop applications that enable students to register and drop courses. The students also ranked the top three most important capabilities that should be developed and invested on a mobile learning device:

1. Being able to receive alert messages regarding course-related issues.

2. Being able to communicate with faculty and administration while on the go.

3. Being able to post discussion on class forums and threads.

Researchers used control variables such as age, gender, and English as a foreign language to determine any perceived difference of iPad use of 209 undergraduate students from Indiana University-Purdue University in Indianapolis (Deimer et al., 2012). Findings revealed 84% of students who used the iPad in class had previously used the device, while 85% of those agreed they would continue to use the iPad in their classes after the initial trial was over regardless of age, gender, or language barrier. Other findings suggested even students with minimal Internet and technology access at home felt confident when using iPads in a classroom environment toward learning (Williams, et al., 2014). Overall, Deimer et al. (2012) found a positive correlation between iPad use and more classroom engagement. The ease of using tablets and

iPads was also a theme found in other studies measuring student perceptions of mobile

technologies (Boyinbode et al., 2011; Chaka & Govender, 2017; Souleles et al., 2015).

An even larger survey given to 823 undergraduate college students at five East African

institutions of higher education focused on the intentions and motivations students have toward

adopting M-learning devices in college courses (Mtebe & Raisamo, 2014). Survey questions

were based on four theoretical assumptions including:

1. The idea that using a mobile device helped students learn more efficiently and
    perform with higher grades and GPAs.

2. The idea that M-learning devices are easy to use and require minimal effort to adopt
    into the classroom environment.

3. The idea that students make their decision to use a mobile learning device due to peer
    pressure or the social influences from others.

4. Institutions of higher education have the proper infrastructure to facilitate
    connectivity or any perceived technological issues if they arise (Mtebe & Raisamo,
    2014).

Researchers also found each theoretical component positively correlated with student

decisions to use and select certain M-learning devices for learning purposes. However, the belief

students could perform better academically when using an M-learning device was found to have

the strongest influence on student decisions to use them in the classroom, while the belief that

minimal effort is needed to adopt such devices had the second strongest influence (Mtebe &

Raisamo, 2014).

Student attitudes have been generally positive when they use M-learning devices, or

iPads, as a part of their course or for assignments. Undergraduate students at Cyprus University

of England and Falmouth University of England revealed both positive and negative attitudes with iPad use based on the findings of a phenomenological study (Souleles et al., 2015). Approximately 20 students from each university were studied; half of those indicated using an iPad had a minimal impact on their learning, while the other half found the iPad to be a beneficial academic tool. Data from an action research study, which was gathered through classroom observations and student interviews, revealed students consistently engaged in more collaborative and active learning activities when the iPad was in use (Fabian & Maclean, 2014). Course instructors involved in this study indicated students appeared to be more fully engaged with classroom exercises when iPads were used compared to when they are not using the iPad devices. Similar studies have also revealed a positive correlation between iPad or tablet use and increased student engagement (Deimer et al., 2012; Fabian & Maclean, 2014; Geist, 2011; Kalissa & Picard, 2017; Macleod, 2015; Rossing et al., 2012; Shih-hsien, 2012). Although research has discussed many of the positive attitudes associated with M-learning devices in classrooms, educators must still be trained and equipped to learn how to use M-learning devices effectively for learning.

Based on a survey of 300 undergraduate students, 71% believed M-learning devices added importance toward learning, while 50% agreed using digital devices increased their self-confidence as learners (Dashti & Aldashti, 2015). Data from the comparative analysis found students felt less anxious, were more self-confident, and received higher achievement scores on assignments and tests when using M-learning devices during the course compared to the control group that did not use M-learning devices for the same course (Jabbour, 2014). Moreover, data from an eight-month case study were analyzed on the impact of using iPads on formative assessments. Students were able to select and utilize their own apps during the study. The

researchers found having such instant and frequent feedback from other peers and the instructor helped improve the quality of their work and gave them more confidence while using the M-learning devices for class (Backhouse et al., 2014).

A number of studies were briefly discussed in this section of the literature review to show evidence regarding the effectiveness of M-learning devices on learning. Many studies provided recommendations on how colleges and universities should implement M-learning devices in the classroom (Hargis et al., 2014; Macleod, 2015; Mang & Wardley, 2012; Mang & Wardley, 2013; Pegrum et al., 2013; Sloan; 2013). Invariably, studies that suggested positive findings and applications regarding M-learning devices were countered by findings that offer refutations; such studies are discussed in the next section.

Research Findings on M-learning Deficiencies

Despite the potential for M-learning devices to be used effectively in the classroom and perceived positively by students and faculty, a number of studies from the perspective of both groups suggest M-learning devices cause distractions to others when inappropriately used for social networking and web-surfing (Alvi, 2011; Bayless, Clipson, & Wilson, 2013; Chen & Denoyelles, 2013; Dashti & Aldashti, 2015; Ellaway, Fink, Graves, & Campbell, 2014; Duncan, Hoekstra, & Wilcox, 2012; Gong & Wallace, 2012; Greener & Wakefield, 2015; Hammer et al., 2010; Jabbour, 2014; Jackson, 2013; Kinash, Brand, & Mathew, 2012; Kutluk & Gulmez, 2014; Manakil & George, 2017; Martin et al., 2013; McCoy, 2013). Cheating has also been regarded as a concern with M-learning devices (Chen & Denoyelles, 2013), while other researchers claim M-learning devices simply have no pedagogical value at all (Ahern-Dodson & Comer, 2013; Thinley, Geva, & Reye, 2014). Such issues represent pivotal areas for research on the subject of

using M-learning devices in higher education (Bayless et al., 2013; Geist, 2011; Greener & Wakefield, 2015; Hammer et al., 2010; Jackson, 2013).

In a survey of 175 faculty from various business-related disciplines, 76% complained mobile device users caused distractions during lectures; 67% revealed texting was a major problem, while 64% indicated browsing the Internet was the biggest problem (Bayless et al., 2013). Similarly, instructors felt less confident about using M-learning devices in the classroom and most participants feared using the devices in the classroom due to the apprehension of student cheating and social networking (Greener & Wakefield, 2015). Another study indicated 29 of 30 faculty members surveyed agreed M-learning devices disrupt learning, rather than facilitate it (Hammer, et al., 2010). Notwithstanding, according to educators, one of the biggest areas of concern related to using M-learning devices was the issue of academic dishonesty and cheating (Bayless et al., 2013; Jackson, 2013) and the inappropriate use of applications on the devices (Geist, 2011).

Pollara (2011) conducted a study to compare the perceptions of both faculty and students on the impact of M-learning devices on learning and engagement. The researcher found 87% of faculty surveyed believed students used their devices for entertainment over academic purposes. In addition, Pollara found 74% of the faculty believed students texted during lectures, while only 39% thought students used their devices for academic-related reasons. Paradoxically, most faculty in the survey agreed using mobile technology in the classroom would make students better engaged and focused on assignments, but they also believed such devices should not be integrated into classroom environments. However, it can be argued such cognitive dissonance is normal for those who were not raised with technology or understand its potential influence towards learning (Prensky, 2001a, 2001b, 2006, 2010; Tapscott, 2008).

Although it may seem normal for instructors to be critical of M-learning devices in the classroom, other studies suggest some students have views similar to their academic counterpart (Chen & Denoyelles, 2013; Dashti & Aldashti, 2015; Duncan et al., 2012; Gong & Wallace, 2012; Jabbour, 2014; Kinash et al., 2012; Kutluk & Gulmez, 2014; Mango, 2015; Martin et al., 2013; McCoy, 2013; Mooney et al., 2013). Chen and Denoyelles (2013) conducted a survey at the University of Central Florida, which included 942 graduate and undergraduate students and found 75% of the participants admitted to using their M-learning devices for non-academic purposes. Seventy-one percent admitted to downloading music, 53% admitted playing games during lecture, while only 30% used their devices to download educational apps. Open-ended questions from a survey of 300 undergraduate students revealed M-learning devices should not be used as learning tools (Dashti & Aldashti, 2015). According to a survey of 319 undergraduate students, 32% of those surveyed believed smart phones, tablets, and even laptops were more of a distraction than a learning tool in the classroom (Duncan et al., 2012).

Before M-learning devices should be used in classrooms, educators may have to create strict policies to ensure students stay attentive and focus on learning rather than socializing (Gong & Wallace, 2012; Martin et al., 2013; McCoy, 2013; Mooney et al., 2013; Jackson, 2013). One study found 46% of undergraduate students surveyed believed M-learning devices encouraged cheating (Gong & Wallace, 2012). In a survey to determine what motivates students to use mobile technologies in the classroom, 54% of participants indicated they were motivated by using social networking to text and contact friends and family during class (Martin et al., 2013). Moreover, McCoy (2013) found 55% of students used M-learning devices in class to relieve monotony from lecture, while 49% used them for entertainment and gaming purposes. Finally, a survey of 450 medical students revealed some of the students had problems remaining

professional during training because of gaming and web surfing during training at their clinical sites (Mooney et al., 2013). Strict policies should be established before allowing students to use iPads and other M-learning devices in college classrooms to control issues of cheating, texting, or other types of distractions to learning (Jackson, 2013).

A study at Brown University found mixed results based on the perceptions of medical students on the benefits of using an iPad device to help with learning (George et al., 2013). According to a pre-course survey, 79% of students initially believed iPads were beneficial to the medical school for learning; however, this number decreased to 65% toward the end of the semester by the same students surveyed. During a second survey also taken at the beginning and end of the course, 75% of students initially believed iPads could be fully integrated into the medical school, which significantly declined to 49% by the end of the semester (George et al., 2013).

Haugn and Bussell (2012) conducted several focus groups with beginning freshman students at the University of Illinois to measure perceptions of iPad use in their courses. The researchers noticed two specific negative themes emerge from the transcripts: (1) a small keyboard size for typing, and (2) distractions in the classroom. Similar research has also found the small keyboard size, size of the screen on the iPad, and lack of word processing capabilities as major complaints and disadvantages among students (Doddss & Callendar, 2012; George et al., 2013; Souleles et al., 2015; Wakefield & Smith, 2012). A separate study documented problems with slow downloading speeds of learning apps on the M-learning devices (James, 2011). For some students, such problems represent an actual barrier to learning (Rossing et al., 2012). Wakefield and Smith (2012) recorded similar barriers to learning from a case study based

on classroom observations and interviews. The researchers recorded the following disadvantages

of using iPads in their classes:

1. Too much emphasis placed on mobile technology; when the devices did not work
   properly, students did not know what to do.

2. At times the devices were a distraction to others.

3. If the instructor did not fully integrate the device into the course curriculum, students
   became bored and uninterested with the class.

4. Learning some of the applications was too ambiguous (Wakefield & Smith, 2012).

In their research at Brown University, George et al., (2013) found similar disadvantages with

iPad devices, as noted by students, including: (1) small keyboard, (2) difficult to access

e-textbook resources, and (3) limitations with the number of medical apps available to students.

Finally, Hawkes and Hategekimana (2010) conducted a study by comparing the data

from four sets of classes that used M-learning devices and four sets of classes that did not use

M-learning devices. The researchers found little to no apparent statistical significance in terms of

grades or exam scores between the classes that used M-learning devices and those that did not.

According to the findings, M-learning devices made little impact on grades and offered no

difference with the classes that did not use the devices. Despite the importance of understanding

the advantages and disadvantages associated with mobile learning and M-learning devices, its

proper integration and utilization as a pedagogical tool requires application and functionality. In

the next section of this literature review, successful strategies have been carefully documented.

The integration of mobile learning with curriculum and pedagogy will also be discussed.

Cochrane's Six Successful M-learning Strategies

Cochrane (2012; 2014) conducted over 35 successful M-learning studies between 2006-2011 while working with both students and faculty. He found six factors that should always be used when implementing M-learning projects to help facilitate student learning through M-learning devices. Cochrane (2014) further clarified what M-learning projects were, stating such projects are created with any mobile device loaded with appropriate educational apps to create student-centered content. This is completed within the context of a collaborative learning environment between instructor and students. Data emerged from various surveys, participant interviews, and focus groups from his longitudinal study that yielded several factors. These six factors are listed in Figure 2.

Figure 2

Six Factors of M-Learning Project Success
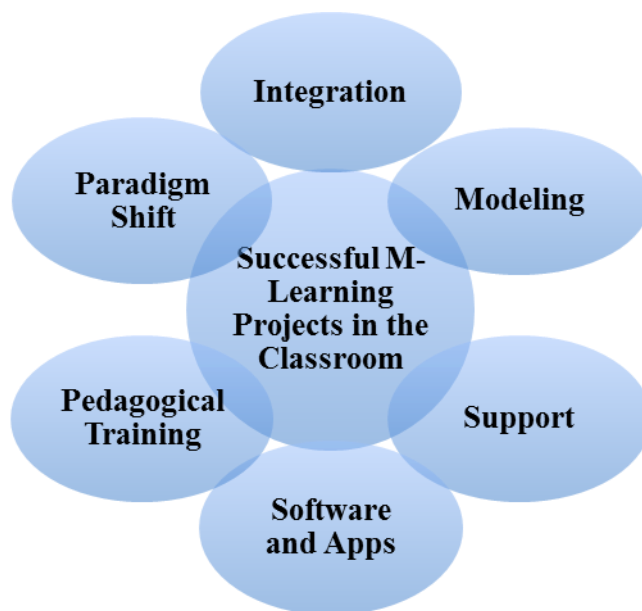
Note: Adapted from Cochrane, 2014.

Each of these six factors was synthesized and corroborated with findings from various other studies with similar conclusions that support Cochrane's work (e.g., Ahern-Dodson &

Comer, 2013; Cavanaugh et al., 2013; Gan & Balakrishnan, 2016; Mang & Wardley, 2012; Parajuli, 2016; Psiropoulos et al., 2016). The next section follows this order: (1) integration of technology and pedagogy styles, (2) instructor modeling, (3) technological support groups, (4) selecting the right software and apps, (5) pedagogical training and support, and finally, (6) a social-constructivist paradigm shift.

Integration. Although M-learning devices such as iPads and tablets offer efficiency, portability, and ease of use for students and faculty, educators have a duty to integrate such technology with student learning styles, pedagogical practices, and curriculum design (Cochrane, 2014). A meta-analysis of research articles discussing iPad and tablet use in higher education revealed serious gaps in the literature, including the need for educators to adopt mobile technology with pedagogy and learning outcomes (Nguyen et al., 2015).

Several studies, similar to Cochrane's (2014) study, emphasized the importance of integrating technology and pedagogy toward successful mobile learning (Ahern-Dodson & Comer, 2013; Cavanaugh et al., 2013; Gan & Balakrishnan, 2016; Mang & Wardley, 2012; Parajuli, 2016). Ahern-Dodson and Comer (2013) conducted a study based on the integration of an iPad device in four courses, which included French, public policy, basic writing, and environmental science. In each of the four courses, instructors effectively utilized the iPad as a learning tool by creating assignments based on popular educational apps. The researchers used a pre/post survey design, faculty blogs, focus groups, and memos during their courses to determine how effectively they were able to integrate their pedagogy with mobile technology. Results from 76 undergraduate students revealed more classroom engagement between instructor and student, increased quality on completed course assignments, and students in the French course showed improvements with learning as well. Cochrane (2012) indicated M-learning projects typically fail

when there is a lack of support by faculty and staff. Mange and Wardley (2012) also noted the importance for educators to fully, not partially, integrate M-learning devices within a course and stated they should have a basic understanding of how to use the device.

Technology-based curriculum and pedagogy are becoming common expectations in higher education. More adequate training is needed to ensure faculty can keep up with the demands of student learning needs (Georgina & Hosford, 2009; Prensky, 2001a; 2001b; 2006; 2010; Psiropoulos et al., 2016; Tapscott, 2009; Werth & Werth, 2011; Raven et al., 2016). Based on a survey of 237 faculty members from 15 institutions associated with the University of North Dakota, 56% believed teaching new technology-based pedagogy with a new curriculum requires formalized training from a technological specialist (Georgina & Hosford, 2009). However, only 50% of those surveyed attended faculty-held training for new pedagogical approaches with mobile devices. A recent survey also revealed 76% of 161 students believed M-learning devices were not being integrated in the classrooms simply because the faculty did not fully support their usefulness. Notwithstanding, many educators and researchers agree simply using new technology, like M-learning devices, will not make learning magically happen (Georgina & Hosford, 2009; Nguyen et al., 2015).

Modeling. Students are more likely to use M-learning devices for academic purposes when they see their own instructors using them to mirror their own behavior (Badwelan et al., 2016; Cavanaugh et al., 2013; Chen & Denoyelles, 2013; Benham et al., 2014; Dashti & Aldashti, 2015; Irby & Strong, 2013; Mueller, Wood, De Pasquale, & Cruikshank, 2012; Greener & Wakefield, 2015; Rosenthal & Eliason, 2015). In a recent survey of 300 undergraduate students, Dashti and Aldashti (2015) found 64% wished their professors used M-learning devices in their courses, while only 25% said they preferred traditional teaching and homework formats. Muller

et al. (2012) conducted several pre and post surveys on a group of MBA students using the latest Blackberry device. The researchers found the more students used their digital devices for educational purposes, the more they perceived it as an instrument of learning; however, they were only willing to use their digital devices if instructors mirrored the same type of behavior in the classroom.

In a survey of 451 undergraduate students, 29% indicated they did not use their devices because they were not required and 20% stated their instructor did not allow them to use a mobile device (Benham et al., 2014). Moreover, students would be more inclined to perceive digital devices as a learning tool if their instructors were willing to use them in class (Parajuli, 2016; Rosenthal & Eliason, 2015). Similarly, Chaka and Govender (2017) found students were often motivated by peers before accepting the usefulness of M-devices as a learning tool. In a survey of 809 undergraduate students, Chen and Denoyelles (2013) found less than 25% of their professors used M-learning devices for class and that same percentage encouraged their students to use educational apps for lectures and assignments. One study, however, focused on how students were able to better use M-learning devices when instructors used pre-selected apps and provided scaffolding with students on how to use them toward learning (Rosenthal & Eliason, 2015).

Support. Drouin et al. (2014) conducted a survey of 139 faculty and staff and found a majority of participants believed professional technology trainers were the best way to learn how to use an iPad device for educational purposes. A survey of 237 faculty from 15 academic institutions revealed that 56% thought the best way to teach new technology with pedagogy was in small groups with at least one qualified trainer (Georgina & Hosford, 2009).

M-learning projects often fail when there is a lack of technological support or support groups (Cochrane, 2012; Psiropoulos et al., 2016). Hamshire, O'Connor, and Crumbleholme (2015) analyzed case study data on how M-learning devices can motivate learners and found faculty were initially reluctant to use new iPads in their programs until they received formal training from a designated E-Learning Support Officer (ELSO). This particular officer was available to provide training before and during the semester. This is similar to what Cochrane (2012; 2014) labeled as a "Community of Practice," or (COP). During much of his research on M-learning projects, Cochrane (2012) held weekly meetings between instructors, researchers, and students to reinforce the importance of maintaining technological support groups to keep M-learning projects successful for both instructors and students.

In a study based on survey and interview data of 224 faculty, Hargis et al. (2014) found that only 63% of instructors felt comfortable using M-learning devices for classroom applications and 64% felt they received sufficient training prior to using the devices for classroom purposes. Vaughn and Lawrence (2013) discussed the findings of an action research study conducted for a teacher education program. Multiple techniques were employed using surveys, interviews, and focus groups including four undergraduate students and six faculty members at Mount Royal University in Canada (Vaughn & Lawrence, 2013). Over half of the faculty surveyed and interviewed thought caution was needed when using M-learning devices to ensure faculty were properly trained and assignments were properly aligned with curriculum outcomes and pedagogical methods.

Software and apps. Student autonomy is imperative when utilizing M-learning devices as learning tools due to the growing number of educational apps that can be selected based on individual student-learner needs (Eppard et al., 2016). Several studies were conducted to

examine the importance of allowing students to pick and choose which apps to use for their own coursework (Backhouse et al., 2014; Brown, 2015; Gordon et al., 2014; Kerrigan et al., 2014; Manakil & George, 2017). Backhouse et al. (2014) examined data from an eight-month case study to determine the impact of using pre-selected apps on student formative assessments. Findings indicated that because students were able to select the best apps to use in their class, up to 87% of the students utilized their M-learning devices for more peer assessment techniques, which led to a significant increase in peer-to-peer engagement. Similarly, data from a recent iPad pilot study revealed an increase in student satisfaction of over 13%, from 59% at the start of the study to 72% after students were able to purchase their own educational apps for their course (Kerrigan et al., 2014).

Student collaboration, engagement, and learning increased when students were allowed to choose their own apps to use during the course, and use their own mobile device (Gordon et al., 2014). In fact, the researchers found 80% of the students believed using their own apps and digital devices made learning more efficient. Brown (2015) argued one of the six predictive trends in higher education would be the continued use of student-owned digital devices with pre-selected apps for classroom learning, which Cochrane (2012) indicated as a major factor for M-learning success.

Haugn and Bussell (2012) created several themes regarding M-learning devices in the classroom; data were based on focus group transcripts compiled from 11 freshman students at the University of Illinois. One of the major themes the researchers found was having access to pre-selected and pre-loaded educational apps relevant to the classes they took. This was discussed as not only an important theme from the focus groups, but was also found to be one of

the most important reasons the freshman enjoyed using the M-learning devices. Comparatively, Hesser and Schwartz (2013) also noted a great deal of student satisfaction when iPads were pre-loaded with relevant apps prior to the start of a general chemistry course. Initially, the students and instructors found the apps difficult to use until they became accustomed to them. Students were eventually so pleased with the efficiency of the apps, the course instructors received positive feedback on the end of course student survey. It was also reported using the apps during the course saved 120 pages of student printouts. James (2011), however, indicated mixed responses from students due to the perceived ineffective learning applications downloaded on their mobile device.

In a more recent study on the selection of educational apps, Eppard et al., (2016) created a list of features that should be considered by educators and students when using M-learning devices in the classroom. The researchers based their list on data yielded from focus groups, surveys, and journals from a semester-long study of iPad integration in an English language course, which was based on the recommendation of several educators. Table 2 displays the specific characteristics students and educators should use when choosing apps.

Table 2

Criteria for Selecting Appropriate Educational Apps

Function or Feature of App	Description
Sharing	Apps should have the function to allow sharing by everyone in the classroom.
Collaboration	Apps should have the function to allow everyone the ability to work together on projects and assignments.
Customization	Apps should have the function to allow everyone the ability to alter, or tailor, their own individual assignments and work.
Engagement	Apps should have the function to allow everyone the ability to stay active engaged in the classroom.
Thinking Skills	Apps should have the function to allow everyone the ability to arrange and process information systematically while learning.
Relevance	Apps should be applicable to content specifically taught in the course.
Feedback	Apps should have the function to allow everyone the ability to receive instant feedback from peers and the instructor.
Multiple Features	Apps should have to function to allow users the ability to perform many tasks.
Low Cost	Apps should be selected on the basis of low cost or should be free.
Training	Students and educators should use apps that are easy to learn.

Note: Adapted from Eppard et al. 2016, p. 23-25.

Not only is it important for students and educators to select their own educational apps for learning, it is also critical to allow them to create learning applications for student and academic use. Several graduate students were encouraged to create educational apps that could be used by the university, as well as consumers, as part of their final grade for the course. Four specific apps were created including, LivUOC, iUOV, Language Learning, and Mprogcourse and were made available on both Apple and Android platforms. The university was able to utilize each app for free and made them available for incoming students; the apps were also later sold for consumer use (Ruis, Masip, & Clarisò, 2014). Allowing students to take charge of their

own learning through peer work and creativity are characteristics found in younger learners (Prensky, 2001; Prensky, 2001a; 2006; 2010; Ruis at al., 2014; Tapscott, 2009; Werth & Werth, 2011).

Pedagogical training. In order for faculty to willingly accept and integrate new technology such as M-learning devices into their courses, faculty need to change their mode of instruction and adapt new pedagogical strategies. It also requires proper training, scaffolding, and institutional and peer support (Cochrane, 2014; Nerantzi et al., 2015; Pegrum et al., 2013; Psiropoulos et al., 2016; Vaughn & Lawrence, 2013; Vedantham & Shanley, 2012; Wong, 2014). According to Cochrane (2014), one of the most important of his six factors that leads to successful M-learning projects was establishing a Community of Practice (COP) between instructors, administrators, and students. It was this type of community that encouraged faculty and institutions to embrace any type of new pedagogical change with regard to M-learning devices in the classroom (Cochrane, 2014; Parajuli, 2016; Pegrum et al., 2013; Nerantzi et al., 2015).

Nerantzi et al. (2015) examined the findings of educators enrolled in a program that taught them how to use M-learning devices in their classrooms and found they were more willing to use M-learning devices in their own courses when they received formal support within a learning community of their peers, which was also consistent with findings by Psiropoulos et al., (2016). This learning community offered the educators specialized training and scaffolding from instructors and allowed for peer collaboration on assignments and for selecting appropriate educational apps related to their courses. Similarly, 67% of faculty surveyed from a different study indicated caution is needed before creating assignments that use M-learning; 64% of those same faculty argued proper training is needed for using M-learning devices; otherwise, they

would see no need to use them at all (Vaughn & Lawrence, 2013). In addition, Rossing (2012) suggested four recommendations for educators to follow when aligning M-learning devices with curriculum and pedagogical styles including: (1) students must understand the relevancy of using mobile technologies for learning, (2) educators must temper the use of M-learning devices in the classroom, (3) educators must learn how to adopt new technologies to different learning styles, and (4) educators must understand some students will be resistant to new forms of learning.

Several action research studies were conducted to determine how to successfully integrate M-learning devices into curriculum and course designs, or from theory to practice (Cochrane, 2010; Cochrane et al., 2011; Cochrane, 2012; Cochrane, 2014). Cochrane (2010) conducted a longitudinal study by working with students, educators, and administrators to create a social constructivist-learning environment for M-learning devices used in college courses. Essentially, Cochrane had students and faculty work collaboratively to develop a curriculum that was conducive to the tools and applications available on the M-learning devices. The collaboration between both students and faculty created a Community of Practice (COP) due to having capable students, staff, and upgrades to the institutional infrastructure. Other studies also stressed the importance of having an updated infrastructure for M-learning devices to be successfully integrated in a classroom environment (Cochrane, 2012, Hemmi, Naraumi-Munro, Alexander, Parker, & Yamauchi, 2014; Franklin, 2011).

Cochrane et al. (2011) had students work with their instructors to create their own learning environment in different courses. A social constructivist approach to course design was utilized for each course and students were able to create their own course content and assignments. Students created polls based on real-world problems rather than lecture-centered pedagogy for the business course, while students were encouraged to create their own music with

videos using recording applications on the iPad in the music course (Cochrane et al., 2011). This study was significant for two reasons: (1) it demonstrated effective use of M-learning, and (2) the study detailed the success of student and faculty collaboration with M-learning in terms of creating assignments and curriculum.

Paradigm shift. Not surprising, changing the perceptions of educational roles from content lecturer to content facilitator is the most difficult factor for creating M-learning success (Cochrane, 2014; Fink, 2003). In 2003, Fink wrote a book entitled, *Creating Significant Learning Environments: An Integrated Approach to Designing College Courses.* In the book, Fink argues that trying to sell the idea of change in the midst of perceived structural efficiency within an institution is a daunting task. Fink also believes in six necessary conditions for faculty to adapt to a new culture where student learning is the principal reason for instruction including: (1) awareness, (2) encouragement, (3) time, (4) resources, (5) cooperative students, and (6) rewards and recognition. Fink suggests such factors are reciprocal and need to be transformed before any type of cultural change can occur. Essentially, academia must share this vision of student-centered learning as a key value and a central goal in order for curriculum change to occur. Both faculty and staff should seek the same goal of creating a learning institution where individual input is encouraged and the collectivity of the group is promoted (Cochrane, 2014). Although his idea of change was similar to Fink, Cochrane referred to this process as the P.A.H. (pedagogy, andragogy, heutagogy) illustrated in Figure 3.

A case study from Morrisville State College in New York revealed students thought the iPad was a fun device to use for entertainment, but not as useful for learning (Sloan, 2013). However, to fully incorporate such a device into a college classroom, it would require a complete transformation of the curriculum and instructional methods to be successful (Cochrane, 2010;

Cochrane et al., 2011; 2012; 2014; Mellhuish & Falloon, 2010). In contrast, many students

continue to find iPads, and M-learning devices in general, relevant for modern learners

(MacLeod, 2015; Werth & Werth, 2011).

Figure 3

Pedagogy to Andragogy, to Heutagogy Continuum
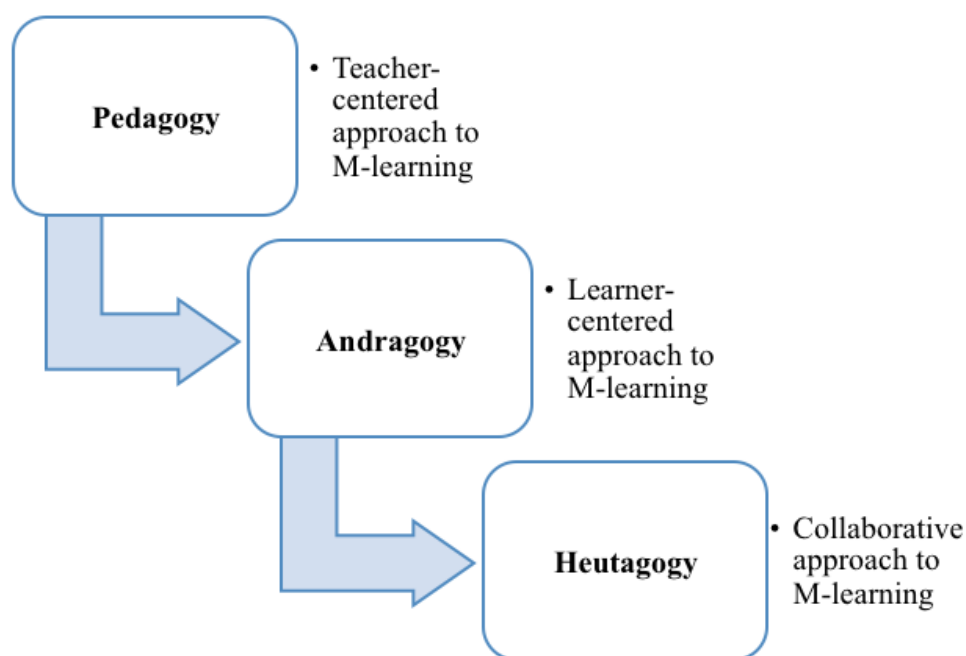
Note: Adapted from Cochrane (2014).

Not only do instructors need to transform their classroom roles to facilitate better student

learning, but students need to change their perception of being mere consumers of knowledge to

consumers and co-creators of knowledge (Cochrane, 2010; Cochrane et al., 2011; 2012; 2014).

The capabilities and apps afforded by devices like the iPad have the potential to transform

decades-old pedagogical techniques as long as educators are willing to fully utilize them as part

of course curriculum (Mellhuish & Falloon, 2010). This view is also supported by numerous

studies (Ahern-Dodson & Comer, 2013; Ally & Blazquez-Prieto, 2014; Benham et al., 2014;

Cavanaugh et al., 2013; Cochrane, 2014; Drouin et al., 2014; El-Hussein & Cronjie, 2010;

Duncan et al., 2012; Franklin, 2011; Georgina & Hosford, 2009; Gordon et al., 2014; Hammer et al., 2010; Hamshire et al., 2015). According to Cochrane (2010; Cochrane et al., 2011; 2012; 2014), a paradigm shift is needed in order to successfully design and utilize M-learning projects in the classroom. However, such a shift requires collaboration between students and instructors, as well as understanding the need for change itself (Fink, 2003).

In this section, Cochrane's six factors for successful M-learning projects were briefly discussed. However, using M-learning devices alone does not support learning and requires proper policies, regulations, and support for mobile learning to occur (Alvi, 2011). Without proper guidance and direction, as outlined by Cochrane's studies, M-learning devices in classroom environments could continue to be viewed as mere distractions for both students and instructors (Parajuli, 2016). Nevertheless, mobile technology is quickly becoming more affordable and universal, and higher education may need to integrate new pedagogical styles with learning applications on M-learning devices. If this is true, educators must be ready to implement mobile technologies in all areas of higher education, especially because of a new generation of students that have grown up with mobile technologies and iPads known as net-geners (Geist, 2011; Tapscott, 2009) and digital natives (Prensky, 2001; Prensky, 2001a; 2006; 2010; Werth & Werth, 2011).

Prensky's Theoretical Framework

The literature review presents many discussions about a new generation of learners entering institutions of higher education who have been socialized by video games, computer technology, the cyber community, and ubiquitous wi-fi accessibility (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Brown, 2015; Franklin, 2011; Hammer et al., 2010; Geist, 2011; Menkhoff & Bengtsson, 2012; Tapscott, 2008; Werth & Werth, 2011). Researchers often refer to

these young students as "Gen Y Learners" (Menkhoff & Bengtsson, 2012), "Net-Geners" (Tapscott, 2008), "Millennials" (Werth & Werth, 2011), or "Digital Natives" (Prensky, 2001a; 2001b; 2005; 2010). The following section of the literature will: (1) provide a brief discussion of this generation and their educational needs, (2) introduce the work of Prensky as the main theoretical framework of this study, and (3) examine some of the findings and arguments that refute Prensky's major assumptions.

Digital learners. A perceived disparity exists between the needs of student-learners today and the methods and attitudes employed by those who teach them (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Menkhoff & Bengtsson, 2012; Gan & Balakrishnan, 2016; Werth & Werth, 2011). Alexander (2014) argues the role of technology will continue to re-shape the landscape of learning as more technologically-advanced young learners enroll in college. Students will predominately learn through digital storytelling and various other social media platforms. Higher education is not prepared to meet the needs of the 21st-century learner and educators should begin creating more classroom engagement through active learning (Ally & Blazquez-Prieto, 2014). They reiterate this belief because technology now exists that can deliver abundant course content, which can personalize the learning process.

A case study was conducted to determine how to better engage a group of 49 Gen Y learners enrolled in a business class from a Chinese university (Menkhoff & Bengtsson, 2012). First, the researchers allowed their class to use their own cell phones or mobile devices and select the apps they thought would benefit the course assignment. The researchers used five M-learning techniques to encourage peer learning and student collaboration with M-learning devices. These techniques included the use of Flickr for photo sharing, apps for a scavenger hunt, the creation of their own wiki pages, podcasts to reflect on what they had learned, and walking

tours through a Chinese city with their M-learning devices. Findings from this study revealed a majority of students viewed this type of learning as efficient, fun, and more engaging than lectures (Menkhoff & Bengtsson, 2012). Such activities are exactly how educators should be teaching their students, especially with M-learning devices (Werth & Werth, 2011). The continued marketing and consumption of mobile technologies, especially within this generation, will only continue in higher education whether educators like it or not (Brown, 2015).

A generational-shift is occurring in higher education as educators are beginning to interact more frequently with a new generation of digital learners. Many scholars and researchers call for a paradigm shift within higher education to accommodate their style of learning with new technology (Werth & Werth, 2011). Addressing the need for educators to change their instructional philosophy is nothing new and simply reiterates the position taken by many practitioners and scholars in the field (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Cochrane, 2010; Cochrane et al., 2011; 2012; 2014) and especially for educators addressing the learning needs of digital learners (Prensky, 2001a; 2001b; 2006; 2010; Tapscott, 2009).

Tapscott (2009) postulated a separate theory of generational learner, which he coined Net-Geners. Tapscott, similar to Prensky, generated a set of assumptions and characteristics he believed helped shape the net-generation to explain their values regarding learning. Tapscott's eight major characteristics of the net generation are summarized in Table 3.

Table 3

The Eight Characteristics of the Net-Generation

Net-Generation Characteristics	Description
Freedom	Net-Geners enjoy having the flexibility to choose, be independent, and work or learn anytime from any location based on the availability of M-learning devices and their own needs.
Customization	Net-Geners like to personalize everything from gadgets to avatars on video games. They believe learning should be customized to meet individual needs.
Scrutiny	Net-Geners are highly skeptical of others and of any information due to growing up with instant access to facts from various online sources.
Integrity	Net-Geners fight for causes they value and are very tolerant of diverse issues.
Collaboration	Net-Geners enjoy working with others face-to-face or online and enjoy working in close collaboration with teachers and employers.
Entertainment	Net-Geners believe both learning and work should be fun and stimulating. Multitasking at work and school is to be expected.
Speed	Net-Geners expect quick feedback, as well as instant access to information.

Note: Adapted from Tapscott, 2009, p. 73-96.

As detailed in Table 3, assumptions such as freedom, customization, collaboration, entertainment, speed, and innovation are similar characteristics found in Prensky's digital natives (2001). Tapscott provides a detailed set of characteristics that describe the younger generation today. Although not exact, Prensky's digital native has many of the same characteristics of Net-Geners because they represent traits found in the same young learners today (Menkhoff & Bengtsson, 2012; Werth & Werth, 2011).

Prensky's theory. In 2001, Marc Prensky wrote a seminal article entitled, "Digital Natives, Digital Immigrants," which generated much attention from the educational community. The central thesis of his article was based on three general assumptions:

1. A new generation of students with unique technological and learning habits have begun entering colleges and universities.

2. An older, more refined generation of educators must figure out a new way to teach this newer generation of technologically-advanced students.

3. Educators must change their method of instruction and collaborate with the new generation or effective learning will fail to occur (Prensky, 2001).

Many of today's students are perceived as lazy, inattentive in class, disengaged, uninterested in the subject being studied, and lack a sufficient attention span from an older generation of educators. But are such stereotypes and perceptions accurate? Such perceptions have become common because of how Prensky would define and label both groups: digital natives and digital immigrants. However, Prensky (2001a; 2001b; 2006; 2010) maintains such perceptions stem from a lack of understanding of just how digital natives think and behave, especially from the perspective of digital immigrants. A synthesis between digital natives and digital immigrants and their mutual collaboration in the classroom is presented in the Figure 4.

Figure 4

Dichotomous Assumptions of Digital Natives and Digital Immigrants Synthesis
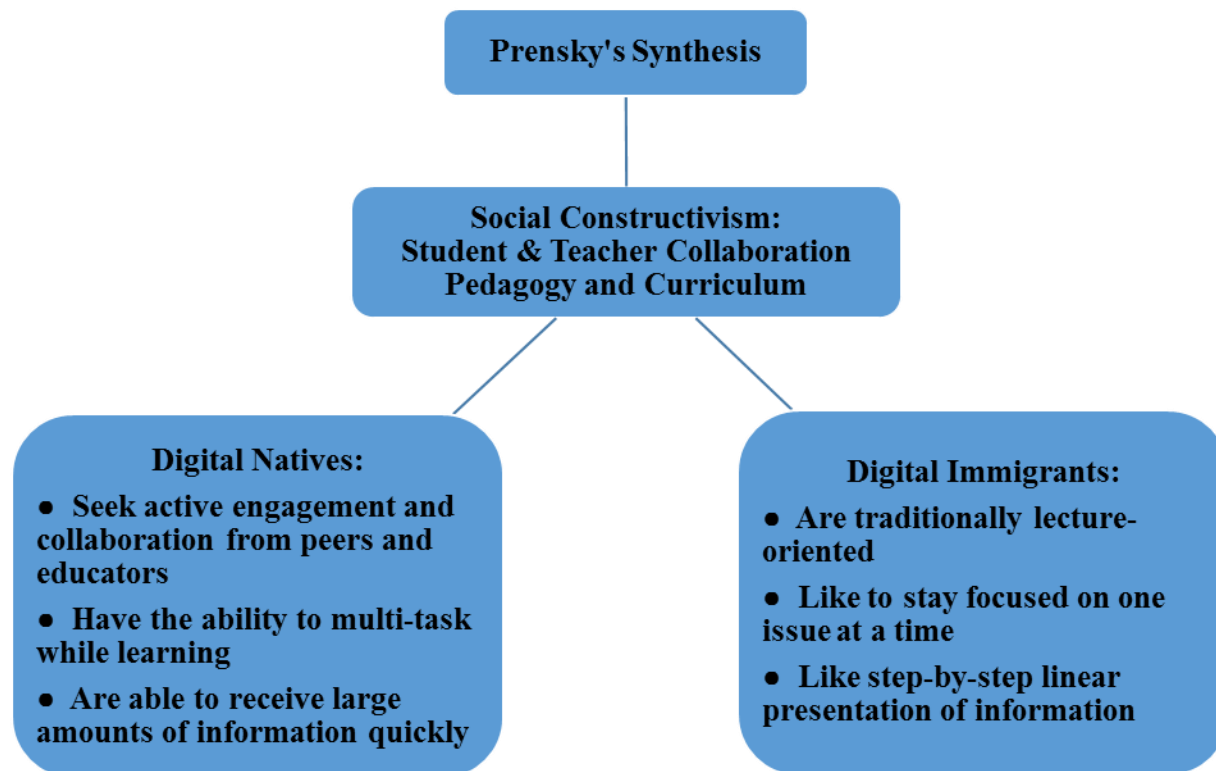
Note: Adapted from Prensky (2010).

Digital natives now make up a majority of students in higher education today and all digital immigrants must adapt to the language and culture of this new generation in order to keep up with the demands of new technologies and the perceptions of how digital natives use such technology. As technology use continues to grow, the perceived gap and lack of understanding between the natives and immigrants will only continue to grow as well (Prensky, 2001a). In 2006, Prensky published the article, *Listen to the Natives*, which invited digital immigrants to listen to what their native students were telling them and to create the type of instructional change needed to take place in the classroom. Prensky (2010), introduced nine assumptions to

provide greater clarity on the characteristics and values of the digital natives. These assumptions included:

1. Dislike lectures

2. Expect to be valued

3. Passionate about what interests them

4. Seek creativity

5. Enjoy working with others

6. Want to be in control of learning

7. Enjoy connecting with others through "networking"

8. Able to work with others closely on projects

9. Want their education to be grounded in real-world issues

A further argument was digital natives are so profoundly different than their digital immigrant counterparts, that being able to empathize with the natives is a greater skill for educators than having an expertise in their own content (Prensky, 2006).

The theoretical framework for this dissertation was based on Prensky's assumptions of digital natives and provides a basis for addressing the research questions presented in this study regarding the perceptions of iPad use effectiveness between digital natives and digital immigrants. Several studies also support this framework when comparing generational learner differences and technology (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Hammer et al., 2010; Geist, 2011; Menkhoff & Bengtsson, 2012; Pollara, 2011; Tapscott, 2008; 2009; Werth & Werth, 2011). Finally, the theoretical foundation was used as a set of assumptions to help analyze the data collected from this study.

Arguments against Prensky. Theoretical ideas offer generalizations and assumptions about how the world works by categorizing ideas into manageable units of measurement for substantiating, refuting, and further testing (Creswell, 2014). Prensky's theoretical assumptions are no different and have been criticized and tested by several educational researchers (Alvi, 2011; Corrin et al., 2010; Margaryan & Littlejohn, 2008; Peluso, 2012). A major criticism of Prensky has been his descriptions of digital natives and digital immigrants being over-simplistic, over-hyped, and over-generalized (Alvi, 2011), or simply a myth (Margaryan & Littlejohn, 2008). Many generational theorists, like Prensky, make the speculative assumption that younger learners have an intrinsic capacity to use a variety of digital and mobile technologies more efficiently than their older instructors (Peluso, 2012).

Going beyond the realm of mere speculation and conjecture, some educational practitioners have tested Prensky's theory for validity and rigor (Corrin et al., 2010; Margaryan & Littlejohn, 2008). Margaryan and Littlejohn (2008) conducted a survey study to test Prensky's theory on the learning styles and technological efficacies between digital natives and digital immigrants using an M-learning device. The researchers administered a survey to 160 undergraduate students and 16 faculty members from two separate universities. According to the results, those classified as digital natives were more likely to use websites, Wikipedia tools, blogs, and social networking software on their devices, compared to digital immigrants who were more likely to use their M-learning devices for texting. Although the findings between digital natives' and digital immigrants' technological use on M-learning devices were somewhat different, the study did not indicate a large enough disparity between Prensky's two groups to confirm his theoretical assumptions. Alvi (2011) contends labels such as digital native and digital immigrant are poorly operationalized, and thus cannot be adequately tested. Peluso (2012) also

reminds us when it comes to utilizing educational technology such as M-learning devices, all students should receive scaffolding and instruction despite academic labeling.

In a more recent effort to test Prensky's theory that digital natives are naturally good with educational and social technology, Corrin et al. (2010) conducted a survey of 47 undergraduate freshmen from an Australian university to determine the actual aptitude and ability students have when using mobile technology for educational purposes. The survey measured technological use as expert, intermediary, or novice; up to 67% of the students from the survey admitted to only having an intermediary-level of technological ability, while 9% indicated a novice technological aptitude, and 10% admitted to not using any technology at all. Although technological utilization in the classroom can be a boon for student learning, more scientific evidence is needed to warrant a total transformation of educational tradition based on general assumptions of so-called digital natives (Alvi, 2011).

Despite arguments and criticisms leveled against Prensky, the researcher utilized Prensky's theory as the conceptual framework for this study for two reasons:

1. Prensky's ideas were prominently discussed throughout the literature review, thus making his theory plausible to the study.

2. Its dichotomous assumptions regarding digital natives and digital immigrants regarding the perceptions of technological effectiveness are potentially different.

The researcher tested the characteristics described by Prensky in relation to the emergent need to understand how to better utilize M-learning devices in the classroom. Notwithstanding, testing his theory on vocational college students contributed to the growing literature on Prensky's work and the role of iPads in higher education.

Conclusion

The literature review presented in this chapter explored the perceptions and trends of M-learning devices in higher education. Moreover, the following general conclusions can be gathered from the present literature: (1) researchers around the world have studied the importance of M-learning devices in terms of effectiveness in the classroom from both student and faculty perspectives, (2) faculty and students alike have experienced positive and negative results with M-learning devices in the classroom, (3) data exists from various action research studies on how to create and promote M-learning activities and projects, and (4) years of pedagogical action research by Cochrane, and further substantiated by more recent studies, suggested strategies for educators to properly utilize M-learning devices as a pedagogical tool. The review of the literature closed with a brief analysis of Prensky's (2001) assumptions about today's digital learners and the difference between digital natives and digital immigrants. Prensky's assumption provided the groundwork for this study regarding student and faculty needs and perceptions of how to use M-learning devices in the classroom effectively.

This dissertation adds to the current body of literature by focusing on students in vocational colleges and filling in the gaps as listed below:

1. Research that examines any differences between faculty and student perceptions of mobile learning effectiveness in vocational colleges to compare with findings from state colleges and universities (Dashti & Aldashsti, 2014).

2. The need to investigate Prensky's assumptions of digital natives and digital immigrants concerning technology in the classroom (Alvi, 2011; Corrin et al., 2010; Margaryan & Littlejohn, 2008; and Peluso, 2012).

Chapter III

Design and Methodology

Introduction

Chapter II presented a review of the literature regarding the use of iPads in college classrooms. Gaps in the literature were identified, which provided the basis for the research questions that guided this study. Chapter III has been organized as follows: a discussion of the research design used for the study, the population and a description of each of the seven individual school settings where surveys were administered for the study, the data collection methods used, analytical methods, and a final discussion pertaining to the limitations and delimitations of this study.

The literature review for this study explored many studies related to how M-learning devices are used in higher education; such devices have proven advantageous for learners and educators because of their unique designs, apps, and seemingly unlimited educational benefits (Al-Emran, Elsherif, & Shaalan, 2016; Backhouse et al., 2014; Boyinbode et al., 2011; Cheon et al., 2012; Chen & Denoyelles, 2013; Dashti & Aldashti, 2015; Davison & Lazaros, 2015; Doddsss et al., 2012; Deimer et al., 2012; DiVall & Zgarrick, 2014; Enriquez, 2010; Gordon et al., 2014; Hargis et al., 2014; Hashim, 2014; Irby & Strong, 2013; Macleod, 2015; Mango, 2015; Marmarelli & Ringle, 2011 Martin et al., 2013; Mang & Wardley, 2012; Mang & Wardley, 2013; Pegrum et al., 2013; Sarrab et al., 2016; Rosenthal & Eliason, 2015; Rossing, 2012; Rossing et al., 2012; Shi-hsien, 2012; Sloan, 2013). The gaps were identified after an exhaustive review of the relevant literature. Moreover, the following gaps exist from the literature review that addressed M-learning devices and perceptions of effectiveness:

1. Research that focuses on faculty and student perceptions of mobile learning effectiveness in vocational colleges to compare with findings from state colleges and institutions (Dashti & Adashsti, 2014).

2. The need to further test Prensky's assumptions regarding digital natives and digital immigrants in terms of their use and perceptions of technology (Alvi, 2011; Corrin et al., 2010; Margaryan & Littlejohn, 2008; Peluso, 2012).

This study added to the scientific literature by addressing these gaps in an attempt to develop best practice solutions and insights for the development of mobile learning course designs, policy, and the assessment of learning outcomes with M-learning devices in vocational college classrooms. Through these contributions, the research was able to test Prensky's theory of digital immigrants and digital natives and add more information to the expanding literature on digital natives.

For this dissertation, two research questions were extrapolated from the gaps in literature discussed in chapter II. Using Prensky's theory of digital immigrants and digital natives, the purpose of this study was to examine faculty and student perceptions of the effectiveness of iPads in vocational college classrooms. In order to measure perceptions in the study, the researcher selected a mixed-methods approach to collect and study the data. According to Creswell (2014), a mixed-methods approach is used when the researcher gathers both quantitative and qualitative data in an effort to attain rich data and triangulate results. Moreover, triangulating data from a mixed methods study adds increased validity and reliability to qualitative data (Golafshani, 2003). The issue of validity and reliability will be discussed later in chapter III. The following research questions were used to guide this study:

1. How do faculty and students differ in their perceptions of the effectiveness of iPad use in vocational college classrooms?

2. How do faculty and students differ in their perceptions of the appropriate use of iPads related to student engagement in course activities?

Two null and two alternate hypotheses were constructed for testing:

1. H_o: There is no statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

2. H_1: There is a statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

3. H_o: There is no statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities.

4. H_1: There is a statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities.

Research Design

Research questions and methodological design are equally influenced by an extensive analysis and summary of a related literature review (Ravitch & Riggan, 2012). Part of the literature review in this study provided a discussion of the theoretical foundations used in the design, which helped shape both the research questions and research hypotheses. Prensky's research provided a source for drawing inferences based on the results of the data. As Table 4 indicates, the independent variable used for each question is based on age, which is consistent with Prensky's theoretical framework on digital natives and digital immigrants. The dependent variables are also listed in the table along with the statistical method that was used to test each variable.

Each survey consisted of 24 questions. The first five questions asked for basic demographic information, while questions 6-20 utilized a Likert scale to measure the perceptions of each respondent. The main statistical test used in the study was the Mann-Whitney *U*, which was instrumental in comparing the perceptions of faculty and students based on ordinal data (Tanner, 2011).

Table 4

Research Questions and Tests

Research Questions	Independent Variable(s)	Dependent Variable(s)	Test
How do faculty and students differ in their perceptions of the effectiveness of iPad use in vocational college classrooms?	Age	Perceptions of effectiveness	Mann Whitney *U*
How do faculty and students differ in their perceptions of the appropriate use of iPads related to student engagement in course activities?	Age	Perceptions of student engagement	Mann Whitney *U*

Based on the relationship between variables and the test used for this dissertation.

Four open-ended questions were also included in the survey. The following four open-ended questions for faculty and students were matched/paired for comparative purposes: The four open-ended questions are listed below:

Open-ended questions included on the student survey:

1. What did you find to be the benefits of using iPads in your course(s)?

2. What did you find to be the drawbacks of using iPads in your course(s)?

3. Please describe your experience(s) using the iPad as a learning tool in the classroom.

4. Please share any suggestions for improvement you may want to provide.

Data from the open-ended questions were analyzed for specific words or themes to help answer the research questions in chapter V. According to Creswell (2014) and Marshall and Rossman (2016), qualitative data in terms of open-ended questions are typically organized and coded to determine emergent themes from the data. Data from both sets of open-ended questions were used to: (1) describe the benefits and drawbacks associated with the use of iPads, (2) to describe the experiences of faculty and students using the iPads as a learning tool, and (3) to offer any suggestions for improving the use of iPads in the classroom. For this study, the researcher used an open coding process, which helped the researcher analyze specific patterns based on the frequency of responses (Marshall and Rossman (2016). Open coding was used to analyze the comments from each of the four open-ended questions.

The questions created for this study were based on gaps in the literature. Furthermore, the goal of the researcher was to fill these gaps and add to the growing body of literature on M-learning in higher education by analyzing the perceptions of iPad effectiveness between students and faculty. In order to answer these questions, both surveys were piloted during the months of July and August 2016. The actual distribution of the surveys occurred during the month of September 2016 and the write-up and analysis of took place from October through December 2016.

Instrument

The instrument used for this study was a five-point Likert scale survey with both open-ended and closed-ended questions. Survey items were modified from several survey instruments used in previous studies (e.g., Margaryan & Littlejohn, 2008; Pollara, 2011; Rossing et al.,

2012). The researcher sought and received permission to use questions from these three survey instruments by drafting a permission letter requesting to use each survey (See Appendices A and B).

      Reliability and validity. Establishing the reliability of a research instrument implies that the same instrument can be utilized many times and achieve similar results each time (Gliem & Gliem, 2003). Alternately, establishing the validity of a research instrument suggests that an instrument will always measure what it was intended to measure (Creswell, 2014; Gliem & Gliem, 2003; Golafshani, 2003; Marshall & Rossman, 2016). Each survey instrument had been previously pilot tested and checked for validity and reliability due to their former use. However, the researcher modified questions from each of the original surveys and piloted the revised survey for clarity and correction. Despite having modified a previously validated survey, it was imperative to pilot-test the revised instrument with a similar sample of those to be surveyed (Babbie, 1990; Bulmer, Gibbs, & Hyman, 2006; Creswell, 2014). In fact, using surveys from previous studies can provide a truthful assessment of data because such research questions have already been piloted (Hyman, et al., 2006).

      Prior to the distribution of the survey for data collection, dissertation committee members offered expert insight and criticism of the questions. Additionally, survey questions were sent to a research expert for further analysis prior to the pilot test. The survey was piloted by 34 students from the following academic programs: dental hygiene, pharmacy technology, and medical billing and coding. After the surveys were received from the first piloted study, some questions were modified for clarity based on the respondents' suggestions. During the following week, the survey was piloted again with 24 students completing the survey. After the surveys were received, the data were entered into SPSS v. 24 to establish the internal validity of the survey

scales. A common method for determining the internal reliability of a scaled survey is by computing a specific coefficient known as Chronbach's alpha (Tanner, 2011). According to George and Mallery (2003), the Cronbach's alpha scale ranges from 0.0 to 1.0 where: ">.9 - excellent, >.8 - Good, >.7 - Acceptable, >.6 - Questionable, >.5 - Poor and < .5 - Unacceptable" (p. 231).

For the piloted survey, two constructs were measured to determine the internal reliability of the survey instrument. The first construct, "effectiveness," consisted of five questions and had a Cronbach's alpha of 0.765. The second construct, "engagement," consisted of six questions and had a Chronbach's alpha of 0.747. An acceptable Chronbach's alpha for internal reliability should be 0.7 or above (George & Mallery, 2003; Gliem & Gliem, 2003), which was achieved.

When conducting qualitative research, the role of the researcher is to create knowledge from the meaning of others, which makes it imperative for the researcher to admit the potential for bias in the interpretation and write-up of qualitative analysis (Creswell, 2014). To ensure the validity of qualitative research interpretation, all collected data were triangulated to provide a more descriptive analysis of the research findings. One method of achieving this type of credibility was by triangulating the qualitative data with the quantitative data (Creswell, 2014; Golafshani, 2003; Marshall & Rossman, 2016). Moreover, using various types of data not only adds additional validity to the qualitative research, but also helps generalize the findings of the study (Marshall & Rossman, 2016). For this study, three sources of data were used including: (1) descriptive data from Likert-scale questions, (2) results from the Mann Whitney U test, and (3) open-ended questions from the end of the survey. Each of these data sources were analyzed separately and were then combined to answer both research questions.

Participants and Setting

The participants for this study included undergraduate students and faculty from each of the seven selected campuses at Victory College. Six programs at Victory College were selected because they require both faculty and students to use iPads as part of the curriculum. Before distributing surveys for data analysis, the researcher applied for and received permission to conduct research for this study (Appendix C). For this study, purposive sampling was used because the criteria for the population was predetermined. Purposive sampling is typically used when the researcher has a set of criteria pre-established for the target population of the study (Babbie, 1990; Vogt, 2007). For this study, the criteria for being selected was based on the following:

1. Students and faculty from each of the seven campuses preselected for the research.

2. Students born in or after 1990 and faculty born before 1990.

3. Students that have used an iPad in at least one class at Victory College.

4. Students that regularly use iPads from one of the six academic programs identified.

5. Faculty that regularly use iPads from one of the six academic programs identified.

The total student population between each of the seven selected campuses was 4,287. Of this total population, 1,180 students and 130 instructors were selected to receive the survey. Students and faculty were selected from the following programs represented at each of the seven vocational college campuses: (1) criminal justice, (2) dental hygiene, (3) medical billing and coding (4) medical assisting, (5) pharmacy technology and (6) dental assisting. Program deans from each of the seven vocational college campuses were contacted to assist in the distribution of both surveys to each class. Since each of the academic programs were offered on the seven different campus locations, program deans from each campus were asked to help

distribute each survey to the students and faculty. Weekly reminders were also sent out to each program dean to encourage faculty and student survey participation. Each dean that volunteered signed a separate Informed Consent Form (see Appendix E).

Participants from each of the seven campuses were demographically heterogeneous. Demographic information and degrees offered for each campus is described later in this section of the chapter. Faculty and students at each of the seven campuses completed surveys anonymously. As a safeguard, anonymity was given to all who participated in the survey. Prior to the distribution of the survey, the researcher enrolled in, and completed all necessary ethical training guidelines (see Appendix D).

Before any student and faculty participant chose to take part in this study, they were given an Informed Consent Form (See Appendix F) to read and sign if they agreed to participate in the survey. Permission to survey students and instructors was granted by Victory College (see Appendix F). It is also important to note that the consent form detailed all information regarding ethical concerns. In addition, students were made aware that they could opt out of the survey at any time and for any reason. Finally, permission was granted and a copy of the approval form from Northwest Nazarene University's HRRC was received before any data collection began (see Appendix I).

This study was conducted at seven vocational colleges located throughout the western United States. For the sake of this study, the name of the college was changed to Victory College (pseudonym). Victory College has a history spanning 45 years with 18 total campuses located throughout eight western states. Victory College is a for-profit school accredited by the Commission for Community and Junior Colleges, Western Association of Schools and Colleges (ACCJC/WASC) and was purchased by a larger vocational college in 2008. Each of the seven

campuses was selected due to their recent decision to include iPads as a part of their curriculum.
Although each vocational college specializes in allied health sciences, the campuses offer an
array of associate degrees and certificates in a variety of technical and vocational areas. Each
campus offers a variety of academic majors to select from, but do not offer the same majors for
each campus. Demographic information for each campus is provided in
Table 5.

Table 5

Demographic Information of the Seven Victory College Campuses

Race/Ethnicity	Campus One %	Campus Two %	Campus Three %	Campus Four %	Campus Five %	Campus Six %	Campus Seven %
Native American	2.7	1.3	0.3	1.2	1.1	1.4	0.9
Asian	3.7	12.0	4.3	10.1	18.4	8.5	8.4
African American	7.0	12.0	3.7	11.1	1.9	20.8	7.5
Hispanic /Latino	14.7	26.7	64.7	24.8	48.5	41.7	46.3
Native Hawaiian	2.7	2.5	1.1	2.1	3.0	4.1	2.7
White	61.3	39.7	23.8	37.3	24.1	17.1	29.0
Two or more races	4.6	2.5	0.5	5.1	2.6	4.5	3.3
Unknown	3.1	2.8	1.6	8.3	0.1	1.6	1.8
Non-resident alien	0.2	0.3	0.0	0.0	0.4	0.4	0.2
Gender	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Male	16.4	18.5	12.0	12.3	12.3	13.6	11.3
Female	83.6	81.5	88.0	87.7	87.3	86.4	88.7
Faculty	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Full-Time	9	15	12	32	19	10	8
Part-Time	8	21	2	70	35	10	5
Enrollment	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Campus Total	577	599	374	1,385	805	509	549

Based on Fall 2015 Data
Total Student Enrollment for Seven Campuses is 4,798
Adapted from the National Center for Educational Statistics, U.S. Department of Education 2015.

Data Collection

   Two sets of surveys were created using Qualtrics software and were sent to the program

deans at each of the seven campuses to assist in the distribution of the survey to pre-selected

courses at each campus location. A survey was created for both students and faculty (see

Appendix G & H). Each participant in this study received an electronic form asking them to take

part in the study (see Appendix J). After each survey was distributed, the researcher collected the

feedback by logging into the Qualtrics website to retrieve the data from each survey. After all of

the data were submitted, survey data were entered into SPSS statistical software for computation

based on both descriptive and inferential statistical information.

   Because this was a mixed-methods design, both quantitative and qualitative methods

were employed using an explanatory sequential design, which first relies on quantitative data

then qualitative data (Creswell, 2014). Data for this study were collected in September 2016. As

part of the survey, descriptive data were collected, which included: age of student, age of faculty,

students' academic major, and gender. Age was specifically used as a control variable for each of

the two research questions based on the assumptions of the theoretical framework. The age

classification designated for digital immigrants and digital natives was vague according to

Prensky's research. Therefore, the researcher selected anyone born in or after 1990 to be

classified as digital natives, while digital immigrants were determined to be anyone born before

1990. Therefore, all students born before 1990 and all instructors born after 1990 were deleted

from the survey results. It was imperative for the researcher to tabulate and test only those

students who met those criteria. Additionally, instructors had to represent an age similar to

Prensky's notion of a digital immigrant, or anyone born before 1990.

Inferential statistics were derived from the comparison of two populations including students and faculty. This type of research required a Mann-Whitney U test, which compared the perceptions of two populations (Tanner, 2011; Vogt, 2007). The Mann-Whitney U test is a non-parametric test used when there are no assumptions made about the population being studied and collected data can be ranked (Tanner, 2011). For this study, survey data were ranked according to a five-point Likert scale based on perception. The alpha level of significance was set at $p = 0.5$, which is a common statistical level for the Mann-Whitney U test (Tanner, 2011). For this study, a comparison was made between the perceptions of faculty and students, and survey numerical scores of $p < 0.5$ were considered significant.

Analytical Methods

To answer the research questions, a five-point Likert survey was administered to students and faculty at each of the seven vocational college campuses used in the study. Two survey instruments were created using Qualtrics; the surveys were matched/paired for faculty and students. Both faculty and student surveys contained 20 items with four additional open-ended questions for a total of 24 items. Open-ended questions were analyzed for themes relating to the effectiveness of iPad use in vocational college classrooms.

The survey was divided into three sections for organization. The beginning of the survey asked students for demographic information (questions 1-5). The most important demographic information obtained from this section was age. The next section of each survey included questions used to determine both faculty and student perceptions of the effectiveness of using the iPads in the classroom. Section three of the survey included four open-ended questions.

Limitations

The limitations of this study were due to the research design employed to gather and analyze data. Bryant (2004) stated limitations are created by the methodology selected by the researcher. Additionally, Creswell (2014) also indicated limitations are created due to external factors beyond the control of the researcher. Surveys, for example, are limited by the response rate of the participants. However, it is common for electronic surveys to have significantly lower response rates compared to mail-in surveys (Shih & Fan, 2008). A limitation of this study was the response rates for faculty and students. The response rate for faculty completing the survey was 47%, while 24% of students completed the survey. Despite a literature review that is international in scope, an additional limitation with this study was its emphasis on vocational college campuses located in western United States. The final limitation addressed within this study was the internal reliability of the survey instrument. Although alpha coefficients were established at levels of acceptability (i.e., ≥ 0.7 according to Gliem & Gliem, 2003), survey item 14 had a Cronbach's alpha score of < 0.7 but it was not deleted from the survey because the question was related to the theoretical framework of the study.

Delimitations

Delimitations are always present when conducting any type of research and this study was no exception. Bryant (2004) argues delimitations are always present in research and limit the researcher from generalizing the findings to populations outside of the population originally studied. For this study, one of the major limitations was the site or location where the study took place. This study only focused on the faculty and student populations from seven vocational college campuses located in the western United States, which limits the generalizability or significance of the findings to that population. In addition, the researcher works at one of the

vocational college campuses (none of the campuses used in this study), which could possibly create a bias with the findings. Therefore, it was imperative for the researcher to remain objective in the interpretation of the data to reduce the risk of unintentionally finding favorable results that benefit Victory College.

There are many generations of iPad devices and PC tablets that were not the focus of the survey. The iPad minis used by faculty and students at Victory College during the writing of this dissertation were second generation devices. As technology continues to advance, iPads and tablet PC's will continue to evolve, which potentially limits the findings of the study. Bryant (2004) continues to note that delimitations are often subject to the historical context from which the study occurred. In this case, the technology of the iPad is restricted to the months and dates of this study.

Chapter IV

Results

Introduction

iPad devices are being utilized in all types of settings and as learning tools in higher education. Even though studying the importance and effectiveness of M-learning in higher education is relatively new, gaps exist in the literature regarding student and faculty perceptions of iPad effectiveness in vocational college classrooms (Dashti & Adashsti, 2015). An additional need exists to further study Prensky's theory of digital immigrants and natives to determine its validity (Alvi, 2011; Corrin et al., 2010; Margaryan & Littlejohn, 2008; and Peluso, 2012). This study sought to address the gaps as noted in the literature on M-learning in higher education.

Using Prensky's theory of digital immigrants and digital natives, the purpose of this study was to examine faculty and student perceptions of the effectiveness of iPads in vocational college classrooms. The purpose was achieved by surveying faculty and students. Open-ended questions were also utilized to gain additional insight into the quantitative data recorded. Therefore, a mixed-methods approach was used for conducting this study.

The two research questions addressed this study included:

1. How do faculty and students differ in their perceptions of the effectiveness of iPad use in vocational college classrooms?

2. How do faculty and students differ in their perceptions of the appropriate use of iPads related to student engagement in course activities in vocational college classrooms?

To address these questions, surveys were distributed to seven vocational college campuses located in the western region of the United States. Research questions were tested using the Mann-Whitney U to test for a significant difference between the perceptions of faculty

and students based on collected survey data. The null and alternate research hypotheses are indicated below:

1. H_o: There is no statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

2. H_1: There is a statistical difference between faculty and student perceptions of the effectiveness of iPad use in vocational college classrooms.

3. H_o: There is no statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities in vocational college classrooms.

4. H_1: There is a statistical difference between faculty and student perceptions of appropriate use of iPads related to student engagement in course activities in vocational college classrooms.

Each null and alternate hypothesis was tested to determine if a significant difference was observed at the $p = .05$ level of significance.

This chapter provides an overview of the results of this study. This chapter is organized around each of the two research questions that guided this study. This chapter follows this order: (1) analysis of demographic and descriptive data, (2) analysis of 15 scaled Likert questions, and (3) analysis of emergent themes based on the four open-ended questions at the end of the 24-item survey. The descriptive and demographic data were put into tables and figures to compare faculty and student responses. Data from this study was triangulated by integrating both quantitative and qualitative methods to better substantiate the findings (Marshall & Rossman, 2016).

Descriptive Statistics

   Faculty response rates. Faculty members from seven Victory College campuses were

surveyed during the month of September 2016. A total of six academic programs were selected

for the study based on the sampling technique employed by the researcher. The sampling

technique also required faculty to belong to a specific age-range to complete the survey. All

faculty were asked to complete the survey; however, a filter was used from the Qualtrics survey

platform called Skip-Logic, which automatically terminated those responses that did not meet the

criteria for the sampling technique. Over 130 surveys were distributed to faculty members from

seven Victory College campuses. Surveys were sent to faculty that teach in the following six

academic programs: (1) criminal justice, (2) medical assisting, (3) dental assisting, (4) dental

hygiene, (5) pharmacy technology, and (6) medical billing and coding. Results indicated dental

hygiene, dental assisting, and medical assisting faculty had the highest survey completion rates.

The overall percentages of faculty completing surveys by academic program/degree are provided

in Figure 5. After the elimination of 10 surveys, the overall faculty surveys used for this study

were 51. The response rates of all faculty members are recorded in Table 6.

Figure 5

Faculty Survey Completion by Program Taught
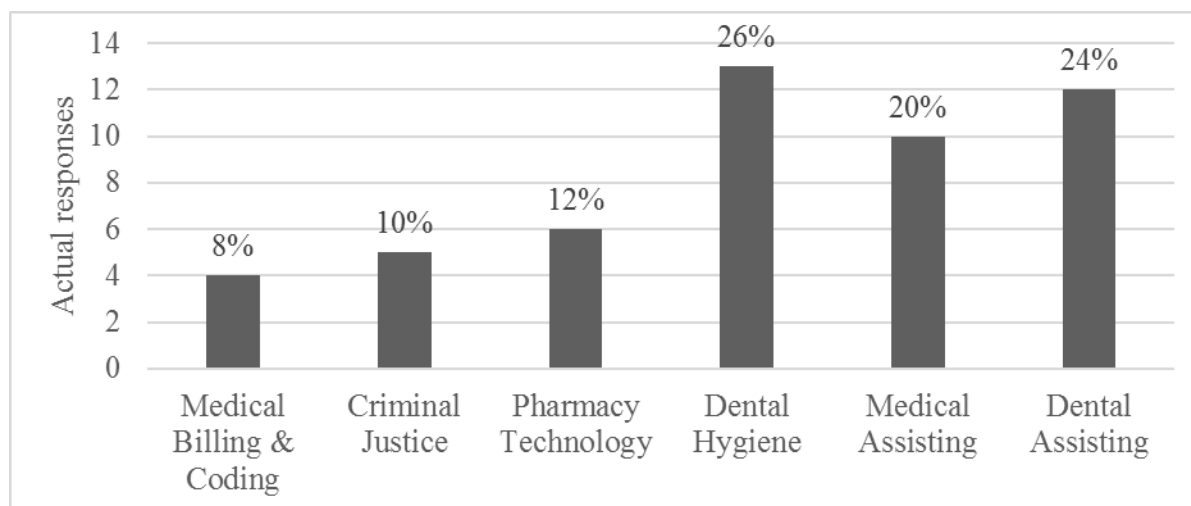
Table 6

Survey Response Rates by Faculty

Responses by Faculty	Total
Surveys Sent	130
Survey Responses	61
Surveys Excluded	10
Surveys Used	51
Response Rate	47%

Student response rates. Over 1,180 students were also surveyed from the seven Victory College campuses. Overall, 289 students completed the survey. Sixty-four of those responses were eliminated using Skip Logic because those students were born before 1990. After the elimination of 64 surveys, the overall student surveys used for this study were 225. The response rate was calculated and recorded in Table 7.

Table 7

Survey Response Rates by Students

Responses by Students	Total
Surveys Sent	1,180
Surveys Responses	289
Surveys Excluded	64
Surveys Used	225
Response Rate	24%

Demographic data for students completing the survey indicated disproportionate responses. A majority of students who completed the surveys were from the fields of pharmacy technology, medical assisting, and dental assisting. Lower numbers of responses were yielded from students in medical billing and coding, criminal justice, and especially dental hygiene. Figure 6 provides survey completion rates of students by degree or academic program.

Figure 6

Student Survey Completion by Program Enrollment
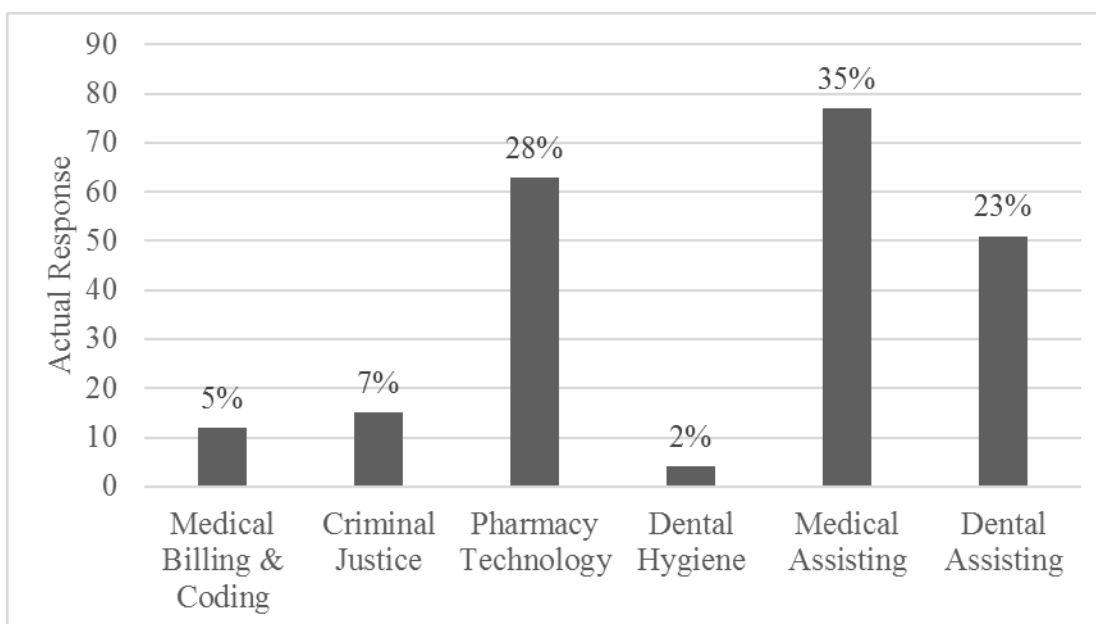
Demographic information from students indicated 15% males and 85% females completed the survey. Faculty data also indicated 22% of male and 78% of female respondents completed the survey. Figure 7 reveals the completion of students and faculty by gender across each of the seven Victory College campuses.

Survey item 4 asked faculty and students to rate their ability using technology. The majority of faculty and students ranked their ability with technology at an intermediate-level. Thirty-percent of students rated their ability as advanced, while 24% of faculty rated their ability as advanced. Responses for both faculty and students are compared in Figure 8.

Figure 7

Completion of Survey for Faculty and Student by Gender
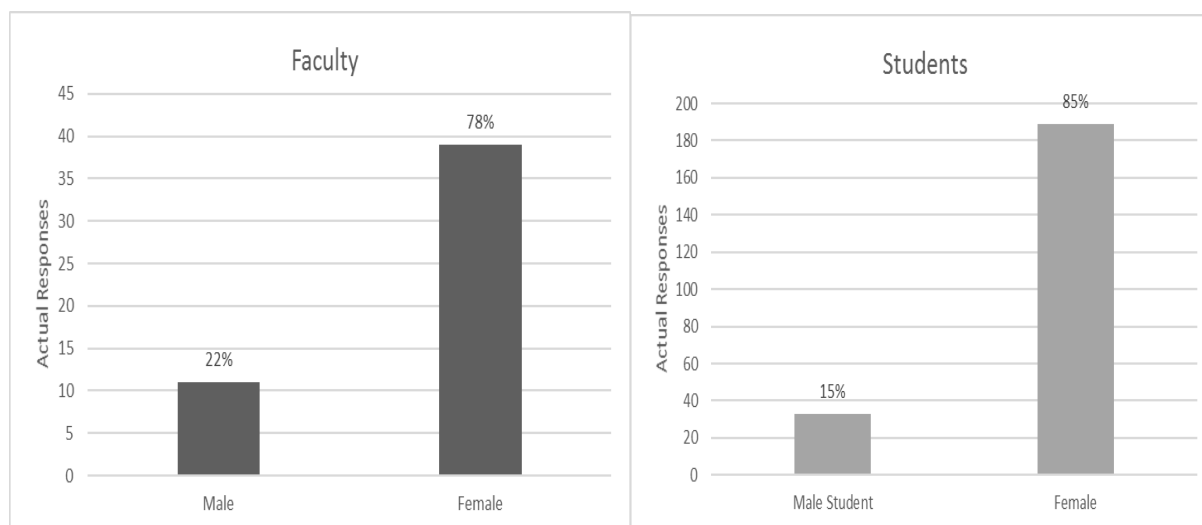
Figure 8

Perceived Technical Ability of Faculty Compared to Students
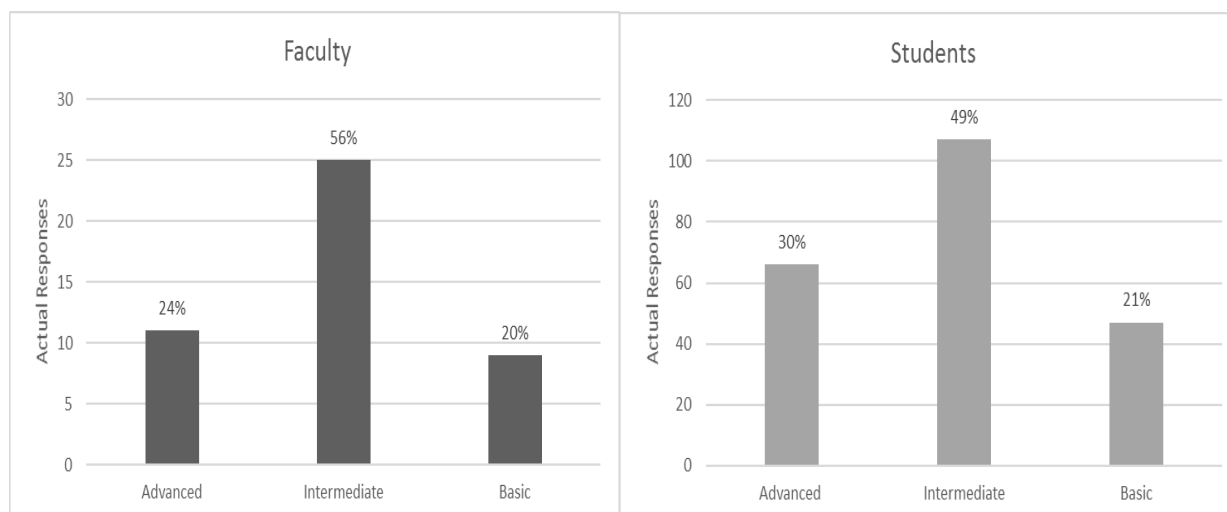
Survey item 5 asked faculty and students to identify themselves according to the definition of digital natives and digital immigrants by Marc Prensky. According to the results, 62% of faculty perceived themselves as digital immigrants, while 38% perceived themselves as digital natives. However, 21% of students perceived themselves as digital immigrants, while 79% perceived themselves as digital natives. Figure 9 reveals the differences.

Figure 9

Self-Perception of Faculty and Students

Question: In 2001, Marc Prensky, an educational consultant and author, coined the terms "Digital Native" and "Digital Immigrant" to contrast a generation who grew up using computer technology with those who did not. Do you consider yourself to be a digital immigrant or a digital native?
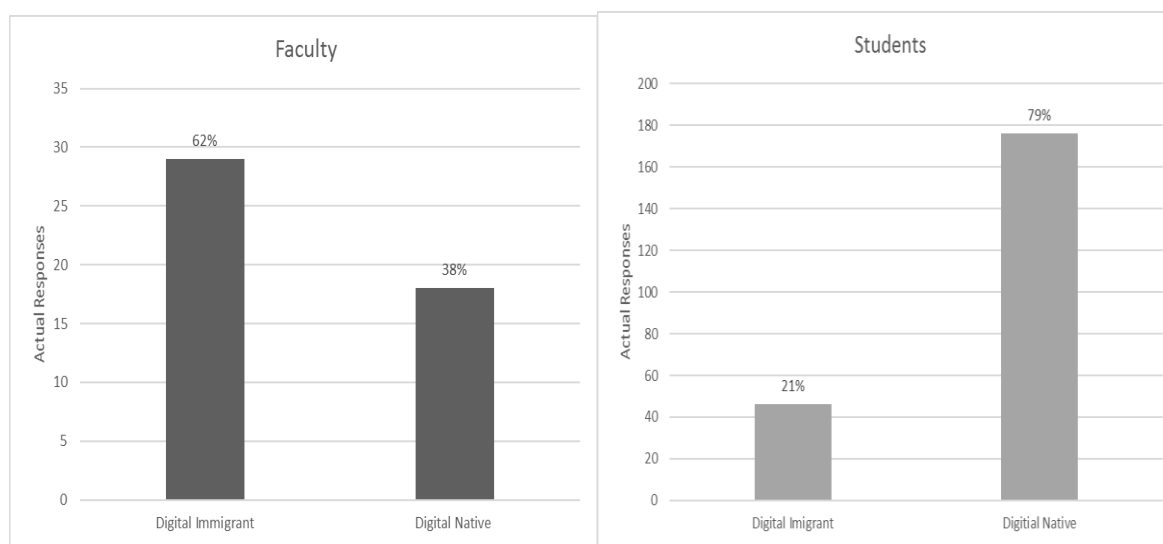
Students were asked a follow-up question based on Marc Prensky's definition to rate their instructor as either a digital immigrant or digital native. Although 38% of faculty labeled themselves as a digital native, 59% of students perceived their instructor to be digital native. A bar chart was created for Figure 10 showing a visual comparison.

Figure 10

Student Perception of Instructor

Question: Based on the previous information, would you consider your instructor to be a digital native or digital immigrant?
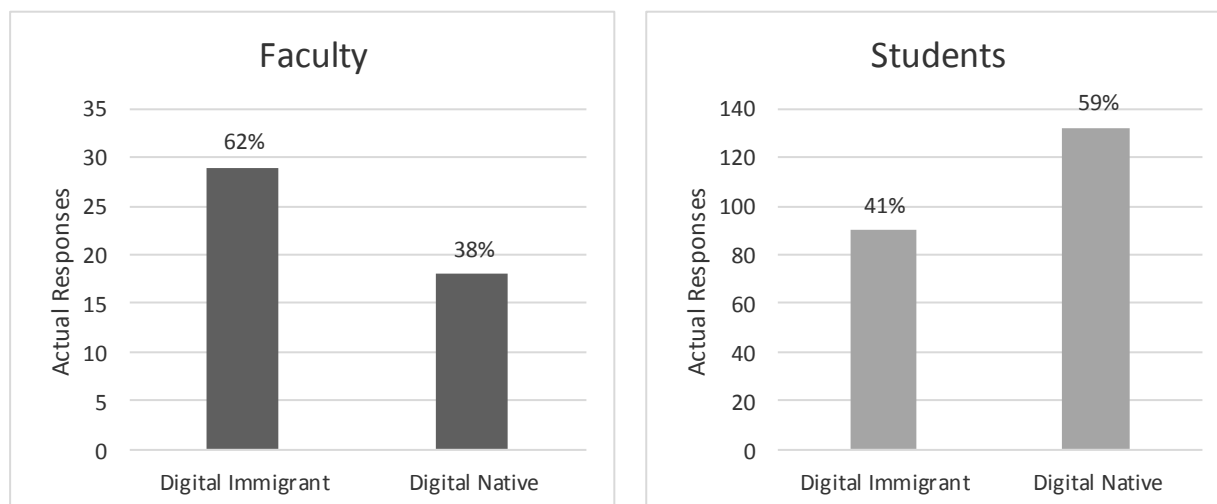
Questions 6-20 of the surveys were used to gauge perceptions about iPad use in the classroom. A majority of the survey was used to specifically measure the perceptions between faculty and students in terms of: (1) M-learning effectiveness, and (2) student engagement with M-learning devices. The survey used 15 questions with a five-point Likert scale:

1 = Strongly agree

2 = Agree

3 = Neutral

4 = Disagree

5 = Strongly disagree

Reliability and Validity of Survey Instrument

As described in chapter III, the surveys used in this study were modified from existing surveys and pilot-tested. Acceptable Cronbach's alpha coefficients were also established. Since

the surveys were modified, additional pilot-testing was conducted during the months of July and

August 2016. Each survey was initially piloted to improve the clarity of the survey questions.

Grammatical changes and errors on the survey were corrected based on initial responses. The

surveys were then piloted a second time with no needed changes to the wording. Data from the

pilot test were analyzed by SPSS v. 24 to determine appropriate Chronbach's alpha coefficient

numbers, which were found to be acceptable at .7 or above (Tanner, 2011).

In this section of chapter IV, tables and figures were organized according to each of the

major research questions for this study. For example, tables that highlight the means and

standard deviations of survey responses were created followed by tables and figures that

emphasized percentage responses for Likert-scale questions. Finally, a brief analysis was given

after each research question explaining the rationale for either accepting or rejecting the null

hypothesis for each question in the study. Each research question was based on a mix of survey

items 6 – 20 from faculty and student surveys. It is important to note, however, not all faculty

and student respondents answered each survey question. Therefore, there was some minor

variation to the number of responses on the survey questions.

The surveys used for this study utilized 15 Likert scale questions; however, four of those

questions did not form the basis of a research question. Instead, these questions provided

supplemental data to highlight other findings from this study. Table 8 examines descriptive data

for survey items 6, 8, 19, and 20 related to the ease of using an iPad when compared to faculty

and students. Based on the table, the mean range for this set of survey items was 1.94 to 3.33. A

3.0 represents a neutral position on a question. Faculty indicated a neutral stance when asked if

students seemed to prefer using their iPads to complete coursework with a mean of 3.33. Overall,

this table indicates that both students and faculty had a mixed set of responses from strongly agree to neutral for each question.

Table 8

Descriptive Statistics for Survey Items, 6, 8, 19, and 20

Survey Items		N	Mean	Standard Deviation
6. Using an iPad as an instructional tool was easy because I was already familiar with its functions.	Faculty	49	2.82	1.26
6. Learning on my iPad was easy because I was already familiar with its functions.	Students	222	1.94	1.12
8. When given a choice, students seemed to prefer using their iPad to complete their coursework.	Faculty	49	3.33	1.27
8. When given a choice, I preferred to use my iPad to complete my coursework.	Students	220	2.33	1.33
19. Students' competency in using ipads seemed to impact their ability to learn course content.	Faculty	49	2.92	1.23
My competency in using iPads impacted my ability to learn course content.	Students	221	2.44	1.19
20. Students seemed very comfortable using their iPad to impact their ability to learn course content.	Faculty	49	2.45	1.13
20. I was very comfortable using an iPad to help me complete coursework.	Students	220	1.94	1.07

Tables 9 reflects Likert-score responses from faculty and students pertaining to survey items 6, 8, 19, and 20. When comparing the tables for survey item 6, 40% of faculty strongly agreed or agreed that using the iPad as an instructional tool was easy compared to 72% of students. For survey item 8, 60% of students either strongly agreed or agreed they preferred using their iPads to complete coursework compared to 26% of faculty who believed students seemed to prefer using them for coursework. For survey item 19, 49% of student compared to 36% of faculty, either agreed or strongly agreed that competency impacted their ability to learn

course content. Finally, survey item 20 revealed that 59% of faculty, compared to 74% of

students, strongly agreed or agreed they were comfortable using the iPad in class.

Table 9

Likert Responses by Faculty and Students for Survey Items 6, 8, 19, and 20

	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Faculty	6	18% (9)	22% (11)	31% (15)	16% (8)	12% (6)	49
	8	10% (5)	16% (8)	27% (13)	24% (12)	22% (11)	49
	19	16% (8)	20% (1)	29% (14)	24% (12)	10% (5)	49
	20	20% (10)	39% (19)	22% (11)	12% (6)	6% (3)	49
	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Students	6	47% (105)	25% (56)	19% (42)	4% (8)	5% (11)	222
	8	36% (80)	24% (53)	21% (46)	8% (17)	11% (24)	222
	19	29% (64)	20% (45)	36% (80)	7% (15)	8% (17)	221
	20	44% (97)	30% (66)	18% (41)	3% (6)	5% (10)	220

Research question one. For research question one, survey items 7, 12, 14, 17, and 18

were used to measure the construct "effectiveness" between faculty and students. The Mann

Whitney *U* test was used to determine any differences in the perception of iPad effectiveness in

the classroom between faculty and students. The null hypothesis for each survey item pertaining

to research question one was rejected. According to the findings displayed in Table 10, there was

a statistical difference between faculty and student perceptions of iPad effectiveness in

vocational colleges at $p < .05$ for each survey question. Therefore, there was not sufficient

evidence to warrant rejection of the claim that there is no statistical difference between faculty

and student perceptions on the effectiveness of iPad use in vocational college classrooms.

Table 10

Mann-Whitney U Test Results for Research Question 1

Survey Items		Mann-Whitney U	Z Score	p-value
7. I effectively monitored appropriate use of the iPads during class time.	Faculty			
7. My instructor effectively monitored appropriate use of the iPads during class time.	Students	4191.5	-2.671	.008
12. Students seemed to spend more time on coursework outside of class when they could access course materials at anytime, anywhere on their iPad.	Faculty			
12. I spent more time on course work outside of class when I had access to course materials at anytime, anywhere on my iPad.	Students	3089.0	-4.876	.000
14. Students seemed to get more out of the class when they could use their iPad to help them learn course content.	Faculty			
14. I felt like I got more out of the class when I used my iPad to help me learn course content.	Students	3372.5	-4.145	.000
17. I modeled effective use of the iPad during instruction.	Faculty			
17. My instructor modeled effective use of the iPad during instruction.	Students	3863.5	-2.901	.004
18. I effectively integrated iPads into the course curriculum.	Faculty			
18. My instructor seemed to effectively integrate iPads into the course curriculum.	Students	4214.0	-2.346	.019

For each of the five survey items tested, compared to faculty, students believed iPads were more effectively utilized in the classroom when made available compared to faculty. The largest statistical difference is reflected in questions 12 and 14. Students, when compared to faculty, believed they spend more time on their coursework outside of class, $U = 3089.5$, Z -4.876,

p =.000, which is *p* < .05. For question 14, compared to faculty, students were also more likely

to agree they get more out of their class when using an iPad, *U* = 3372.5, *Z* = - 4.145, *p* = .000.

Responses for survey questions 7, 12, 14, 17, and 18 were also analyzed using descriptive

statistics. For question 12, the average response for students was *M* = 2.18, while the average

faculty response for the corresponding question was *M* = 3.00 with a combined standard

deviation of 1.09. Student responses for question 14 revealed the same average score *M* = 2.18

and faculty average score of *M* = 2.98, which was slightly above a score of neutral. Table 11

indicates descriptive data for survey questions pertaining to research question one.

Table 11

Descriptive Statistics for Research Question 1

Survey Items		N	Mean	Standard Deviation
7	Faculty	49	2.33	1.10
	Students	223	1.91	1.09
12	Faculty	49	3.00	0.93
	Students	222	2.18	1.13
14	Faculty	49	2.98	1.20
	Students	218	2.18	1.09
17	Faculty	48	2.48	1.10
	Students	217	1.99	1.04
18	Faculty	48	1.10	1.01
	Students	222	2.22	1.01

Likert-score responses for faculty and students were compared in Table 12. For survey

question 18, one faculty respondent did not answer the question. The total number of students

who participated in the survey was 223; however, only the total number of respondents answered

question 7. Not all student respondents answered questions 12, 14, 17, and 18 as indicated in

Table 12. For question 12, the data reveals a 38% difference between faculty and students when

strongly agree and agree responses were combined. Seventy-four percent of students indicated they spend more time on coursework outside of class when they could use their iPad compared to 26% of faculty. For question 14, 64% of students surveyed either agreed or strongly agreed that they got more out of class when using an iPad compared to just 41% of faculty who felt students get more out of class when using an iPad.

Table 12

Likert Responses by Faculty and Students for Research Question 1

	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Faculty	7	24% (12)	37% (18)	27% (13)	6% (3)	6% (3)	49
	12	6% (3)	20% (10)	45% (22)	24% (12)	4% (2)	49
	14	10% (5)	31% (15)	22% (11)	24% (12)	12% (6)	49
	17	21% (10)	31% (15)	33% (16)	8% (4)	6% (3)	49
	18	21% (10)	35% (17)	33% (16)	6% (3)	4% (2)	48
	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Students	7	49% (109)	22% (49)	23% (51)	2% (4)	4% (10)	223
	12	35% (77)	29% (64)	25% (55)	7% (15)	5% (11)	222
	14	33% (72)	31% (67)	26% (57)	5% (12)	4% (10)	218
	17	42% (91)	27% (58)	25% (55)	3% (6)	3% (7)	217
	18	41% (91)	26% (58)	27% (60)	4% (8)	2% (5)	222

Research question two. Survey questions 9, 10, 11, 13, 15, and 16 were used to measure the construct "student engagement" between faculty and students for research question two. A Mann-Whitney *U* test was used to determine any statistical differences in terms of appropriate use of iPads related to student engagement in the classroom between faculty and students. Table 13 reveals no statistical difference for survey items 9, 15, and 16 between faculty and students'

perception of appropriate use of iPads and student engagement. However, there was a statistical difference between faculty and students on survey items 10, 11, and 13. Therefore, evidence shows there was a statistical difference between faculty and students' perceptions of appropriate use of iPads related to student engagement in vocational colleges at $p < .05$. For questions 9, 15, and 16, there was no statistical difference and the null hypothesis must be rejected.

Table 13

Mann-Whitney Results for Research Question 2

Survey Items		Mann-Whitney U	Z Score	*p*-value
*9. I encouraged students to use their iPad to engage in course-related activities during class.	Faculty	4544.0	-1.878	.060
*9. I was encouraged to use my iPad to engage in course-related activities during class.	Students			
10. Students having an iPad in class was a distraction that competed for their full attention during class.	Faculty	1928.5	-7.366	.000
10. Having an iPad in class was a distraction that competed for my full attention during class.	Students			
11. Students were more actively engaged in class activities when using their iPad was an option.	Faculty	4084.5	-2.705	.007
11. I was more actively engaged in class activities when using my iPad was an option.	Students			
13. Students were more likely to engage in class discussions during class when they could use their iPads.	Faculty	3178.5	-4.676	.000
13. I was more likely to engage in class discussions during class when I could use my iPad.	Students			
*15. I established clear policies for appropriate and inappropriate use of iPads in the classroom.	Faculty	5169.0	-.434	.664
*15. My instructor established clear policies for appropriate and inappropriate use of iPads in the classroom.	Students			
*16. I encouraged students to use their iPads to engage in course-related activities outside of class.	Faculty	5229.0	-. 138	.890
*16. I was encouraged to use my iPad to engage in course-related activities outside of class.	Students			

An asterisk indicates a lack of statistical significance at p < .05.

Responses from question 10 revealed the greatest statistical differences between faculty

and students, $U = 1928.5$, $Z = -7.366$, $p = .000$. Based on the results, we can infer most faculty

members believed using an iPad during class was a distraction that kept students from doing classwork, compared to students who were less likely to believe using an iPad during class was a distraction. Question 13 also indicated a substantial statistical significance between faculty and student's perceptions of classroom engagement with iPads, $U = 3178.5$, $Z = - 4.676$, $p = .000$. In other words, when compared to faculty, students believed they were more engaged in classroom discussions when they could use their iPad.

Table 14 provides descriptive information from each survey response for research question two. A closer examination of question 10 suggested most faculty members agree using an iPad during class was a distraction to learning ($M = 2.53$), while average responses for students were $M = 4.10$. Survey question 13 revealed students had an average score of $M = 2.39$ and $SD = 1.16$ when asked about being more engaged in class with their iPad compared to the average score of faculty $M = 3.24$ with a $SD = 1.06$.

Table 14

Descriptive Statistics for Research Question 2

Survey Items		N	Mean	Standard Deviation
9	Faculty	49	2.04	0.81
	Students	221	1.88	1.08
10	Faculty	49	2.53	1.20
	Students	220	4.10	1.10
11	Faculty	49	2.86	1.07
	Students	219	2.39	1.16
13	Faculty	49	3.24	1.06
	Students	221	2.39	1.16
15	Faculty	49	1.84	0.89
	Students	219	1.81	1.00
16	Faculty	49	1.98	0.98
	Students	216	1.95	1.04

Table 15 reveals responses of survey questions 9, 10, 11, 13, 15, and 16 between faculty and students using a Likert-scale. For question 10, 55% of faculty either strongly agreed or agreed to the question about iPads being distracting compared to 79% of students strongly disagreeing or disagreeing to the question. Additionally, question 13 revealed 53% of students either strongly agreed or agreed they engage more in classroom discussions while using an iPad compared to just 24% of faculty when asked with a similar question.

Table 15

Likert Responses by Faculty and Students for Research Question 2

	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Faculty	9	27% (13)	47% (23)	22% (11)	4% (2)	0% (0)	49
	10	22% (11)	33% (16)	20% (10)	18% (9)	6% (3)	49
	11	12% (6)	22% (11)	39% (19)	20% (10)	6% (3)	49
	13	6% (3)	18% (9)	31% (15)	35% (17)	10% (5)	49
	15	47% (23)	24% (12)	27% (13)	2% (1)	0% (0)	49
	16	35% (17)	43% (21)	16% (8)	2% (1)	4% (2)	49
	Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N
Students	9	49% (108)	27% (59)	17% (38)	3% (7)	4% (10)	222
	10	5% (11)	5% (12)	10% (23)	33% (73)	46% (102)	221
	11	28% (62)	26% (57)	31% (68)	9% (19)	6% (14)	220
	13	28% (63)	25% (55)	33% (74)	7% (15)	7% (15)	222
	15	51% (112)	24% (53)	20% (45)	2% (4)	3% (6)	220
	16	39% (85)	35% (75)	21% (46)	2% (5)	3% (6)	217

Emerging Themes from Open-Ended Questions

The third part of the survey was qualitative in nature and asked respondents to answer four open-ended questions including: (1) What did you find to be the benefits of using iPads in your course(s)?, (2) What did you find to be the drawbacks from using iPads in your courses?, (3) Please share your experience(s) using the iPad as a learning tool in the classroom, and (4) Please share any suggestions for improvements. Matched/paired questions were asked on both the faculty and students surveys. Collected responses from open-ended questions were coded using an open coding method. Major themes from these open-ended questions were described using frequency tables to show the frequency of responses for each major theme.

Faculty responses were first recorded followed by student responses. Frequency tables were created for each open-ended question showing the theme, frequency, and examples from respondent answers on the survey.

Table 16 provides themes based on faculty responses from open-ended question one. The first major theme based on the frequency of responses was the idea that iPads were beneficial in the classroom because they created opportunities for student engagement. Next, faculty believed iPads were efficient as a mobile device, followed by the additional benefit that iPads were lightweight and portable. The frequency of responses from faculty were listed from highest to lowest.

Table 16

Faculty Responses for Open-Ended Question 1

What did you find to be the benefits of using iPads in your course(s)?		
Theme	**Frequency**	**Example(s)**
Engagement	14	• "Using Nearpod was a great tool and was fun for students to use." • "Learning games can be played on the iPad." • "Students enjoyed using Schoology as a learning tool and they thought it was fun." • "They can participate in different games and learning tools on the iPad." • "Kahoot games for learning."
Efficient	13	• "Students are able to look up relevant material to help them in their coursework." • "They have instant access to the Internet for research." • "Students were able to access additional material during the laboratory part of class to aid in their understanding." • "One can save a lot of time and paper not having to copy notes and power point lectures."
Lightweight	7	• "Students did not have to carry heavy books around." • "It is great to have all of the textbooks in class every day of the week." • "Students didn't have to carry heavy books and they always have all of their books." • "The students are able to access their books and course activities using their iPads."

In Table 17, data from open-ended questions asking students about their perceived

benefits of using iPads were recorded. Two common themes among students was the belief that

iPads were "efficient," followed by iPads being "lightweight." Table 17 breaks down the

findings from 165 student responses. Examples from respondents are provided along with each

theme.

Table 17

Student Responses for Open-Ended Question 1

What did you find to be the benefits of using iPads in your course(s)?		
Theme	**Frequency**	**Example(s)**
Efficiency	71	• "Can find the answers to homework questions and classwork faster." • "When I don't have access to a computer to do a paper, my iPad comes in handy." • "What I liked about having my iPad at home was I didn't have a computer to type up essays and things like that so I would download apps like Google Drive and when I typed it I was able to save it in there and print it at school and was able to access it at any time."
Lightweight	48	• "Didn't have to carry around a heavy bulky inconvenient textbook." • "It's easy to carry around and better than having to carry a lot of books." • "It's lightweight and easy to access instead of bringing the heavy laptop to school." • "Not having to carry all those heavy books." • "Lighter load when carrying backpack."

Theme	Frequency	Example(s)
All-in-one Device	19	• "Everything is in one device like books, assignments, grades, communication with teacher, notes, typing essays, etc…" • "All our books were in one device." • "Access to all material in one place." • "I can Google what I don't know and everything is in one place on the iPad."
Eco-Friendly	2	• "Eco-friendly." • "Not having to print out a lot of papers."
Apps	2	• "I only use it for one thing, Near pod." • "I enjoy using the apps like Schoology and e-College."

Figure 11 indicates a comparison of the most frequently coded responses between faculty and students on the benefits of using an iPad in the classroom. Forty-one percent of faculty believed the greatest benefit for using an iPad was the opportunity for better student engagement. However, 43% of students, compared to faculty, ranked efficiency as the main benefit of using an iPad in the classroom.

Figure 11

Faculty and Student Comparison of iPad Benefits
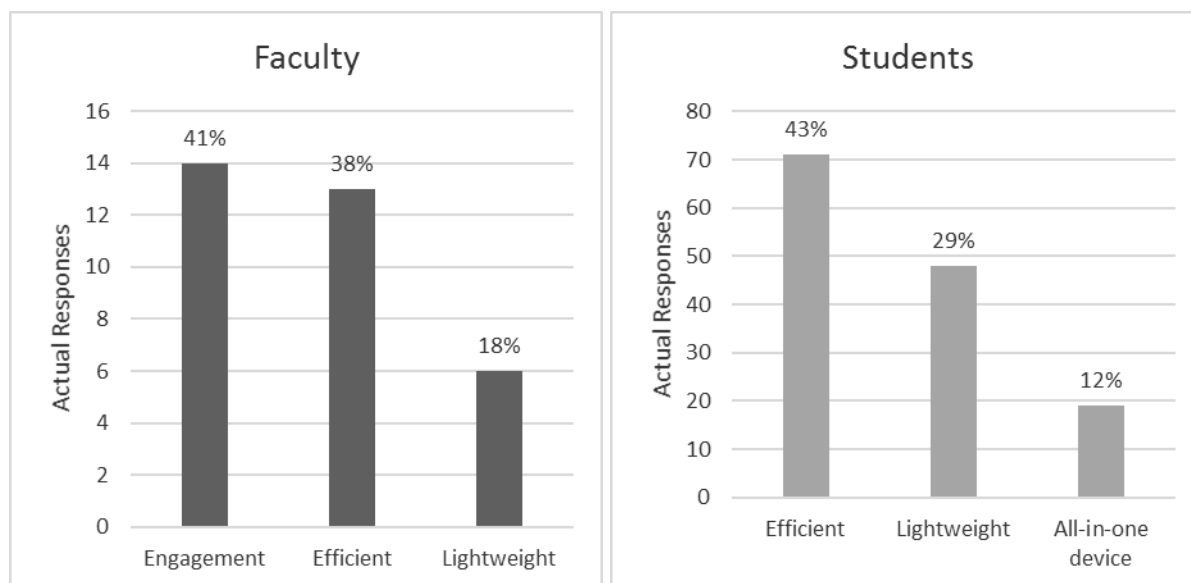
Table 18 reports findings from 31 faculty responses for open-ended question two on the drawbacks of using iPads in the classroom. Faculty members mainly believed using iPads represented a potential "distraction" for students, which was the first major theme recorded. Faculty members also believed iPads were incompatible with their curriculum and assignments with examples of common student complaints in their responses. Another recorded theme was the small size of the iPad screen and keyboard, followed by not having real textbooks. The frequency of faculty responses were listed from highest to lowest.

Table 18

Faculty Responses for Open-Ended Question 2

What did you find to be the drawbacks of using iPads in your course(s)?

Theme	Frequency	Example(s)
Distraction	13	• "Students are looking to Google or using the search engines to find answers instead of reading the material." • "Too much personal use." • "Students using their iPads for personal use." • "Distraction from lecture." • "If students have it in an upright position and I am in front of the class, I am not able to see if they have something else, not related on the screen." • "Students would often check email, grades and other things during class."
Not having real textbooks	6	• "I have students who are not digital natives, they prefer a real textbook with full size images." • "Most students who have mentioned the iPad to me, have stated they dislike them and wish they had real books."
Small size	5	• "Hard to read books on the screen." • "The size of the mini iPad makes it hard to read the book pages." • "The students are not able to type papers using their iPads." • "Depending on the font size and whether or not the device is held vertically or horizontally, images appear with paragraphs unrelated – causing student confusion."

Table 19 recorded themes related to some of the drawbacks of using iPads from the

perspective of students. Out of 82 respondents, a majority of students believed "connectivity

problems" represented the biggest drawback to using iPads, followed by the belief iPads are

"distracting." The third theme to emerge was the perceived "incompatibility" of iPads. Themes

were organized from highest to lowest based on the number of student responses.

Table 19

Student Responses for Open-Ended Question 2

What did you find to be the drawbacks of using iPads in your course(s)?		
Theme	**Frequency**	**Example(s)**
Connectivity problems	33	• "The wi-fi doesn't work everywhere which is not good when you're trying to load something." • "The wi-fi was not always working on campus." • "Sometimes it lags on Internet." • "Poor connection on the wi-fi in the building." • "When the wi-fi is down you can't do anything."
Distraction	17	• "It was more for personal use than classroom use." • "Sometimes it's a distraction to me." • "I am able to get on social media during class." • "It is a big distraction and some people don't use it wisely." • "It was connected to my iPhone so I was able to text during class and it was distracting but I did it anyways."
Incompatibility	13	• "Not user-friendly with the online class discussions and submitting papers." • "Can't turn in assignments or homework." • "It is hard for me to submit homework and assignments when logging on or off any app." • "School programs didn't sync with the iPad."

Theme	Frequency	Example(s)
Small Size	11	• "It was an eye strain looking at the small screen all day." • "Sometimes my eyes hurt from staring at the small screen all day." • "My eyes would get tired." • "I am a visual learner so it's difficult to read out of the iPad."
Keyboard	5	• "Keyboard is too small to type on." • "No keyboard made it very difficult for me to complete any coursework on the actual iPad."
Inconvenient	3	• "It requires a lot of charging and sometimes dies." • "I always have to remember to charge it and sometimes I forget."

In figure 12, the top three responses were compared between faculty and students regarding the drawbacks of using iPads in the classroom. Interestingly, 42% of faculty believed iPads were a "distraction" and was recorded as the greatest drawback compared to 40% of students who believed "connectivity problems" was the greatest drawback with iPads. Faculty did not believe connectivity problems to be a drawback. However, both faculty and students believed the small size of the iPad screen was a drawback.

Figure 12

Faculty and Student Comparison of iPad Drawbacks
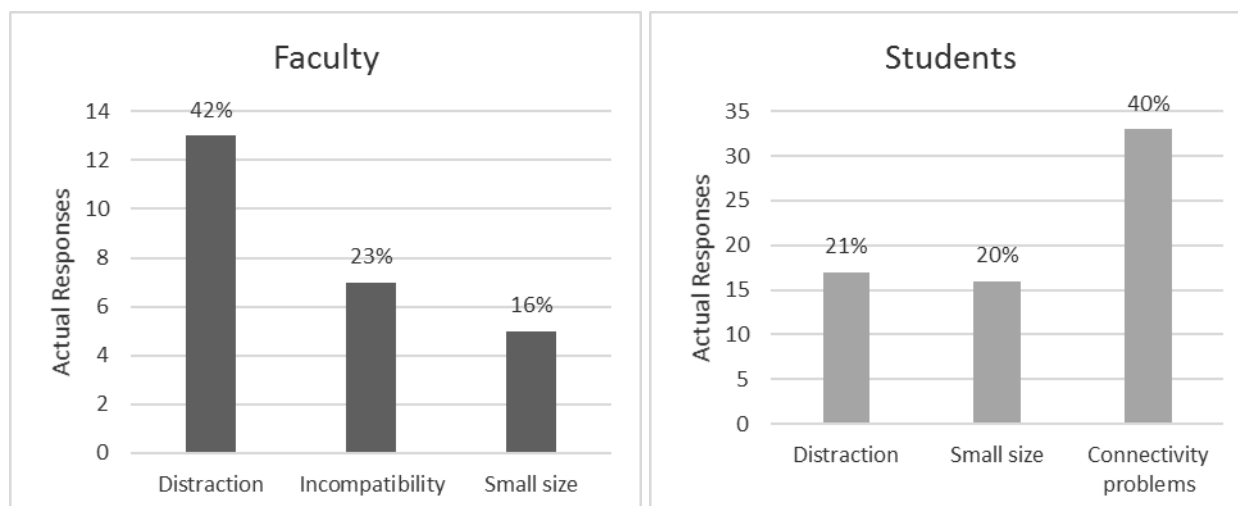
Table 20 reports themes derived from asking faculty about their experiences using iPads in the classroom. For this question, 26 faculty responded to the question. According to the responses, faculty believed their experiences with iPads were positive, citing the accessibility of the device. Respondents also believed, however, their experiences with iPads in the classrooms were very "challenging." Therefore, data seem to indicate an equal number of both positive and negative experiences according to faculty responses.

Table 20

Faculty Responses for Open-Ended Question 3

Please describe your experience(s) using the iPad as a learning tool in the classroom.		
Theme	Frequency	Example(s)
Accessible	13	• "We use them for reviews and games; the students do like that and it is easy for both instructors and students to access." • "I am coming up with new activities every day." • "During dental morphology, it's nice for students to be able to pull up their workbooks!" • "Very accessible to use in class to look up information on the go."
Challenging	13	• "It can be challenging to make sure that students are participating with their iPads." • "I do not use iPads for coursework in classroom." • "It has been challenging." • "It's hard keeping them engaged." • "Overall, I found the negatives to be greater than the positives. Maybe, as applications for education improve, the experience will improve."

When students were also asked to describe their experiences using the iPad, the main theme to emerge was the belief iPads were "accessible." Accessibility was also the main theme to emerge from faculty respondents who answered the same question. Students also indicated other positive experiences with iPads including the belief iPads create very "engaging" learning environments, which represented the second theme to emerge in Table 21. The frequency of student responses was organized from highest to lowest.

Table 21

Student Responses for Open-Ended Question 3

Please describe your experience(s) using the iPad as a learning tool in the classroom.		
Theme	**Frequency**	**Example(s)**
Accessible	26	• "I love being able to access class anywhere!" • "The way I would describe my experience with using the iPad as a learning tool in the classroom is that it is a great experience because I can search up information that I need anytime on Google." • "I find it amazing because I can now look up a certain definition of a word you didn't understand!"
Engaging	16	• "It was a great experience using the iPad as a learning tool in the classroom." • "Easier to use and more hands-on." • "It gets the class more engaged!"
Good for Research	11	• "It helps to find all the subjects and keywords to help us find the right answers." • "I can always search stuff up or Google it while in class if I don't understand something." • "It comes in handy when we are away from our computer and we need a quick word looked up that we are not familiar with."
Fun	7	• "Absolutely LOVE using the iPad for in class Kahoot tests and study reviews. It makes learning fun!" • "Fast and fun to use." • "Fun and easy to use." • "Love it. It is very easy to operate."

Theme	Frequency	Example(s)
Difficult	5	• "I'm still struggling a bit but getting the hang of it." • "I liked using it, sometimes I had to figure out how to use certain stuff." • "I have mixed emotions on the iPad use during school. I like it then again it's hard for me to adjust since I have grown up with books all my life and switching to iPad is nice but is a switch."

When asked to describe their experiences using iPads in class, 50% of faculty who responded believed iPads were convenient and accessible. Forty-percent of students who responded also regarded their experience using the iPad as very "accessible." Figure 13 also reveals an equal percentage of faculty 50% described their experiences using iPads as "challenging," while no students indicated iPads were challenging to use.

Figure 13

Faculty and Student Comparison of their Experience using iPads
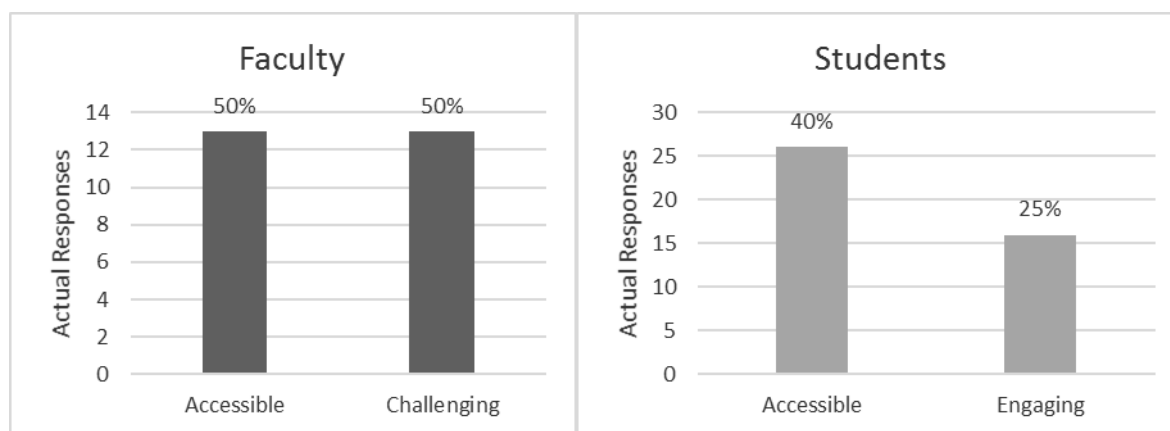
The final open-ended question asked faculty to offer any suggestions for improvement regarding the use of iPads in the classroom. For this question, only two themes emerged because of the low number of responses. Of those who responded, faculty believed "more training" was

needed if iPads were to be utilized as a learning tool. The second theme to emerge was a belief

that "technology was over-emphasized," which could be detrimental for learning as described in

Table 22. Although the number of respondents answering this question was low, they were still

organized from highest to lowest.

Table 22

Faculty Responses for Open-Ended Question 4

Please share any suggestions for improvement		
Theme	**Frequency**	**Example(s)**
Training for instructional purposes needed	3	• "Having a training course for using iPads." • "I was never given any training on it. It would have been helpful to know little things like how to use Bookshelf." • "I like the concept of the iPads, but it should have been tested out and researched."
Too much emphasis on technology	2	• "I feel we are in real trouble, most students are great at Google, but need to read more." • "This slavish devotion to ONLY IPAD is not helpful."

For the final question, students were asked to share any suggestions for improvement

with iPads in the classroom. The first theme to emerge as a suggestion for improvement was the

need for "better wi-fi." This theme was followed by "students should be given a choice" whether

they decide to use an M-learning device for class or not. Students also indicated iPads were a

great "supplemental tool," which represented the third largest theme to emerge from this

question. The responses provided additional insight and feedback based on the perception of

students found in Table 23. Responses were organized from (highest to lowest).

Table 23

Student Responses for Open-Ended Question 4

Please share any suggestions for improvement		
Theme	**Frequency**	**Example(s)**
Better wi-fi needed	11	• "Need improvement with wi-fi connection." • "The school should invest in a better wi-fi system. When our whole class has to take a quiz or look at a power point lecture, it tends to stall. Resulting in loss of class time." • "We need faster connection!" • "Need more gbs and better wi-fi." • "Can't learn when the wi-fi goes down."
Should be given a choice	9	• "Before people enroll in the school, they should be given an option to either use books or an iPad for their school work." • "Students didn't even get a notice or heads up." • "If I wanted to use technology to complete a class, I would have signed up for an online school. I do not feel the iPad is any more beneficial than a hardback textbook would be." • "Stick to books or laptops. We should be able to choose if want to use iPads in the classroom."
Supplemental learning tool	5	• "iPads are a great aid in the classroom, if you use them appropriately." • "Adds to the learning environment."

Theme	Frequency	Example(s)
Not useful	3	• "iPads are not useful." • "Difficult to use especially because I grew up without computers in my house because I couldn't afford them."
Trendy and cool	1	• "iPads are trendy and technology is always evolving."

Figure 14 compares the top two findings from faculty and students regarding any suggestions for improvement. When asked about any suggestions for improvement for using iPads, 60% of faculty who responded indicated that additional training should be provided. In comparison, 38% of students who responded believed having better wi-fi was the main suggestion for improvement followed by the idea that students should be given a choice if they want to use iPads or not. It is also important to note that faculty responses for this question were low, while student responses were also low.

Figure 14

Faculty and Student Comparison on Suggestions for Improvement
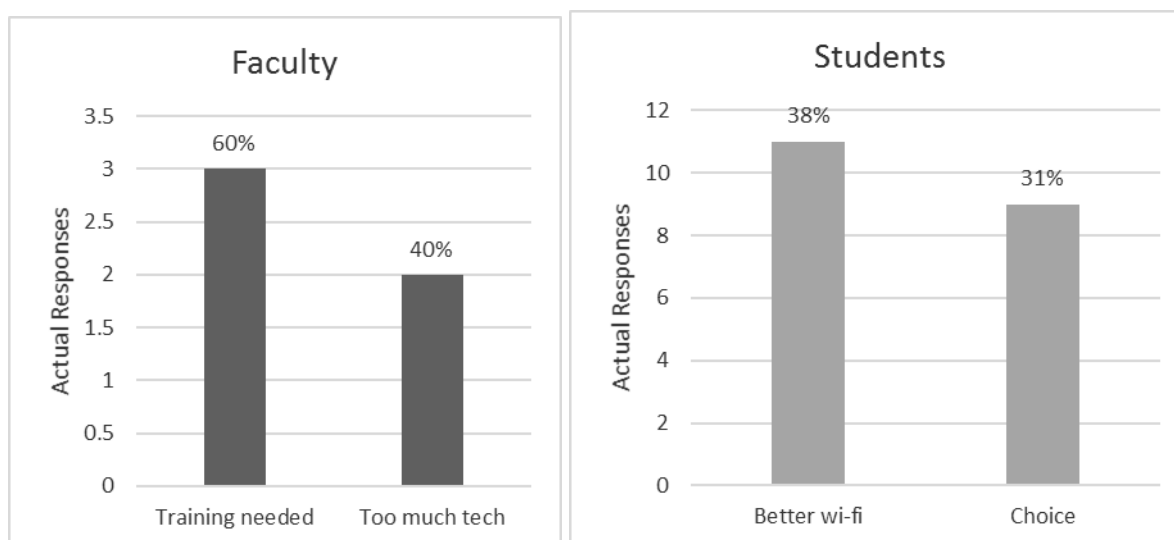
Conclusion

Chapter IV provided an analysis for data collected based on faculty and student surveys. This study used a mixed-methods approach to compare faculty and student perceptions of iPad effectiveness in vocational college classrooms. Quantitative data were first summarized using descriptive and inferential statistics using a non-parametric test, the Mann-Whitney U, to compare results from two independent groups. Qualitative data was then summarized using an open coding method, which was based on determining the frequency of responses from open-ended survey questions. Percentages were then calculated comparing the results of open-ended questions between faculty and students.

Chapter V provides additional analysis of findings compared to the current literature on M-learning in higher education. Gaps in the literature are also addressed in chapter V as well as an explanation of how this research fills those gaps. Finally, an additional analysis is conducted to determine any consistencies or inconsistencies of the findings compared to Prensky's assumptions.

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Chapter V

Discussion

Introduction

The intent of this chapter is to provide a discussion of the results from this study. This chapter is organized similarly to chapter IV, but links the findings with the current literature. This chapter addresses the problem related to the study, purpose, review of the methodology, summary of Likert score data, Mann Whitney *U* test findings, themes from open-ended questions, impact of limitations, summary of major findings, conclusion, significance of the findings, recommendations for future research, and the implications for professional practice.

Statement of the Problem

Recently, educators have begun using M-learning devices in college classrooms in an effort to keep up with technological trends and the changing demographics of students (Rossing, 2012). As a result, educators are more frequently being tasked with using tablet technologies and need to understand how to use such devices effectively. Designing curriculum and developing pedagogical strategies to meet the demands of many students who have grown up with iPad and tablet technology should be one of the goal of today's educators (Ally, Blazquez-Prieto, 2015; Dashti & Aldashti, 2015; Geist, 2011; Rajasingham, 2011).

Several studies have focused on the use of M-learning devices in education with a majority of the findings suggesting high student satisfaction as a learning tool because of its ease of use and efficiency (e.g., Boyinbode et al., 2011; Deimer et al., 2012; Geist, 2011; Hargis, et al., 2014,; Haugn & Bussell, 2012; Jackson, 2013; Mang & Wardley, 2012; Rossing et. al., 2012; and Williams et al., 2014). However, gaps exist in the literature regarding faculty perceptions of tablet effectiveness in vocational college classrooms (Dashti & Aldashti, 2015).

Purpose of the Study

Using Prensky's theory of digital immigrants and digital natives, the purpose of this study was to examine faculty and student perceptions of the effectiveness of iPads in vocational college classrooms. The researcher utilized Prensky's theory to provide an explanation for any differences perceived between students and faculty. Data were used to provide best practice solutions for college administrators and faculty on how to proceed with iPad integration at Victory College (pseudonym).

Methodology Review

A mixed-methods approach was used for this study to add greater depth to the findings through a process of triangulation. For this study, two surveys were distributed at seven vocational college campuses located in the western United States. One survey was sent to faculty and the other survey was sent to students. Each survey contained 24 items including four open-ended questions. A purposive sampling technique was used to determine who was eligible to participate in the study. In other words, all participants had to meet a set of criteria prior to participating in the survey (Babbie, 1990; Vogt, 2007). Faculty and students were selected based on their use of iPads in the classroom from six different programs that required the use iPads in courses.

The surveys were distributed to 130 faculty; 51 completed the survey for a 47% response rate. For students, 1,180 surveys were distributed and 225 were completed, resulting in a response rate of 24%. The surveys were matched/paired, which means the survey asked similar questions for faculty and students. The first five questions on the surveys asked for demographic information and the next 15 items used a Likert-scale to measure perceptions of faculty and students. Four identical open-ended questions were included at the end of each survey. A mixed-

methods design was chosen by the researcher to use multiple sources to answer the same

research questions and add additional insight into survey responses (Creswell, 2014; Marshall &

Rossman, 2016). This mixed-methods approach was selected to help the researcher answer the

following two research questions:

1. How do faculty and students differ in their perceptions of the effectiveness of iPad use in vocational college classrooms?

2. How do faculty and students differ in their perceptions of the appropriate use of iPads related to student engagement in course activities in vocational college classrooms?

Two instruments were created and modified from existing surveys to distribute to faculty

and students at seven vocational colleges. A five-point Likert scale was used to measure the

following two dependent variables: effectiveness and engagement. Each survey was piloted to

establish reliability and validity to ensure grammatical accuracy and clarity of questions. After

the survey questions were finalized, surveys were distributed to faculty and students at seven

Victory College campuses. Other than the first five demographic questions and four open-ended

questions toward the end of the survey, respondents were asked to answer 15 questions using the

following five-point Likert scale:

1 = Strongly agree

2 = Agree

3 = Neutral

4 = Disagree

5 = Strongly disagree

The theoretical framework for this study was based upon the writings of Marc Prensky.

Prensky argues that students today are more technically-advanced compared to their instructors.

He argued that students were brought up on technology that educators have had to adapt and learn later in life. He refered to younger students as digital natives and older educators as digital immigrants (2001). Age was an important independent variable for this study; the researcher established the appropriate ages for faculty and students participating in this study consistent with Prenky's assumptions. Notwithstanding, educators must begin to allow students to collaborate with their instructors because they understand how to use technology more effectively (Franklin, 2011; Prensky, 2010).

The findings for this dissertation are based on three sources of data including: (1) descriptive statistics from Likert scale responses, (2) results from the Mann Whitney U test, and (3) coding from open-ended survey data. Each data source was analyzed and discussed separately. Ultimately, these sources of data were used to answer each research question.

Descriptive Data from Likert Scale Questions

For survey item 4, faculty and students were asked to rate their ability level using technology as either basic, intermediate, or advanced. Interestingly, 24% of faculty rated their ability as advanced, while 30% of students rated their ability as advanced, which was only a 6% difference. Fifty-six percent of faculty believed they had an intermediate level of ability compared to 49% of students. These findings are contrary to Prensky's assertion that a technology gap exists between most faculty and younger students because a greater percentage of students indicated having an "intermediate" or "basic" aptitude with technology (Alexander, 2014; Ally & Blazquez-Prieto, 2014; Hammer et al., 2010; Geist, 2011; Menkhoff & Bengtsson, 2012; Pollara, 2011; Tapscott, 2008; 2009; Werth & Werth, 2011). However, these findings are consistent with research by Corrin et al. (2010) who found 67% of students surveyed rated their ability to use technology as intermediate, while only 8.5% rated themselves as advanced. Such

results clearly demonstrate that not all digital natives share a natural propensity for using technology (Alvi, 2011).

Survey item 5 asked respondents to label themselves as either a digital native or digital immigrant based on the definition provided by Prensky. Results indicated that only 38% of faculty considered themselves digital natives. In comparison, 79% of students considered themselves digital natives. For the follow-up question, however, 59% of students thought of faculty as digital natives, while 41% believed faculty were digital immigrants. These findings are not surprising because both faculty and student respondents probably agreed to the labels based on their own age as they answered the survey question. What is interesting about the results, however, is 62% of faculty labeled themselves as digital natives, while 21% of students labeled themselves as digital immigrants according to Prensky's definition of terms.

Survey items 6, 8, 19, and 20 were supplemental questions used to add additional insight to the study, but were not used as a comparison for significance with the Mann Whitney U test. According to the results from survey item 6, students believed iPads were easy to use because of their familiarity with its functions. However, faculty were less likely to agree that iPads were easy to use especially as an instructional tool. Research suggests when students perceive M-learning devices as easy to use, they often believe they can achieve better grades (Irby & Strong, 2013; Baldwelan et al., 2016). This finding also supports Prenky's argument technology is often easier for digital natives to use because of the amount of time they have spent growing up playing video games and using cell phones (2001b).

According to findings of survey item 8, when compared to faculty, students indicated they preferred using their iPad to complete coursework. This finding is consistent with previous studies that found students often prefer utilizing M-learning devices during class so they can

collaborate with friends (Rossing et al., 2012) and choose apps that make learning fun (Kaliisa & Picard, 2017). Nonetheless, Prensky (2005; 2010) argues that older adults, or digital immigrants, often fail to initially understand how to utilize newer technologies in the classroom simply because they did not grow up using them.

For survey item 19, students indicated that being competent using the iPad had an impact on their ability to complete course content. Yet, faculty believed student competency had little impact on their ability to use iPads. Hargis et al. (2014) suggested additional training should be given to classroom instructors who do not feel comfortable using M-learning devices to increase their willingness to integrate them within their own curriculum and course activities. Despite such findings, even students with minimal Internet and technological access at home felt confident when using iPads in a classroom environment (Williams et al., 2014).

Question 20 on the survey was used to compare faculty and student perceptions on how comfortable they felt using the iPad. Not surprisingly, students indicated they felt more comfortable using their iPad compared to faculty. Essentially, the lack of specific faculty training and unfamiliarity of M-learning is often a problem when trying to successfully integrate M-learning devices into a school or program (Parajuli, 2016; Psiropoulos et al., 2016; Rossing, 2012). Educators can become more comfortable with classroom technology when they partner their academic expertise with the technological experience of younger students through a system of partnership (Prensky, 2010).

Mann Whitney *U* Results for Research Question One

Survey items 7, 12, 14, 17, and 18 were used to compare the perceptions of faculty and students regarding iPad effectiveness in vocational college classrooms. Results from the Mann Whitney *U* test revealed statistically significant differences between students and faculty;

compared to faculty, students found iPads to be more effective in the classroom. The greatest

significance was found with survey items 12 and 14. For question 12, students indicated they

spent considerably more time on coursework outside of class when they could access course

materials anytime or anywhere. Findings from question 12 were consistent with prior research,

which found students generally enjoy using M-learning devices because they can access

information on the go when using them outside of the classroom (Boyinbode et al., 2011; Martin

et al., 2013; & Rossing et al., 2012). Not surprisingly, Prensky (2010) argued M-learning devices

can be used effectively outside of the classroom when instructors create assignments based on

active rather than passive learning. Moreover, digital natives are more likely to be actively

engaged with schoolwork when they can use their technology outside of the classroom (Prensky,

2005; 2010).

For survey item 14, when compared to faculty, students revealed they felt like they got

more out of class when they could use their iPad to learn course material. This finding seemed to

validate part of Prensky's assumption that digital natives enjoy using the latest technology

whether for social or educational reasons (2010). However, the researcher does admit this survey

item should have been better defined to determine exactly what students felt they get out of class

when using iPads, which was a limitation in this study. The findings could infer students get to

collaborate more with friends, or that using the iPad makes learning somehow more fun. This

finding may also indicate that having instant access anywhere at anytime is equivalent to getting

more out of the classroom when the iPad is used compared to when it is not used. Research

supports the notion that students enjoy their classroom experience more with M-learning devices

because they could access their courses and instructors on the go (Boyinbode et al., 2011).

Additional research also suggests students have more enjoyable learning experiences when using

M-learning devices to complete coursework (Ahern-Dodson, & Comer, 2013; Hemmi et al., 2014).

Mann Whitney *U* Results for Research Question Two

Survey items 9, 10, 11, 13, 15, and 16 were used to determine any statistical differences on the appropriate use of iPads related to student engagement in vocational college classrooms between faculty and students by using the Mann Whitney *U* test. Results from survey item 9 found no statistical differences between faculty and students when asked if faculty encouraged them to use their iPad to engage in course-related work during class. There was also no significant difference in survey item 15 when asked if clear policies had been established for iPad use in the classroom when compared between faculty and students. In other words, both faculty and students generally agreed that policies were put in place to guide students on how to use the iPad during class. However, results showed a statistically significant difference between faculty and students regarding survey items 10, 11, and 13 with the greatest difference with survey items 10 and 13.

For survey item 10, faculty perceived iPads to be much more of a distraction compared to students. This finding is consistent with research by others including Alvi (2011), Bayless et al., (2013), Chen and Denoyelles, (2013), Dashti and Aldashti (2015), Ellaway et al. (2014) Duncan et al. (2012), Gong and Wallace (2012), Greener and Wakefield (2015), Hammer et al. (2010), Jabbour (2014), Jackson (2013), Kinash et al. (2012), Kutluk and Gulmez (2014), Martin et al. (2013), McCoy (2013), and Pollara (2011). In fact, some instructors do not allow students to have personal electronic devices of any kind in class due to the fear they cause distractions (Duncan et al., 2012). Regardless of how technologically-advanced digital natives might be, educators must guide students on how to use M-learning devices in classroom settings to avoid

being distracted (Alvi, 2011; Prensky, 2005; Prensky, 2010). Corrin et al. (2010) even found that students often admit to using M-learning devices for the main purpose of engaging in social activities. Prensky (2005; 2015) and Tapscott (2009) also argue digital immigrants typically find M-learning devices distracting because they fail to understand the ability of students to multitask and learn at the same time.

Another interesting finding from survey item 10 was the fact some students also admitted to being distracted by the iPad in class. This is not as common in the literature, but is consistent with findings (Duncan et al., 2013; & Haugn & Bussell, 2012; Gong & Wallace, 2012; McCoy, 2013). However, when faculty use M-learning devices appropriately, students are less likely to be distracted and more likely to be engaged (Duncan et al., 2013; Mooney et al., 2013). The researcher believes it is important for educators to model their behavior with M-learning to decrease the likelihood of any classroom distractions, which is supported in research by Badwelan et al. (2016), Benhem et al. (2015) Cavanaugh et al. (2013), Chen and Denoyelles (2013), Cochrane (2014), Dashti and Aldashti (2015), Irby and Strong (2013), Mueller et al. (2012), Greener and Wakefield (2015), and Rosenthal and Eliason (2015). This finding is particularly significant because it suggests vocational college faculty should be specifically trained on how to better model behavior with iPads in order to encourage effective iPad use and discourage the potential for distractions during class.

As educators, it is important to see students more engaged in the classroom; using M-learning devices can certainly facilitate that goal. Results from survey item 13 revealed students, compared to faculty, were more likely to be engaged in class discussions when they could use their iPad. This finding is similar to a prior study, which found a positive correlation between iPad use and better student engagement with classroom discussions (Deimer et al.,

2012). This finding is also consistent with research, which suggested the more M-learning devices were used for active learning purposes both inside the classroom, the more students were likely to get more out of class (Ahern-Dodson, & Comer, 2013; Hemmi et al., 2014). Based on the findings from survey item 13 and evidence from prior research, the researcher believes faculty members at Victory College should find more creative ways to integrate iPads with classroom activities during class. Students often get bored even when using classroom technology like M-learning devices if their instructors fail to integrate the technology with real-world applications and make learning more meaningful (Prensky, 2003 & 2007).

Open Ended Question Emergent Themes

Faculty and students were asked four open-ended questions at the end of each survey. Because this portion of the study was qualitative, an open-coding method was used to interpret responses, create themes, and determine the frequency of those responses (Creswell, 2014). Once the frequency of responses was calculated, they were put into tables in chapter IV for comparative purposes. This section of chapter V explains the significance of each of the main themes from each question as it pertained to each research question.

Themes from open-ended question one. When asked about the benefits of using iPads in the classroom, 49 faculty members from Victory College participated in the survey and 34 answered the first open-ended question. Based on faculty responses, the following were coded into themes as benefits of using iPads in the classroom from highest to lowest: (1) engagement, (2) efficient, (3) lightweight, and (4) all-in-one device. Of the 271 students who participated in the survey, 165 answered the first open-ended question. The following responses were coded into the following themes from highest to lowest: (1) efficiency, (2) lightweight, (3) all-in-one device, (4) engagement, (5) eco-friendly, and (6) apps. Ironically, it was faculty who believed the

greatest advantage of using iPads was "engagement." Pollara (2011) found similar results when a majority of faculty members surveyed thought M-learning devices lead to better student engagement but did not want to see them integrated into the classroom. The researcher believes faculty may understand the hypothetical importance of using iPads, but not when it comes to actually using them in the classroom. Although important, students ranked engagement as the fourth most important theme and efficiency as the number one benefit. The perception that learning could be more efficient was strongly associated with the willingness of students to use M-learning devices (Cheon et al., 2012). The researcher believes this could be one of the reasons students found iPads to be more effective as a learning tool compared to faculty members. Efficiency with technology is also one of the main characteristics of digital natives (Prensky, 2001a; 2001b; 2005; & 2010).

  Themes from open-ended question two. When asked about the drawbacks of using iPads, 31 faculty responded to the question. Based on the response frequencies, the following themes emerged from highest to lowest: (1) distraction, (2) incompatibility, (3) not having real textbooks, and (4) small size. Not surprisingly, one of the greatest statistical differences from this study was how faculty members, when compared to students, viewed iPads in the classroom as a distraction . According to Bayless et al. (2013), faculty found M-learning devices to be not only a distraction in the classroom, but also a source of cheating. Victory College students also responded to open-ended question two on the survey. Those responses were coded with the following frequencies from highest to lowest pertaining to the drawbacks of using iPads in the classroom: (1) connectivity problems, (2) distraction, (3) incompatibility, (4) small size, and (5) inconvenience. Having insufficient wi-fi capabilities has certainly been a major complaint by students and considered an obstacle to student engagement (Backhouse et al., 2014; James,

2011). It is the researcher's belief that academic institutions should invest in good infrastructure if M-learning is required for student and faculty use.

Themes from open-ended question three. Open-ended question three asked faculty and students to describe their experiences using iPads in the classroom. For this question, the researcher coded the information for emergent themes to describe the experiences of both faculty and students. Of the Victory College faculty who participated in the survey, 29 responded to open-ended question three. The following themes emerged to describe the experiences from faculty from highest to lowest: (1) accessible, (2) challenging, and (3) good for research. Sixty-five students from Victory College also responded to this question and the following themes were recorded from highest to lowest: (1) accessible, (2) engaging, (3) good for research, (4) fun, and (5) difficult. The most prominent theme to emerge based on the frequency of responses from faculty and students was also the belief that iPads were very "accessible." This finding supports previous studies where students and faculty ranked the accessibility of M-learning devices as one of its most important benefits in terms of being able to communicate with others on the go (Alden, 2012; Boyinbode et al., 2011) and being able to take the device anywhere at anytime to either complete course work or teach students (Rossing, 2012; Souleles et al., 2015). Moreover, having instant feedback and frequent feedback from instructors has also been demonstrated to improve the quality of student work and help them become more confident (Backhouse et al., 2014).

Themes from open-ended question four. The final open-ended question asked respondents to provide suggestions on how to improve the use of iPads at Victory College. For this question, only a few faculty and students responded. Again, themes emerged and the frequencies of the responses were recorded from highest to lowest. Only five faculty members answered this question. The following suggestions for improvement were recorded: (1) training for instructional purposes needed, and (2) too much emphasis on technology. The need for additional faculty training with M-learning devices is also consistent with the recommendations of previous studies (Cavenaugh et al., 2013; Drouin et al., 2014; Hargis et al., 2014; Jackson, 2013; and Mang & Wardley, 2012). Research has found when faculty were given sufficient training, they were more successful integrating iPads into their courses and developing better teaching methods (Cavenaugh et al., 2013; Cochrane, 2014). Only 27 students responded to the final open-ended question with the following list of improvements from highest to lowest including: (1) better wi-fi needed, and (2) should be given a choice. The need for better wi-fi and infrastructure has been a main complaint among students as documented in previous research (Backhouse et al., 2014; Dashti & Aldashti, 2015; Rossing et al., 2011). At times students have viewed the lack of sufficient wi-fi and infrastructure as a major barrier toward learning (James, 2011).

Impact of Limitations

Several limitations existed in this study and may have impacted the findings. A major limitation was the number of respondents who completed the surveys. Extensive efforts went into ensuring a large number of faculty and students participated in completing the survey. Links to the surveys were sent out to program directors at each of the seven Victory College campuses and were made available for one month. In an effort to increase the response rates, weekly

reminders were sent out via email to each program director from the seven campuses to reiterate the importance of the study. The researcher also called the corporate academic office of Victory College in an effort to get senior administrators to remind faculty and students about the study and encourage greater survey participation.

A second limitation was the potential for bias associated with the interpretation of open-ended questions. The interpretation of qualitative data is often subjective and difficult to generalize. Moreover, efforts were made by the researcher to ensure the authenticity of the findings. In order to validate the qualitative analysis from this study, findings from each data source were triangulated in an effort to authenticate the results (Creswell, 2014).

A third limitation for this study was the lack of additional statistical testing. In this study, the Mann Whitney U test was performed because it compared ordinal data between two independent groups in terms of significance. This study did not utilize any parametric tests because ratio and interval data were not collected, which could have added more depth to the study.

Discussion and Triangulation of Data Sources

Three types of data sources were used to answer the two research questions put forth by this dissertation. These data sources included: (1) Likert scale data, (2) results from the Mann Whitney U test, and (3) four open-ended questions. These data sources were triangulated to provide a deeper understanding of the findings and provide a general discussion of the data (Creswell, 2014).

Summary of Major Findings

Research question one. Faculty and students differed significantly in their perceptions of iPad effectiveness in the classroom. Students either agreed or strongly agreed that they spent

more time on coursework when they used their iPad outside of class compared to faculty. When describing their experiences using the iPad during class, both faculty and students found them appealing based on their accessibility. Students, compared to faculty, were more familiar with how the iPad functions. Nonetheless, as appealing as iPads may be, faculty described their experiences using the iPad as challenging, while students did not. The researcher believes faculty may be apprehensive about assigning homework outside of the class to be completed on the iPad because they have never had to use them for anything beyond a social tool and because the vocational college made iPads mandatory for courses without providing formal training for faculty.

Not only do students seem more willing to use their iPads to engage in course work outside of the classroom, they also believed they got more out of class when they used them. If faculty are trained correctly on how to use all of the iPad functions and choose apps relevant to what they teach, they may become more inclined to use the device to assign homework to encourage their students to spend more time studying and make the learning experience for students more enjoyable. Survey items 6, 8, 19, and 20 indicated that students, compared to faculty, found the iPads easier to use. Findings also suggested students, compared with faculty, preferred using their iPads when given a choice. More students than faculty also believed that being both competent and comfortable with iPads impacted their ability to not only learn course content but also complete coursework. After examining each source of data, the researcher concludes that students, compared to faculty, find the iPad to be more effective in vocational college classrooms.

Research question two. Faculty and students also differed in their perceptions of the appropriate use of iPads related to student engagement. Results from the Mann Whitney *U* test revealed a statistical difference between faculty and students as faculty found them more of a distraction and less of a tool for engagement when used in the classroom. It was not surprising that faculty perceive iPads in the classroom as a potential distraction; however, it was surprising to find students also find them to be distracting. According to the qualitative analysis, both faculty and students believed iPads caused distractions. Although data from the quantitative and qualitative analysis seemed inconsistent, it suggests a need for faculty to learn how to better model their behavior when using the iPad for class to avoid distractions.

Despite iPads being perceived as a distraction from learning, students were more likely to engage in class activities outside of the classroom when it involved using the iPad. Ironically, faculty believed the main benefit of using iPads was to provide better student engagement. This inconsistency seems to suggest faculty believe student engagement with iPads are important during class time, but not necessarily outside of class when students complete homework. Both faculty and students agreed that iPads were convenient and information could be accessed at any time on the go, but faculty training must focus on how to create assignments that can be completed anytime or anyplace.

Although M-learning devices are used by millions of people, it does not mean that educators or students know how to use them correctly in a classroom or educational setting without sufficient training. If proper training for faculty using iPads at Victory College becomes required, faculty may see its usefulness as something more than a social networking device and more as an educational tool. This assumption is also consistent with the belief that although today's younger learners may understand how to use technology more efficiently, they need

instructional guidance from their teachers who are experts in content information; therefore, a partnering system should be established that combines expertise with technology to make learning more effective (Prensky, 2010).

Conclusion

The evidence from this dissertation revealed students, when compared to faculty, believed iPads were more effective to use in the classroom at Victory College. Students, compared to faculty, also generally believed iPads provided better engagement as a learning tool in terms of findings from survey items 10, 11, and 13. Findings from survey items 9, 15, and 16 showed no statistical difference between faculty and students. The findings from each survey item pertaining to each research question were also corroborated by findings from various Likert scale data and open-ended questions. It is important to note, however, results from this study are limited to the faculty and students at Victory College. This study filled the gap in the literature by examining the effectiveness of iPad use in vocational colleges addressed by Dashti & Aldashti (2015). The degree to which this study can be generalized is limited to the sample size, which was relatively small. However, this study does add to the growing body of literature that addresses the use of all types of M-learning devices in higher education. This body of research will only continue to grow as educators embrace changes associated with 21st century learning.

The assumptions conceptualized by the work of Marc Prensky were also instrumental in helping the researcher explain differences between faculty and student participants at Victory College. As findings indicated, students, compared to faculty, found the iPads to be more effective as a learning device according to the measurement of each dependent variable in the study including effectiveness and engagement. What the findings failed to show, however, was any indication the iPads were being used for collaborative purposes between students or between

faculty and students. One of the major characteristics of digital natives is the desire for more collaborative learning. Some of the findings from this study seem to validate Prensky's ideas, but more research is needed. Additional studies should be conducted to more thoroughly investigate Prensky's assertion that a new generation of learners, defined as digital natives, requires a major transformation of current pedagogical practices in higher education.

Significance of the Findings

The findings from this dissertation will benefit vocational colleges that decide to integrate iPads, or M-learning devices, into their course curriculum. As M-learning devices, like tablets and iPads, continue to have a presence in society, especially with digital natives, more colleges may decide to utilize them in the classroom as either a trend or marketing tool to increase student enrollment (Brown, 2015). M-learning will not only continue to play a role in higher education, but will also compete with online learning as an educational learning format (Alexander, 2014). However, the findings from this study suggest that not everyone finds M-learning devices effective, especially digital immigrants. Notwithstanding, as digital natives continue to enter college classrooms, more demands will be placed on digital immigrants to modify their existing instructional methods (Prensky, 2001a; 2010; Werth & Werth, 2011).

Institutions of higher education that review the results derived from this study will also be guided on the decision to ensure sufficient infrastructure and training are available for faculty before the devices are used in the classroom. Administrators will also be guided on what faculty should emphasize in order to make faculty training more efficient to meet student needs. For example, faculty training should include a discussion on M-learning trends and the impact of digital natives in college classrooms. For individual researchers, the findings from this study will

help discover other areas to research, to help close the technology gap that seems to exist between faculty and students using M-learning devices such as the iPad.

Although the need for more faculty training when using M-learning devices has been discussed throughout the literature review, the findings from this study provide specific ideas for a training program for all faculty members at Victory College and perhaps other vocational colleges. This study is also significant because it fills in the gap by proposing a new way to integrate iPads into classrooms through faculty training based specifically on data (Drouin, et al., 2014). Training should focus on ways to help faculty understand how iPads can be an effective learning tool in the classroom, which would enable faculty to better integrate them for daily class use with course curriculum. Based on the findings from this dissertation, the literature review, suggestions by Prensky, and inferences drawn by the researcher, M-learning training for faculty at Victory College should emphasize the following:

1. Training that focuses on the modeling of iPad behavior to encourage classroom participation and discourage distractions from learning.

2. Training that focuses on more active rather than passive learning with appropriate learning apps during class to make learning more interactive and enjoyable.

3. Training that focuses on how to create homework that utilizes the iPad outside of the classroom.

4. Training that focuses on current trends in M-learning and the technology gap that appears to exist between digital natives and digital immigrants.

5. Training that focuses on student and teacher collaboration, or partnering, to make M-learning more effective.

Recommendations for Future Research

Using M-learning devices has become a daily routine for many worldwide. In fact, it is also believed tablets and iPads have become an extension of our own personalities (Prensky 2010). M-learning devices such as iPads will also continue to play a major role in higher education in the coming years, especially as tablet technology continues to advance (Brown, 2015). This study focused on different perceptions between faculty and students primarily on the basis of age. Findings from this study suggest there are differences of perception regarding iPad use in vocational college classrooms. However, additional studies may focus on different perceptions of iPad effectiveness between students (i.e., traditional vs. non-traditional students). Additional research should address the same research questions but focus on other demographic variables such as race, ethnicity, and gender. It has become common for older students, or digital immigrants, to return to college and learn with their academic counterpart digital natives. Likewise, additional research could also focus on perceptual differences between instructors that grew up with M-learning devices versus those that did not.

Another recommendation for future research is to address how students get more out of class in vocational colleges when using M-learning devices, as was asked by survey item nine. The idea of "getting more" out of class should be further defined and examined through focus groups and additional open-ended survey questions. In other words, in what ways do students get more out of class? Or, how do they get more out of class when M-learning devices are used? Such data could yield rich results if examined from a more purely qualitative lens.

Because this study was limited to a relatively small number of faculty and students in a vocational college setting, more surveys should be distributed to larger populations of faculty and students at vocational colleges to replicate this study. New research could also employ the

use of more qualitative research methods for investigating the effectiveness of M-learning through ethnographic or case study methods. Because qualitative research often provides more in-depth analysis, additional studies could investigate and capture the experiences of those using M-learning devices in vocational colleges (Creswell, 2014; Marshall & Rossman, 2016).

Future research should also continue to test the assumptions of Marc Prensky's digital natives and digital immigrants regarding the use of M-learning devices in higher education. Although several studies have been conducted on the attitudes of using M-learning devices in college classrooms, there is still a need to further test Prensky's work on digital natives. If more evidence is given to support his assertions, educators may need to radically change their instructional methods to adapt to the growing numbers of these students entering college classrooms. Despite which direction to take, one thing is certain: the use of M-learning devices in higher education is not going away and educators will need to continue to understand their presence in the classroom as an instructional tool.

Implications for Professional Practice

Based on the findings from this dissertation, several recommendations from the researcher are given for educational practitioners. Recommendations are based on the results from this study as well as the ideas and research by Ahern-Dodson & Comer (2013); Cochrane et al., (2010), Cochrane (2011; 2012; 2014); Eppard et al., (2016); and Prensky (2005; 2010). Before utilizing iPads in the classroom, it is recommended that faculty receive extensive training based on the findings from this study to help close the technology gap that seems to exist between digital natives and digital immigrants. Training can help educators learn how to use the iPad as a learning tool rather than simply being given an iPad because it has become a trend to use them. Students should also receive basic training on how to use iPads for classroom purposes

rather than simply for social media. It is also recommended that sufficient wi-fi and broadband be available when using iPads on campus. Faculty should also collaborate with students on how to use iPads more effectively. Moreover, faculty should also model their behavior when using M-learning devices in the classroom appropriately to encourage students to use them for more academic, rather than social, purposes. Finally, to address the faculty issue that iPads are incompatible with course curriculum, administrators and faculty should follow some of the advice provided by the work of Cochrane (2014) on how to integrate M-learning with course curriculum and create projects by following the steps he discussed as indicated in chapter II, figure 3.

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Appendix A

Permission to Use Survey

12/5/15

Dr.(s) _____:

My name is Robert Reed and I am currently a PhD candidate at Northwest Nazarene University in Nampa, Idaho. I recently read your study and would like to seek permission to use and modify the survey instrument you used in your article for my own dissertation.

My dissertation is focused on the perceptions of iPad integration effectiveness between faculty and staff in vocational colleges. I plan to begin collecting data and using the survey sometime this coming July to December 2016. I already have my proposal written for the study and will be seeking IRB permission from our university this coming spring.

I feel that using your survey will be of great help in my own dissertation study. In addition, I would be more than happy to send you a copy of the modified survey along with the findings from the study once it has been completed.

Please feel free to contact me for more information about the study at the contact information written below:

Respectfully,
Robert A. Reed

RReed@nnu.edu

Appendix B

Approval to Use and Modify Existing Surveys

Linda Corrin <linda.corrin@unimelb.edu.au> 1/3/16
AttachmentsJan 3 to me, lori.lockyer, sbennett

Dear Robert,
Thank you for your email. We would be very happy for you to adapt/use our survey in your
research. I have attached a copy of the survey. All the best for your research and we would be
very interested to see the findings of your study when it is done.

Kind regards, Linda

Pamela <Pollara pamela_pollara@hotmail.com>

12/19/15
to me

 Robert,
You have my permission to use and modify the survey instrument as you see fit for your study.
Best of luck on your dissertation!

Pam Pamela Pollara, Ph.D.
973.493.5473
pamela_pollara@hotmail.com

Margaryan, Anoush <Anoush.Margaryan@gcu.ac.uk> 12/18/15 to me

Dear Robert
Thanks for your interest in this work and for reaching out. I am happy for you to use the survey
and would be interested to see your findings and the new instrument. All the best with your work

Anoush Glasgow
Caledonian University is a registered Scottish charity
number SC021474

Rossing, Jonathan Paul Jan 7 (10 days ago) 1/7/16

Hello Robert, Thank you for the message. You are welcome to use the survey. Best wishes with your research.

Jonathan

Jonathan P. Rossing, Ph.D.
Assistant Professor of Communication Studies
Indiana University School of Liberal Arts
Indiana University–Purdue University
Indianapolis 425 University
Blvd Cavanaugh Hall 309
Indianapolis, IN 46202 317-278-5192
 jrossing@iupui.edu liberalarts.iupui.edu
cid:6290421C-E618-41B6-9F68-372DFA4A2AC5

Appendix C

Site Approval Letter
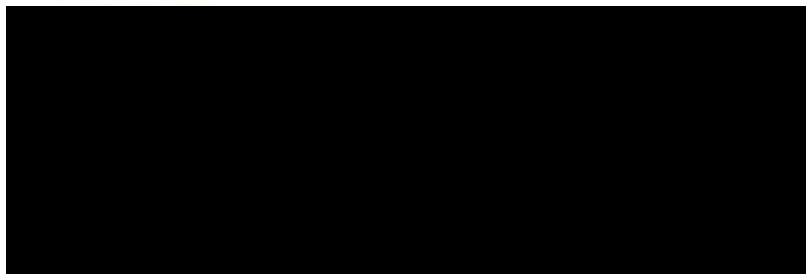
December 14, 2015

Northwestern Nazarene University
Attention: HRRC Committee
Helstrom Business Center 1ˢᵗ floor
623 S. University Boulevard
Nampa, ID 83686

RE: Research Proposal Site Access for Mr. Robert A. Reed

Dear HRRC Members:

This letter is to inform the HRRC that Administration for ▮▮▮▮▮▮▮▮ has reviewed the proposed dissertation research plan including subjects, intervention, assessment procedures, proposed data analysis, and purpose of the study. Mr. Reed has permission to conduct his research at the college and with the students and staff of ▮▮▮▮▮▮▮. The authorization dates for this research are July 2016 to April 2017.

Respectfully,

Provost/Vice President of Academic Affairs

Appendix D

NIH Certificate of Completion

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Robert Reed** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 03/24/2015

Certification Number: 1731288
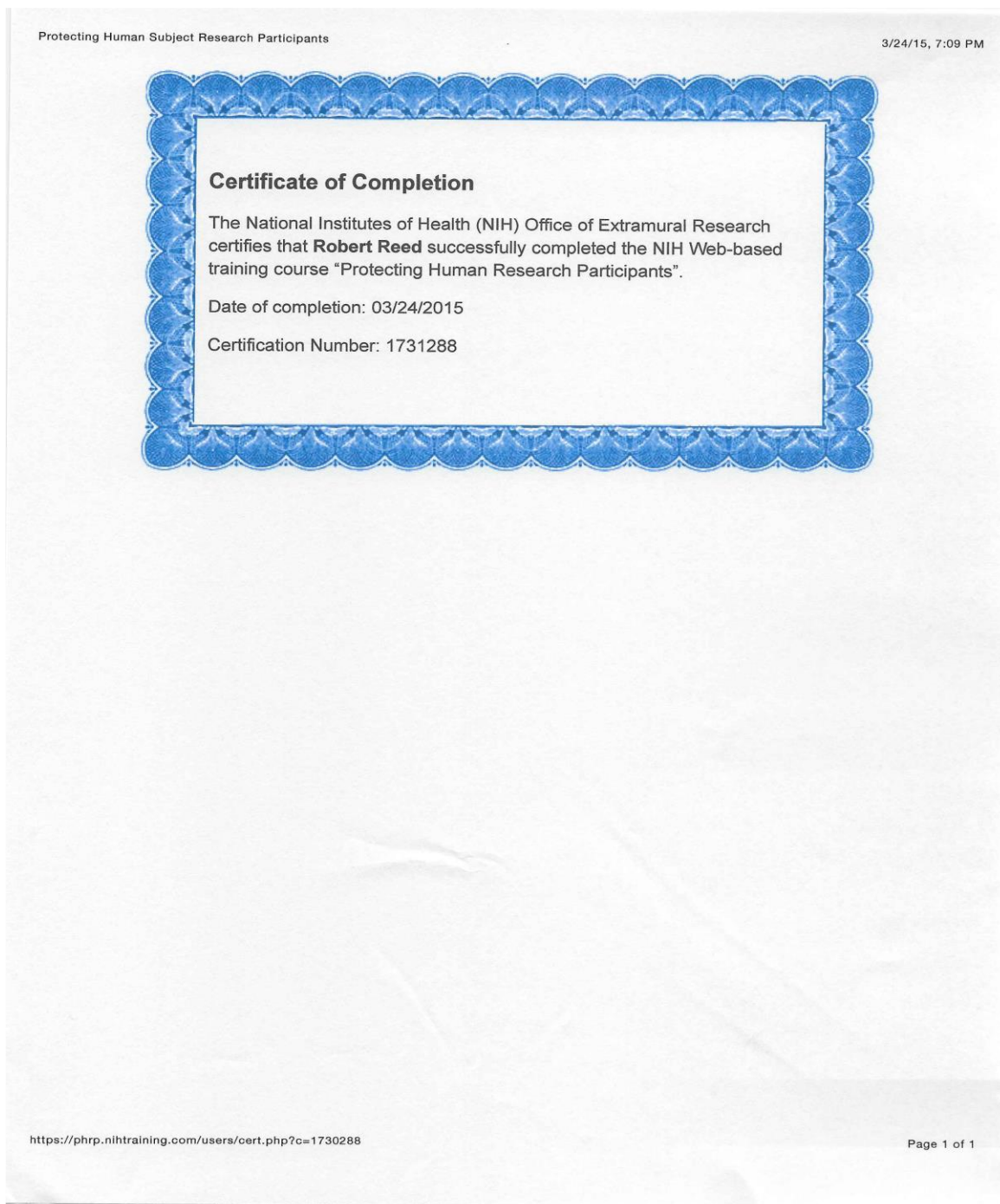
Appendix E

Informed Consent Form Volunteers

A. PURPOSE AND BACKGROUND
Robert A. Reed, Ph.Dc, in the Department of Graduate Education at Northwest Nazarene University is conducting a research study related to the use of iPads use in vocational college classrooms. The purpose of the study is to investigate the effectiveness of iPad integration by comparing the perception of students and instructors at the vocational college sites. We appreciate your involvement in helping us investigate how to better serve and meet the needs of ████████████ students.

You are being asked to participate in this study because you are a healthy volunteer, over the age of 18.

B. PROCEDURES
If you agree to participate in the study, the following will occur:

1. You will be asked to sign a copy of this Informed Consent Form, volunteering to participate in the study.

2. You will distribute the Qualtrics surveys electronically according to the name of students in the courses selected and the faculty members teaching them.

3. You will be asked to reply to an email at the conclusion of the study asking you to confirm the data that was gathered during the research process.

These procedures will be competed at a location mutually decided upon by the participant and principal investigator and will take a total time of about 5-10 minutes.

C. RISKS/DISCOMFORTS
1. Some of the discussion questions may make you uncomfortable or upset, but you are free to decline to answer any questions you do not wish to answer or to stop participation at any time.

2. For this research project, the researcher is requesting demographic information. Due to the make-up of population at the college, the combined answers to these questions may make an individual person identifiable. The researcher will make every effort to protect your confidentiality. However, if you are uncomfortable answering any of these questions, you may leave them blank.

3. Confidentiality: Participation in research may involve a loss of privacy; however, your records will be handled as confidentially as possible. No individual identities will be used in any reports or publications that may result from this study. All data from notes, and surveys will be kept in a locked file cabinet. In compliance with the Federal wide

Assurance Code, data from this study will be kept for three years, after which all data from the study will be destroyed (45 CFR 46.117).

4. Only the primary researcher and the research supervisor will be privy to data from this study. As researchers, both parties are bound to keep data as secure and confidential as possible.

D. BENEFITS
There will be no direct benefit to you from participating in this study. However, the information you provide may help educators to better understand advising students using various forms of technology.

E. PAYMENTS
There are no payments for participating in this study.

F. QUESTIONS
If you have questions or concerns about participation in this study, you should first talk with the investigator. Robert A. Reed can be contacted via email at rreed@nnu.edu, via telephone at 541-216-3068, or by mail:
    4443 Riata Circle, Ontario, Oregon 97914

Should you feel distressed due to participation in this study, you should contact your own health care provider.

G. CONSENT
You will be given a copy of this consent form for future reference.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You are free to decline to be in this study, or to withdraw from the study at any point. Your decision as to whether or not to participate in this study will have no influence on your present or future status as a student at Carrington College.

I give my consent to participate in this study:

_____   _____

Signature of Study Participant   **Date**

_____   _____

Signature of Person Obtaining Consent   **Date**

THE NORTHWEST NAZARENE UNIVERSITY HUMAN RESEARCH REVIEW COMMITTE HAS REVIEWED THIS PROJECT FOR THE PROTECTION OF HUMAN PARTICIPANTS IN RESEARCH.

Appendix F

Informed Consent Form

Students and Faculty

A. PURPOSE AND BACKGROUND

Robert A. Reed, Ph.Dc, in the Department of Graduate Education at Northwest Nazarene University is conducting a research study related to the use of iPads use in vocational college classrooms. The purpose of the study is to investigate the effectiveness of iPad integration by comparing the perception of students and instructors at the vocational college sites. We appreciate your involvement in helping us investigate how to better serve and meet the needs of ▮▮▮▮▮▮▮▮▮ students.

You are being asked to participate in this study because you are a healthy volunteer, over the age of 18.

B. PROCEDURES

If you agree to participate in the study, the following will occur:

1. You will be asked to sign a copy of this Informed Consent Form, volunteering to participate in the study.

2. You will answer a set of open and closed survey questions on the perceptions of the efficiency of iPad use in vocational college classrooms. The survey questionnaire should only take about 5-minutes to complete.

3. You will be asked to reply to an email at the conclusion of the study asking you to confirm the data that was gathered during the research process.

These procedures will be competed at a location mutually decided upon by the participant and principal investigator and will take a total time of about 5-10 minutes.

C. RISKS/DISCOMFORTS

1. Some of the discussion questions may make you uncomfortable or upset, but you are free to decline to answer any questions you do not wish to answer or to stop participation at any time.

2. For this research project, the researcher is requesting demographic information. Due to the make-up of population at the college, the combined answers to these questions may make an individual person identifiable. The researcher will make every effort to protect your confidentiality. However, if you are uncomfortable answering any of these questions, you may leave them blank.

3. Confidentiality: Participation in research may involve a loss of privacy; however, your records will be handled as confidentially as possible. No individual identities will be used

in any reports or publications that may result from this study. All data from notes, and surveys will be kept in a locked file cabinet. In compliance with the Federal wide Assurance Code, data from this study will be kept for three years, after which all data from the study will be destroyed (45 CFR 46.117).

4. Only the primary researcher and the research supervisor will be privy to data from this study. As researchers, both parties are bound to keep data as secure and confidential as possible.

D. BENEFITS

There will be no direct benefit to you from participating in this study. However, the information you provide may help educators to better understand advising students using various forms of technology.

E. PAYMENTS

There are no payments for participating in this study.

F. QUESTIONS

If you have questions or concerns about participation in this study, you should first talk with the investigator. Robert A. Reed can be contacted via email at rreed@nnu.edu, via telephone at 541-216-3068, or by mail:

      4443 Riata Circle, Ontario, Oregon 97914

Should you feel distressed due to participation in this study, you should contact your own health care provider.

G. CONSENT

You will be given a copy of this consent form for future reference.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You are free to decline to be in this study, or to withdraw from the study at any point. Your decision as to whether or not to participate in this study will have no influence on your present or future status as a student at Carrington College.

I give my consent to participate in this study:

Signature of Study Participant	**Date**

Signature of Person Obtaining Consent	**Date**

THE NORTHWEST NAZARENE UNIVERSITY HUMAN RESEARCH REVIEW COMMITTE HAS REVIEWED THIS PROJECT FOR THE PROTECTION OF HUMAN PARTICIPANTS IN RESEARCH.

Appendix G

Student Survey

Thank you for taking the time to complete this online survey related to the use of iPads in courses at ▆▆▆▆▆▆▆▆! The information will be very useful as we consider ways to effectively integrate iPads in courses. Your completion of this survey is completely voluntary and all responses to this survey are anonymous. If you feel uncomfortable with any of the questions, please leave the answer blank. The survey will take approximately five minutes to complete.

1. What is your academic major/program?

Medical Billing & Coding
Criminal Justice
Pharmacy Technology
Dental Hygiene
Medical Assisting
Dental Assisting

2. Gender   ☐ Male   ☐ Female

3. Check one: Born before 1990 ☐   Born 1990 or after ☐

4. Rate your ability level using technology?

       ☐ Basic   ☐ Intermediate   ☐ Advanced

5A. In 2001, Marc Prensky, an educational consultant and author, coined the terms "Digital Native" and "Digital Immigrant" to contrast a generation who grew up using computer technology with those who did not. Do you consider yourself to be a digital immigrant or a digital native?

☐ Digital Immigrant
☐ Digital Native

5B. Based on the previous information, would you consider your instructor to be a digital native or digital immigrant?

☐ Digital Immigrant
☐ Digital Native

Please answer the following questions (6-20) using the scale below:
1– Strongly agree
2– Agree
3– Neutral
4– Disagree
5– Strongly disagree

6. Learning on my iPad was easy because I was already familiar with all of its functions.

7. My instructor effectively monitored appropriate use of the iPads during class time.

8. When given a choice, I preferred to use my iPad to complete my coursework.

9. I was encouraged to use my iPad to engage in course-related activities during class.

10. Having an iPad in class was a distraction that competed for my full attention during class.

11. I was more actively engaged in class activities when using my iPad was an option.

12. I spent more time on course work outside of class when I had access to course materials at anytime, anywhere on my iPad.

13. I was more likely to engage in class discussions during class when I could use my iPad.

14. I felt like I got more out of the class when I used my iPad to help me learn course content.

15. My instructor established clear policies for appropriate and inappropriate use of iPads in the classroom.

16. I was encouraged to use my iPad to engage in course-related activities outside of class.

17. My instructor modeled effective use of the iPad during instruction.

18. My instructor effectively integrated iPads into the course curriculum.

19. My competency in using iPads impacted my ability to learn course content.

20. I was very comfortable using an iPad to help me complete coursework.

Open Ended Questions

21. What did you find to be the benefits of using iPads in your course(s)?

22. What did you find to be the drawbacks of using iPads in you course(s)?

23. Please describe your experience(s) using the iPad as a learning tool in the classroom.

24. Please share any suggestions for improvement you want to provide.

Appendix H

Faculty Survey

Thank you for taking the time to complete this online survey related to the use of iPads in courses at ▮▮▮▮▮▮▮▮▮▮! The information will be very useful as we consider ways to effectively integrate iPads in courses. Your completion of this survey is completely voluntary and all responses to this survey are anonymous. If you feel uncomfortable with any of the questions, please leave the answer blank. The survey will take approximately five minutes to complete.

1. What is your academic major/program?

Medical Billing & Coding
Criminal Justice
Pharmacy Technology
Dental Hygiene
Medical Assisting
Dental Assisting

2. Gender   ☐ Male   ☐ Female

3. Check one: Born before 1990 ☐   Born 1990 or after ☐

4. Rate your ability level using technology?

    ☐ Basic   ☐ Intermediate   ☐ Advanced

5. In 2001, Marc Prensky, an educational consultant and author, coined the terms "Digital Native" and "Digital Immigrant" to contrast a generation who grew up using computer technology with those who did not. Do you consider yourself to be a digital immigrant or a digital native?

☐ Digital Immigrant
☐ Digital Native

Please answer the following questions (6-20) using the scale below:
1– Strongly agree
2– Agree
3– Neutral
4– Disagree
5– Strongly disagree

6. Using my iPad as an instructional tool was easy because I was already familiar with all of its functions.

7. I effectively monitored appropriate use of the iPads during class time.

8. When given a choice, students seemed to prefer using their iPad to complete their coursework.

9. I encouraged students to use their iPad to engage in course-related activities during class.

10. Students having iPads in class was a distraction that competed for their full attention during class.

11. Students were more actively engaged in class activities when using their iPad was an option.

12. Students seemed to spend more time on course work outside of class when they could access course materials at anytime, anywhere on their iPad.

13. Students were more likely to engage in class discussions during class when they could use their iPads.

14. Students seemed to get more out of the class when they could use their iPad to help them learn course content.

15. I established clear policies for appropriate and inappropriate use of iPads in the classroom

16. I encouraged students to use their iPads to engage in course-related activities outside of class.

17. I modeled effective use of the iPad during instruction.

18. I effectively integrated iPads into the course curriculum.

19. Students' competency in using iPads seemed to impact their ability to learn course content.

20. Students seemed very comfortable using their iPad to help them complete coursework.

Open Ended Questions

21. What did you find to be the benefits of using iPads in your course(s)?

22. What did you find to be the drawbacks of using iPads in you course(s)?

23. Please describe your experience(s) using the iPad as a learning tool in the classroom.

24. Please share any suggestions for improvement you want to provide.

Appendix I

HRRC Approval Letter

5/31/16

Dear Robert,

The HRRC has reviewed your protocol: Protocol #5052016 - Perceptions on the Effectiveness of iPad Integration in Vocational College Classrooms: A Mixed Methods Study. You received "Full Approval". Congratulations, you may begin your research. If you have any questions, let me know.

Melanie Person
Northwest Nazarene University
HRRC Member
623 S University Blvd
Nampa, ID 83686

Appendix J

Electronic Communication for Participation Form

Dear student or faculty member:

My name is Robert A. Reed and I am currently a doctoral student at Northwest Nazarene University, studying perceptions on the integration of iPads in vocational college classrooms.

You are receiving this survey because you are either a student or instructor in one of the following programs at ▮▮▮▮▮▮▮▮▮ that I am surveying for this study: dental hygiene, dental assisting, medical billing and coding, medical assisting, criminal justice, and pharmacy technology.

Your completion of this survey is greatly appreciated. The questions will focus on demographic information, the effectiveness of iPads in the classroom, appropriate use of iPads in the classroom, and how a person's comfort level with technology impacts how iPads are used in the classroom.

The survey contains 24 questions and should take less than five minutes to complete. If you are willing to participate, please access the survey at: [qualtrics.com.](qualtrics.com) Once you access the website, directions will be made available to take the brief survey.

Your responses will remain anonymous and will provide valuable information for your college, other vocational colleges, policy makers, and others in the field of education.

Thank you in advance for your willingness to participate in this study!

If you have any questions, please don't hesitate to contact me via email at RReed@nnu.edu.