Perceptions of Digital Technology in Military Education

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
May 8, 2016

Keywords: digital technology, military, education

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Abstract

The purpose of this study was to examine the relationship, if any, between perceptions of students and instructors with digital technology in military education at a military installation in the southeast region of Alabama. Technology is fast-paced and keeping it up to date and on the cutting edge for education is an endeavor itself. Instructors should take into account the perceptions of students when developing courseware and students should be aware of technology the military is currently using in education. One instrument was used to gather demographic and informational background, such as gender, age, year born, experience with a computer, whether issued a military computer, and preference of instructional delivery method. Data about students and instructor's personal perceptions on how they could change digital technology in military education was gathered from an open-ended question and categorized. The researcher used both descriptive and inferential statistics to analyze the data. This study indicated there was statistical significance with regard to the perception of technology knowledge and a student being issued a military computer. There was a statistical significance with regard to the perception of technology importance and a student being issued a military computer and the instructional delivery method used in military education. This study indicated significance from students with regard to technology enhancing military education and whether implementing technology helped with their job.

Acknowledgments

I would like to thank the many individuals and entities that allowed me to complete this educational experience. First and foremost, I am grateful to my family for their encouragement and support on this educational endeavor. I would like to thank my advisors, Dr. Jim Witte and Dr. Maria Witte, who helped me to bridge the gap between the worlds of the military and academia and kept me on point throughout my time in the Enterprise Cohort. I would also like to thank Dr. Leslie Cordie for her inspirational guidance in every course, always keeping minds thinking creatively. Thanking Dr. David Shannon and Dr. Chih-hsuan Wang for their time and statistical expertise would be remise, as there is a probability of not making it this far without their guidance. A Special thank you to all of my committee members and Dr. Leane Skinner, who served as the University Reader. To my Enterprise Cohort, Dr. Kasandra Granger, Dr. Tracy Kyser, James Stockton, Cynthia Covington, and Mark Tobin, thank you for all the late evenings, long weekends, and days of statistical nightmare on our journey. If it were not for the combined contributions of these and many others, too numerous to mention, the completion of my doctoral studies would have not been possible. To all, I say thank you.

The views expressed in this paper are those of the researcher and do not reflect the official policy or position of the United States Army, United States Air Force, United States Navy, Department of Defense, or the United States Government.

Table of Contents

List of Tables

Chapter 1. INTRODUCTION

The use of digital technology as a mechanism for conducting professional military education in the United States military is well documented and incorporated into many classrooms at military installations in the southeast region of Alabama. The United States Army Aviation Center of Excellence (USAACE) offers competitive rotary and fixed wing aircraft resident programs, from entry level through graduate level, for becoming Aviators within the United States Army, National Guard, and Army Reserves.

The military education system is witnessing an increased demand for digital technology used in classrooms. With this implementation of technology, some students and instructors perceive the technology as needless and the old ways of paper should be the norm. Within Army Aviation classrooms there are many types of students and instructors, the younger generation are labeled digital natives while the older generation are labeled digital immigrants, each with perceptions of imaginative ways and methods in delivery of instruction.

Teaching with chalkboards is a distant past and now computers are integrated into aspects of teaching. Issuing laptops to students in the Army aviation education system, prior to the beginning of class, reinforces these new standards of applied teaching structures, including the student's expected knowledge of how to use these systems proficiently. Computers have moved out of large air-conditioned rooms into closets, onto desks, and now into laptops and tablets.

The Army Learning Concept (ALC) is an important change to the effort for driving change through a campaign of learning. It describes the environment envisioned by the Army through 2025 and seeks to leverage technology without sacrificing standards so the use can provide credible, rigorous, and relevant training and education for forces of combat-seasoned Soldiers and leaders (TRADOC Pam 525-8-2, 2011). The ALC does not focus on a particular technology, but rather the opportunities of dynamic virtual environments, by online gaming, resident use of tablets and testing material, and virtual collaborative environments (TRADOC Pam 525-8-2, 2011).

The U.S. Army's competitive advantage directly relates to its capacity to learn faster and adapt more quickly than its adversaries. The current pace of technological change increases the Army's challenge to maintain the edge over potential adversaries. In the highly competitive global learning environment where technology provides all players nearly ubiquitous access to information, the Army cannot risk failure through complacency, lack of imagination, or resistance to change. Outpacing adversaries is essential to maintain the Army's global status and to fulfill its responsibilities to the nation (TRADOC Pam 525-8-2, 2011).

The Army's old learning model is a decades-old model and bound by archaic ways of teaching, outdated technology, and is only capable of limited innovation. The Army worked over a decade to find a way to meet the rapidly evolving needs of the Army's challenging learning environments. In spite of these efforts, digital learning and adaptation occurred primarily in combat units while the institutional digital learning struggled to keep pace (Department of the Army, 2011). The Army trains and educates over a half million individuals per year in a resident-based, throughput-oriented education system that provides the Army with Soldiers from Initial Military Training (IMT), functional courses, and Professional Military

Education (PME). Fort Rucker trains approximately 300 IMT student and 1500 student for PME and this number fluctuates by as much as 10 percent annually, depending in management and resourcing challenges (Department of the Army, 2011).

Current learning is typically instructor-led, timed to predetermined course lengths, and not synchronized to meet individual student needs. Current instruction is based on individual tasks, conditions, and standards, which work well when the Army has a well-defined mission with a well-defined enemy (TRADOC Pam 525-8-2, 2011). Similarly, while critical thinking is frequently a course objective, instruction primarily delivers only concepts and knowledge. Mandatory subjects overcrowd Programs of Instruction (POIs) and leave little time for reflection or repetition needed to master fundamentals. Student assessments are traditional paper, open-book tests that lack rigor, technology integration, and fail to measure actual learning levels by objective grading without rubrics (Department of the Army, 2011). The Army often assigns instructors arbitrarily, rather than through a selection process that accounts for Subject Matter Expertise (SME) or aptitude to facilitate adult learning or the proper use of digital technology found in military classrooms (Department of the Army, 2011). Soldiers and leaders access, evaluate, and use information from a variety of sources and leverage technology (hardware and software) to improve their effectiveness and that of their teams while executing the Army's missions. Digital literacy skills are developed at initial entry and increase progressively at each career level (TRADOC Pam 525-8-2, 2011).

Statement of the Problem

Upgrades from regular classrooms to ensure they meet the Army Learning Concept (ALC) requirements has caused significant issues concerning the approach to learning throughout the Army's Training Command (TRADOC). There is a lack of research investigating the commonality or inconsistencies between perceptions of digital technology in the military education system by student and instructors.

The evolution of training within the military is transforming from paper documents to digital devices. Digital technology is advancing in U.S. military missions and individuals have become dependent upon these tools for everyday use (Sikes, Cherry, Duvall, Hargrove, & Tingman, 1996). Although technology surrounds every learner and instructor in the military, Prensky (2001) delineated people into two groups, digital immigrants and digital natives. When it relates to technology, digital immigrants are individuals born before 1980 and have known technology, watched it develop, and tried to stay abreast of this ever-changing industry. Digital immigrants are also referred to as Generation Xers, which denotes individuals that were born in the early 1960s to the early 1980s. The digital natives, born after 1980, are ingrained with the newest technology and have never been without the computer. The digital native closely aligns with Generation Y, which consists of individuals born between the early 1980's and early 2000s.

With the growth of Army aviation, the technology to deliver information in a more efficient manner is an issue that places both students and instructors in situations beyond their control. Some students and instructors find the advancement far beyond their capabilities, while others embrace digital technology. The fear of digital technology instills the proverbial axiom, which simple states "If it ain't broke, don't fix it."

Purpose of the Study

The purpose of this study was to examine the relationship of perceptions of the use of digital technology in military education by students and instructors. According to Prensky (2010), "digital technology is becoming an important part of students' education . . . [but] figuring out how to use technology meaningfully for technology . . . can help or hinder the educational process" (p. 3). In light of today's rapidly changing technology, instructors have important lessons to teach about technology, such as the meaning of research in an era of data and technical manipulation (Prensky, 2012). Whereas, students will teach instructors about technology and the 21st century life in general, and we can learn from them every day (Prensky, 2012). If students and instructors respond to, use and deliver technology differently, then it follows that the instructional technology used in course materials may have an impact on their satisfaction or frustration with the learning environment. This ultimately could impact their levels of learning, which this study seeks to examine through further inquiry and analysis.

Research Questions

The following questions were used in this study:

1) What are the perceptions of digital technology in military education by students?
2) What are the perceptions of digital technology in military education by instructors?
3) What is the relationship, if any, between the perceptions of students and instructors with digital technology in military education?

Significance of the Study

The world revolves around the use of technology and education and is witnessing an increasing demand for technology in the classroom environment. The desired outcome of this study is to determine the perception of digital technology in military education and the need for effective learning and instructing in current lessons. The increasing use of digital technology in learning environments to deliver training and education to members of the military parallels similar movements in both private and public sector organizations across the United States and with the advance of best practices being adopted through globalization, this is fast becoming a worldwide trend (Dicken, 2007). Regardless of the environment, the cost of training new digital technologies can be significant to an organization, not only in terms of the costs associated with the purchase of the technology, but in having to complete a specific training course using the new technology.

Given the substantial impact that technology can have on the military, research that attempts to better understand perceptions of technology of students and instructor and identifies contributing factors relating to digital technology in the military offers much promise in the area of instructional systems design for classroom learning and teaching. This study examines the perceptions of digital technology in the military education system.

Limitations

1) The results may not by representative of all the military education locations throughout the United States since the sample size for this study was 213 students and instructors from a military base in the southeast region of Alabama.
2) The participants were self-selected volunteers who were expected to have basic computer skills and were willing to take personal time to participate in the survey.
3) The study is only a snapshot in time and is limited in that it is a correlational study and does not indicate causation.
4) The use of self-reported knowledge about technology in military education.
5) Varying length of military courses in the military education system could cause the students and instructors to various points perception, due to some phases of training using technology more than others.
6) The participants were all Army Officer's within the Army Aviation Flight program.

Assumptions

1) Participants would truthfully answer the questions on the instrument used to collect data.
2) Participants were representative students and instructors in the military education population.
3) The Technologies in Military Education survey was a reliable and valid instrument in measuring the students and Instructors perceptions of implementing digital technology in military education.
4) Instructors and students would want to voluntarily participate and would be comfortable in a computer-based instrument.

Definitions

Digital immigrant. Either instructor or student in the military education system at the time of the study and were born prior to 1980.

Digital native. Either instructor or student in the military education system at the time of the study and were born in 1980 or more recently.

Flight School Twenty-One (FS XXI). FS XXI program serves as a phase of the initial-entry training program for Army helicopter pilots. Pilots supplement actual flying with classroom training and instructor-led training in leading-edge flight simulators. This phase of training includes flying in active duty Army aircraft.

Initial Entry Rotary Wing (IERW). IERW is sequential phases of training conducted in aircraft that are not used by active duty Army units. This phase of training starts with the theories of aerodynamics and basics of flying through instrument flying.

Instructor Pilot Course (IPC). IPC is an advanced graduate flight-training program specialized in training students become instructor pilots in AH-64A, AH-64D, AH-64E, CH-47D, CH-47F, OH-58A/C, OH-58D, UH-60A, UH-60M, MI-17, or learn to become a fixed-wing pilot. This course is a vigorous test of advanced knowledge and in depth learning of complex subjects, such as aerodynamics, Army and FAA regulations, fundamentals of instruction, and other graduate level training. All flight training is conducted in the pilot's assigned aircraft.

Method of Instruction (MOI). MOI is an advanced graduate flight-training program specialized in training students become instructor pilots in AH-64A, AH-64D, AH-64E, CH-47D, CH-47F, OH-58A/C, OH-58D, UH-60A, UH-60M, MI-17, or learn to become a fixed-wing pilot. This course is a vigorous test of advanced knowledge and in depth learning of complex subjects, such as aerodynamics, Army and FAA regulations, fundamentals of instruction, and other graduate level training. All flight training is conducted in the pilot's assigned aircraft. The pilot's graduating this course remains at Fort Rucker and continue to teach the Initial Entry Rotary Wing students.

Program of Instruction (POI). A requirements document that covers a course and/or phase. Provides a general description of the course content, the duration of instruction, the methods of instruction, and the delivery techniques; lists resources required to conduct peacetime and mobilization training.

Rotary Wing Instrument Flight Examiner Course (RWIFEC). RWIFEC is the pinnacle of instructor flight training. This course is a post-graduate level course teaching exceptionally advanced lessons to enhance active duty and National Guard units throughout the United States and abroad.

Technology. Technology is any form of web-based applications, interactive student handouts, hardware interface systems (computers, smart boards, and tablets), software applications, and other technology tools, which augments learning in a classroom. These technologies are assumed newer than five years old. Although there are areas of technology older than five years, with continuous upgrades, for this study, they would be considered outdated.

Training and Doctrine Command (TRADOC). Training and Doctrine Command develops, educates and trains Soldiers, civilians, and leaders; supports unit training; and designs, builds and integrates a versatile mix of capabilities, formations, and equipment to strengthen the U.S. Army as America's Force of Decisive Action.

Organization of the Study

The material presented in Chapter 1 provides the rationale for the research to examine the relationship between student and instructor perceptions with the use of digital technology us in military education. This quantitative, correlational study examined differences between the perceptions of students and Instructors with the implementation of digital technology in military education. There is an expectation of findings that will contribute positively to the Army education system and help instructors in formulating and employing initiatives to implement digital technology was the justification of this study. Chapter 2 contains a relevant review of the literature pertaining to digital technology and how it pertains to military and other education systems. The methods used to conduct the study, including the instrumentation of the Technology in Military Education Survey are addressed in Chapter 3. Research findings and results are presented in Chapter 4. Chapter 5 provides a summary of the study, conclusions, implications, and recommendations for future studies and research.

Chapter 2. LITERATURE REVIEW

Introduction

This chapter examines contemporary and keystone literature related to theoretical framework, technological students and instructors, technology in military education, and integrating technology in military classrooms.

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Technological Students and Instructors

Digital Immigrants

Just as Prensky describes digital natives, he describes digital immigrants as people who were not born into the digital world (Prensky, 2001). Even though some may have later adopted many aspects of technology (Prensky, 2001), "digital immigrants are immersed in an unfamiliar culture of technology use, language, and behaviors" (Toledo, 2007, p. 88). Writers are in agreement or in dispute with Prensky and many have applied this term to describe the group opposite of digital natives (Toledo, 2007; VanSlyke, 2003). Educational institutions also make use of the term, with the Australian National University directly acknowledging that many of its students are still of the digital immigrant generation (Visser, n.d.).

One identifying characteristic of digital immigrants is their accent (Prensky, 2001; Toledo, 2007). This so-called accent can be construed as the level of one's comfort with technology, so accents can vary among the digital immigrant group (Toledo, 2007). Another difference between the digital natives and digital immigrants, other than age, is the "intuitive acceptance of rapid digital change" (Woods, 2006, p. 2). The Immigrants, not having been exposed to technology as much as their counterparts, may have a more difficult time with the constant changes that often come with technology (Woods, 2006).

On the other hand, there may be some similarities between the two groups when it comes to technology. For example, some digital immigrants prefer information in print format, while only traces of this desire remain in others (Visser, n.d.). Another similarity is that both digital immigrants and digital natives are being overwhelmed with information today (VanSlyke, 2003, p. 3). VanSlyke (2003) goes onto write that, “perhaps it is not a difference in learning styles between the digital natives and digital immigrants, or that one is unresponsive to the teaching and learning forms of the other, but it could be a manner of cultural assimilation and the need to retain elements of both” (p. 4).

While Prensky (2001) asserts that, “digital immigrant instructors, with their pre-digital language and accent, are having difficulty teaching the new digital native population” (p. 2). Toledo (2007) asserts that many, “digital immigrant [instructors] have the ambition to experiment and utilize technology, and that some even become experts in the eyes of their colleagues” (p. 89). Good teaching is the necessary component, however, and it is not necessarily the amount of technology used, but how it is used (VanSlyke, 2003). Brown, Collins, and Duguid (1989) are correct in their assumptions that, “both digital natives and digital immigrants should learn to use technology tools in the culture and context in order to effectively utilize them” (p. 34).

A study of over 2,000 instructors showed statistically significant differences between digital natives and digital immigrants in regards to technologies used in education. One conclusion could be that digital natives and digital immigrants could be on the same level with a variety of technologies; therefore, a possible extrapolation is that they are on the same level when becoming instructors (Guo, Dobson, & Petrina, 2008).

Digital Natives

The actual term digital native was introduced by Marc Prensky in 2001, and has been used by many others as well (Bennett, Maton & Kervin, 2008; Gaston, 2006; Long, 2005; McHale, 2005). According to Prensky (2005), digital natives are "native speakers of technology, fluent in the digital language of computers, video games, and the Internet" (p. 8). In 2001, the students to whom he was referring were in the K-12 school system. However, these same students are now in colleges as well as in the work force, entering our classrooms as both students and instructors (Prensky, 2005). "Today's young people – both students in our schools and those entering instructor education programs – are digital natives who grew up in a world of computers, Internet, cell phones, MP3 players, and social networking" (Levine, 2010, p. 20). Although Prensky's definition has been accepted by many, the term digital natives is only one way to describe the group of students who have grown up with technology as the name of this group seems to change from article to article (Bennett, et al., 2008; Gaston, 2006; Long, 2005; McHale, 2005).

The years of birth of the generation in question also differ according to various researchers, ranging anywhere from 1977 to 2002. In utilizing Prensky's term of digital natives, Levine (2010) writes, "Today's traditional [students], aged 18 to 25, are digital natives," and that a digital native is "a person born in the digital age (after 1980) who has access to networked digital technologies and strong computer skills and knowledge" (p. 21). While the date of birth of a digital native also varies in the literature, the beginning year of birth for use in this study was 1980 due to the fact that in lies within several definitions found in the literature (Experiential eLearning, n.d.; Thiefoldt & Scheef, 2004).

Regardless of which term is used or the exact birth year, this generation is the fastest growing sector of today's workforce, growing from 14% of the workforce to 21% or nearly 32 million workers (Armour, 2010). They are "tech-savvy" since they grew up with technology and rely on it to perform their jobs better (Kane, n.d.). Researchers and authors note that technology (including computers, the Internet, cell phones, and pagers) has always been part of digital natives' lives (Theilfoldt & Scheef, 2004). According to Havenstein (2008), this generation has a constant desire to learn new skills and to have access to new technology. They are "the most connected generation in history" (Heathfield, n.d., p. 1). Jones (2002) found that "college students were among the first in our country to use the Internet for multiple purposes such as communication and recreation" (p. 5). Furthermore, according to Rainie (2006),

> some other technology advances this generation has been able to witness since birth include: the beginning of the World Wide Web in 1990; the Palm Pilot which first shipped in 1996; the Napster file-sharing service beginning in 1999; the creation of Wikipedia in 2001; RSS feeds and social network sites beginning in 2002; the iPod being patented in 2002; free online phone calling (Skype software was made available in 2003); the first camera phone in early 2003; and the online video explosion, including YouTube which went live in 2005. (p. 1)

Digital native generation learns differently, in both K-12 classrooms and higher education institutions (Prensky, 2001). This generation learns through experimentation, collaboration and peer-to-peer connection (Experiential eLearning, 2010). Dede (2005) refers to the "Neomillennial" (p. 1) learning style in higher education and claims that these new students look for shared learning that involves diverse, situated experiences. They also seek a "balance among experiential learning, guided mentoring, and collective reflection" (Dede, 2005, p. 1), which are components of Situated Learning Theory. Even more, learning is based on more active, social experiences and collective knowledge rather than simply individual information, which is again tied to the socialization and culture aspects of situated learning experiences (Dede, 2005).

When looking more closely, digital natives made up 20% of the college students using computers between the ages of five and eight, and before they were 18 years old, many had begun using computers and the Internet was an everyday resource (Jones, 2002). In addition, nearly half of the students reported that they used the Internet mainly to communicate socially and 72% said most of their online communication was with friends (Jones, 2002). Since these statistics were reported in 2002, and members of this group are now some instructors, it is clear that digital natives have had a great deal of access to technology and have used it both as a resource and in a teaching tool. “Today’s [military] student will be well prepared to work in a wired world. Virtually all of them will have experience with online examinations, [blackboard,] the [World-Wide] Web, and most will be familiar with a wide variety of software packages” (Jones, 2002, p. 19).

Even so, although digital natives may be familiar with these applications, and familiar with digital applications, technology is changing at an exponential rate, thus changing our world (Caruso & Salaway, 2007). In a later publication, Prensky (2010) denotes that “86% of U.S. instructors say computer technology has affected the way they teach to some extent, while 55.6% say it has affected their teaching a great deal” (p. 5). Caruso and Salaway (2007) found that undergraduate students “perceive technology’s persistence in their lives. These students, many of whom have never known a world without personal access to information technologies, often take them for granted and integrate them seamlessly into their daily lives” (p. 1). In 2008, another study focused on 2,000 incoming first-year Australian university students found that they were tech-savvy students, but there were variations in skills with different technologies, especially those beyond the most well-known technologies and tools such as computers, cell phones, and email (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Published findings from a study of 1554 prior instructors born after 1980 that found that a gap between everyday information communication technology and the use of it for teaching and learning still exists for this age group, again alluding to the perceived importance of digital technology (Chen, Lim, & Tan, 2010).

In light of these studies, digital natives are fairly new to the professional workplace today and are still in need of mentoring, regardless of experience or confidence in technology (Theilfoldt & Scheef, 2004). Since this generation is now entering classrooms as new instructors, it is important to note that, even though they are more comfortable with technology and have more experience using it in their everyday lives, "it may take longer than we think for the instructor corps to be savvy and effective users of electronic and online instructional tools" (Manzo, 2009, p. 1). The current instructor corps is composed of more than this new generation, so this applies to both digital natives and digital immigrants.

Technology in Military Education

Information Technology

Currently, the senior leadership of the U.S. military is almost entirely made up of digital immigrants, as is the bulk of its instructor and trainer corps (Prensky, 2003). This often leads to frustration from digital natives when the immigrants do not understand what they are asking for or why it is important to them. Many individuals who have tried to initiate programs, which involve digital experiences such as games, have experienced resistance from this group. They often report having difficulty finding high-ranking officers who "get it," enough to support certain types of unconventional digital native – oriented approaches. At this time, the U.S. Military is struggling to make itself as digitally advanced as possible, and to understand and fully exploit the implications for its mission and doing so by teaching from technologically advanced classrooms (Prensky, 2003).

Knowles, Holton, and Swanson (2005) indicated that "adult learning occurs in many different settings for many different reasons" (p. 142). Adults engage in higher education to enhance their opportunities for training or retraining (Knowles, 1984; Thompson & Deis, 2004). Morrison, Ross and Kemp (2007) indicate that the military is one of the environments where large numbers of adults have entered for training.

Teaching with Technology

Whether or not digital native and digital immigrant, students and instructors possess technology skills, and whether or not the technology is present in flight school, researchers agree that K-12 classroom technology implementation in schools has been very slow and below expectations (Inan, 2007). Knowledge of technology is only one critical component to an instructor's use of technology in their practice; they have to also learn how to use it for teaching and student learning, again demonstrating the need for training successful technology integration by both groups (Guha, 2000).

In order to investigate technology use by instructors, Boston College conducted the Use, Support, and Effect of Instructional Technology (USEIT) study in 2004. This study examined practices in 22 Massachusetts school districts, identifying ways in which instructors use technology for professional purposes and the extent to which new instructors are comfortable with technology and use technology for professional purposes. Since the definition of technology use has changed as technology that is more complex has surfaced, a summary of the categories of technology use by instructors was identified in the USEIT study (Bebell, Russell, & O'Dwyer, 2004).

The seven scales of use identified were preparation, professional mail, delivering instruction, accommodation, student use, student products, and grading. In general, instructors reported using technology most for preparation and email rather than student products and when looking at overall technology use, there was little difference between new instructors and those in the profession for 11 or more years (Bebell, et al., 2004). Within the statistics, however, new instructors actually reported utilizing technology more for preparation and accommodation than their more experienced instructors and less often for delivery and student use during class time (Bebell, et al., 2004). "The distribution of responses for the seven separate technology measures, however, suggest that the distribution of use varies dramatically across the separate categories of use" (Bebell, et al., 2004, p. 53). This demonstrates that, although instructors may use technology in their practice, the ways in which they use it varies and specific usage does not necessarily depend on the age of the user.

In a study of 1,382 instructors, it was demonstrated that technology is used in different ways in classrooms and can be grouped into categories: technology for instructional preparation, technology for instructional delivery, and technology as a learning tool (Inan, 2007). A more recent U.S. Department of Education report shows that technology use by students in classrooms also ranges by activity. Only 13% of instructor's report that they have students use technology "sometimes or often" to design and produce a product, 25% to conduct experiments or perform measurements, and 31% to correspond with others. On the other hand, use by students to only prepare written text is 61% and to learn or practice basic skills is 69%. "Most often [instructors] are using technology for administrative or preparatory tasks and only sporadically for classroom instruction" (Gray, Thomas, & Lewis, 2010, p. 156). Studies looking at the technology use by instructors provide valuable information into how instructors in general are using it in the classroom.

Do technology integration practices among new instructors vary according to when they were born as the distinction of digital natives and digital immigrants implies? Perhaps not. According to Webb (2005), although new instructors have entered the field of education with more advanced technology skills as compared to their veteran colleagues, "their integration of technology and use of it with their students has not been apparent" (p. 5). By identifying the similarities and/or differences in the practices of digital native and digital immigrant new instructors, professional development can be provided to this new generation in order to fully prepare them for working many years in a profession where technology integration is necessary for student success (Vitale, 2005). Instructors who have interactive whiteboards available for use, only 57% use them sometimes or often, student response systems only 35%, and videoconferencing only 13% (Vitale, 2005). "Professional development programs for technology integration that focus on the acquisition of skills, as well as those that 'show how' technology can be used in an instructional context, might be necessary pre-requisites to becoming a technology integrator" (Vitale, 2005, p. 13).

Even prior to becoming full-fledged instructors, Bansavich (2005) studied prior instructors' perceptions of the readiness to integrate technology, how program features influence their readiness, and the status of technology integration in instructor preparation programs, noting that the literature on technology background and how it influences prior instructors' readiness to teach with IT is still small. He found little evidence to show that background experiences with technology have an impact on prior instructors' use of technology in their teaching, thus carrying over to teaching. Although digital native new instructors may utilize technology more than digital immigrants outside of the classroom, all new instructors "will also require an understanding of how to develop curriculum and pedagogy that incorporates technology" (Bansavich, 2005, p. 21).

Studies on prior instructors, new instructors and technology use have been ongoing, many with an emphasis on preparedness. As far back as 1999, it has been found that new instructors were not being prepared to teach with technology and that instructor training institutions are not adequately preparing prior instructors to effectively integrate technology into the classroom (Glazewski, Brush, Ku, & Igoe, 2002). Several years later, limited technology use by prior instructors, even if prior instructors would have technology integration experience and knowledge is acquired by acting in the same conditions one would encounter on the job (Glazewski et al., 2002). These findings affect all new instructors, regardless of whether they fall in the digital native or digital immigrant categories, and continue to impact the preparation of new instructors today. "[Prior instructors] have "grown up digital," but being comfortable with technology is not adequate preparation for understanding how to meaningfully integrate technology" (Dutt-Doner et al., 2005, p. 63).

Levine (2010), former president of Columbia Teacher's College, makes the point that "the job of a[n] [instructor] has changed," and that "the preparation of the next generation of [instructors] and the professional development of current [instructors] will have to change if our [students] are to succeed in this new world" (p. 20). Whetstone and Carr-Chellman (2001) foretold Levine, "If [prior instructors] are not learning computer skills in self-contained courses, it is important to consider where these skills are being built" (p. 12). In the situated-learning approach, learning is a sociocultural activity rather than simply individual, which allows instructors to learn these technology skills from one another practicing in context. Teacher preparation programs and school districts can both play a role in building integration skills in order to stress to new instructors the importance of utilizing technology effectively in the classroom (Oregon Technology in Education Council, n.d.).

Perhaps it is the actual integration piece that poses a problem for both digital native and digital immigrant new instructors more than the knowledge of technology itself. When proposing an extended-time, multi-course technology integration model for prior instructors, Pierson (2004) suggested that new instructors possibly believe that "doing" technology means presenting students with "a shimmering, animated, masterpiece of an electronic presentation for every new lesson" (p. 85) rather than consistent, applicable integration. By expecting digital native instructors to effectively utilize technology in the classroom without specifically learning how to do so in the applicable environment, the importance of the social and physical context of using technology tools is ignored, thus working against the foundations of Situated Learning Theory (Brown et al., 1989; Ertmer, 1999; Stein, 1998). Therefore, Smith and Owens (2010) contend that, "technology will fail to meet its educational promise if we neglect to equip instructors with the skills they need to understand and use it and transmit this knowledge and skills to their future students" (p. 73).

Simply, the exposure to and knowledge of technology is not enough to ensure integration of it into the classroom. "If new [instructors] do not have a powerful vision of the types of learning and teaching they wish to support with technology, they will have a difficult time making intelligent choices about technology use in [the classroom] as [instructors]" (Pellegrino, Goldman, Bertenthal & Lawless, 2007, p. 83). Although instructor preparation and prior instructors have received attention in the research, "New [instructor] development following the completion of their formal [instructor] preparation has received little emphasis in the technology adoption literature" (Clausen, 2007, p. 246), demonstrating the need for technology research involving new instructors after they begin their careers.

Future leaders are transforming the Army to embrace Network-Centric Operations. In order to succeed as leaders, they must be able to "translate information superiority into combat power by exploiting hardware, software, and communications networks to interconnect people and systems, improve situational awareness, and shorten decision cycles" (Office of the Dean, n.d., p. 27). Information Technology (IT) encompasses the knowledge, skills, and tools by which one measures the physical world. IT is also used to disseminate, store, transform, process, analyze and present information to make it possible for an officer to understand the surrounding environment, and aid in the decision making process. While some applications of information technology require relatively little knowledge to use, many others are accessible only to those who have substantive understanding of the underlying technology (Office of the Dean, n.d.). Modern Army officers will need to "deal effectively with the pervasive influence of IT on all aspects of military operations, social, political, economic, and technological" (Office of the Dean, n.d., p. 27). Graduates must be able to apply IT productively, to recognize when information technology would assist or impede the achievement of a goal, and to adapt to changes in information technology. The study of IT as a part of the USMA core curriculum thus enables cadets to understand information technology broadly so that it becomes personally relevant and it provides cadets with the foundational skills and motivation to acquire future knowledge as information technology changes (Office of the Dean, n.d.). A graduate's IT proficiency is built upon a breadth of foundational knowledge and understanding that enables them to engage in lifelong learning, to become progressively more adept at applying information technology for a range of purposes, and to develop a deeper understanding of the technological opportunities for doing so. All USMA graduates will achieve a substantive level of understanding and proficiency in IT that is focused on abilities of greatest importance to the Army of 2020 and beyond (Office of the Dean, n.d.).

The single constant true today in society is the constant of technological change. Instructors have been struggling with the integration of technological change throughout education's history (Nickerson & Zodhiates, 2009). Throughout the 1990s, the military education system experimented with web-based tools and CD-ROM based training courses as the access to personal computers exploded in the general population. In the 2000s, distance and blended learning was popularized in the military and the birth of the virtual classrooms was realized (Garrison & Kanuka, 2004). Virtual reality (simulation in the military) has the potential to immerse the student in a variety of situations where they can visualize information and see hidden phenomena and help students understand concepts and processes unlike any previous experience (Mihalca & Miclea, 2007). In addition, virtual worlds allow the student to explore new ideas and concepts without the fear of failure and can always be terminated or restarted (Mihalca & Miclea, 2007). With the approach of digital technology and its potential to fundamentally change the nature of education, combined with the individualized educational experience that technology allows in the future, the 2020s will mark an evolution, perhaps even a revolution, in military education (Mihalca & Miclea, 2007). A keen understanding of the future technological developments, how they affect education, and the resulting necessary business processes in educational institutions is needed to prepare for this future state (Brynjolfsson & Hitt, 2000).

Learning with Technology

When analyzing the impact of technology, there are positive and negative aspects. Best practices for learning permits a sustained transformation of educational systems that focus on improving student performance (Wade, Ramussen, & Fox, 2013). Computer technology can help support learning, and that it is especially useful in developing the higher order skills of critical thinking, analysis, and scientific inquiry (Roschelle, Pea, Hoadley, Gordin, & Means, 2000). Little is known about specific practices or models that lead to substantive gains in student achievement. Some computer applications have been shown to be more successful than others and many factors influence how well even the most promising applications are implemented (Roschelle et al., 2000). However, the negative aspects are that, since technology found its way into our classrooms, many instructors have not adopted such advances and their instructional practices do not reflect the integration of instructional technologies (Mitchem, Wells, & Wells, 2003). The mere presence of computers in the classroom does not ensure their effective use, and the use of technology as an effective learning tool is more likely to take place when it is embedded in a broader education reform movement that includes improvements in student learning, curriculum, student assessment, and a school's capacity for change (Roschelle et al., 2000). Web-based learning opportunities have been expensive, slow to develop and time-consuming to implement despite pressure on schools to adopt technology solutions that will cure their educational ills (Blanchard & Marshall, 2004). All these factors influence a system's transformation and must include the philosophy and ideology of stakeholders, access, and goals of an organization (Wade, Ramussen & Fox, 2013). Leadership plays a vital role in making sure that the vision of an organization is realized. Some instructors indicated strong beliefs in the potential of technology to support student learning and the need to prepare students for the 21st

century workplace. Instructors also described technical support, professional development, and collaboration with other instructors as essential to their integration of handhelds. Some instructors do not effectively integrate technology into the curriculum due to a variety of factors, including a lack of professional development, technical support, and planning time (Hew & Brush, 2007). The limited and mostly low-level use of technology in teaching was largely attributed to the lack of technological and pedagogical resources and support in their schools (Mouza, 2011). Nevertheless, the ways those instructors use their developing knowledge practice varies (Mouza, 2011). Users' psychological variables (cognitive style, personality, self-efficacy, demographics, user-situational variables, etc.) can have different levels of influence on technology acceptance (Alavi & Joachimsthaler, 1992). Instructors do not integrate technology into their instruction is their lack of a vision on how technology can be effectively used and their need for effective models of integration to support teaching and learning (Hew & Brush, 2007). Instructors, which fall into the digital immigrant category, with limited technology literacy, might be reluctant to change even though they are obligated to adjust their teaching strategies to engage digital natives.

Integrating Technology into Military Classrooms

Technology Integration

History of technology integration in military education is commonly defined as a technical device or tool used to enhance instruction. Although there are differing opinions about the nature of instructional technology, the Commission on Instructional Technology (1970) provided the following definition, "Instructional technology is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction" (Lever-Duffy, McDonald, & Mizell, 2005, p. 21). According to Lever-Duffy, McDonald, and Mizell (2005), "educational technology might include media, models, projected and non-projected visual, as well as audio, video and digital media" (Lever-Duffy et al., p. 4).

The training of the U.S. Army, as a systematic educational practice, has ancient roots with technology playing an essential role. While other professions are often considered individual type of pursuits, the military requires the training of vast numbers of personnel in a synchronized fashion capable of producing predictable outcomes under stress. The evolution of military training and use of instructional technologies provides a model of experimentation, advances, and pedagogical practices and learning theory (Lever-Duffy et al., 2005).

As in the case of medicine, engineering, technology, management, organizational leadership, and research, practical applications in technology-based education and training have been a proving ground for innovations in the military. Four key accomplishments highlight the military contribution to instructional technologies: the development of the systems approach to training, the development of the inter-service instructional design models, the development of exportable training packages, and the development of distributed learning.

In the late 1960s, the Air Force assumed the lead in meeting the DoD's training challenges with the development and use of the Systems-Approach to Training (SAT) model (Platt, 1984). The SAT model to instructional design was found to be hugely successful in meeting the DoD's training challenges, and represented the first time that an entire service had required all of its training activities to use the same model (Montemerlo, 1975). The success of the Air Force's SAT model eventually allowed for the development of a joint instructional model which could be agreed upon by all the services and became known as the Interservice Procedure for Instructional Systems Development (IPISD) (Branson, Rayer, Cox, Furman, King, & Hannum, 1995; Platt, 1984).This model helped to further develop the concept of the "team approach" to training and instructional technology applications and uses five main phases: Analyze, Design, Develop, Implement, and Evaluate (ADDIE) and utilized in all military lesson plan and curriculum development today (Carey & Briggs, 1977).

The Navy's key contribution to the field of military educational technology was the development of the Instructional Program Development Center (IPDC) in 1975. The centers are run by civilian instructional developers who are placed at key naval installations throughout the country, and who are responsible for instructional design and media development for use at Navy schools (Carey & Briggs, 1977). The developments of the IPDC centers were created resulting from the difficulty of Navy instructional developers in implementing the IPISD model developed by the Air Force. It was found that many Navy instructors lacked the skills to effectively use the systems approach model, and high instructor turnover left the quality and quantity of instructional materials additionally lacking (Carey & Briggs, 1977). It was also found, that Navy instructors did not have the sufficient time needed to accomplish the systems approach to instruction, which relegated the IPISD model to the back seat as compared to other military priorities. As a result, the Instructional Program Development Centers has proven invaluable to the Navy's ability in producing quality instructional materials, and further enhances the military's team approach in instructional technology development (Carey and Briggs, 1977).

The Army's key contribution to growth of instructional technologies in the military has been in the development of the Technical Extension Course (TEC) concept (Platt, 1984). The TEC lessons represent the use of educational technology on a wide scale, combining advanced media with systematic instructional design. Army leaders decided that a large library of lessons were required to meet the initial and refresher training needs of soldiers that were scattered in remote locations throughout the world. By 1981, over 2,000 TEC courses had been produced, allowing fully exportable, self-contained instructional packages, which supported a variety of skill sets needed in the military (Platt, 1984). The Army Research Institute, evaluating the overall TEC program found it more effective than conventional instruction and cost 16% less (Platt, 1984). With more Army courses becoming transportable through distributed learning mediums, TEC savings is expected to increase even more. By the early 1940s, simulators and simulations came upon the instructional technology landscape, influencing military training and creating a multi-billion-dollar industry. The first simulator developed was the Link simulator for pilot training (Platt, 1984). The Link simulator allowed practice in flight training in a safe environment, at a relatively inexpensive cost. Since the early Link trainer, simulators continue to be developed and used by all of the services for maintenance training, weapons operation, tactical training, team training and many other uses (Platt, 1984). Simulations are currently being developed, using video game constructs, with computer models of complex equipment with the capability to freeze and play back training sessions, providing diagnostic record keeping, and easy malfunction insertion (Platt, 1984).

Today the military has been a leading advocate of distributed learning. The Army's distributed learning technologies has been used to enhance, reinforce and acquire learning for soldiers, by bringing instructions to the student, rather than the student to the instruction. The military forces of the early 21st century face complex and demanding training not just for combat but also for operations short of war, such as peacekeeping, humanitarian aid, counter-terrorism, and nation building (TRADOC PAM 350-70-12, 2013). For the Army, distributed learning technologies have reduced the travel requirements of soldiers and eliminated the need for expensive training costs, as well as providing a just in time training environment, at any time or place. More importantly, to the military, the time saved through distributed learning allows soldiers to be released earlier for operational duties resulting in increasing a soldier's operational value. For the Army, distributed learning is defined as, "deliver[ing] standardized individual and education to soldiers, leaders, civilians, and units using multiple delivery means and technologies that provide the capability to enhance and sustain Army readiness" (TRADOC PAM 350-70-12, 2013, p. 8). Sherron and Boettcher (1997) assert that the national learning needs of the information-age work force, is challenged to train the soldier of today to perform in a digital environment. In addition to leadership and problem-solving skills, today's soldier needs an understanding of advanced technologies and their capabilities. Consequently, the Army encourages soldiers and their family members to engage in continuous education.

In 1996, the Army distance learning plan was released by the Army's TRADOC command providing the development of courseware and the fielding of distance learning hardware, with classrooms equipped with video conferencing systems and computers at every Army installation. The potential for distributed education programs to a worldwide audience has increased the partnerships between academia and the military (Branson, 1976). Consequently, colleges and universities continue to partner with military installations to develop training and education programs for delivery over Army networks. As an example, Fort Hood and the Texas A&M University have developed a partnership in meeting training and professional development challenges through a combination of traditional classroom delivery supplemented with distance learning delivery (Branson, 1976). Unfortunately, even with the instructional technologies available, as identified in 1997 by the Department of Defense, high technology was not finding its way into training programs due to the lack of interoperability across computer-based instructional systems. Interoperability refers to the capability of different programs to exchange data through a common set of procedures, formats and protocols (Wisher, 2007). Standards were not in place, learning content developed in one vendor's system could not be delivered in another vendor's system and opportunities were being lost. As a result, an Executive Order, issued in 1999, charged the Department of Defense to lead in federal participation with business and academia in developing consensus standards for training software and associated services (Wisher, 2007).

One result of such participation included Advanced Distributed Learning (ADL®) and the establishment of the Sharable Content Object Reference Model (SCORM®) that is now in wide use around the world. The military's use of increasingly high-end instructional technologies and SCORM® compliant instructional media would not necessarily guarantee better training. It was found that in order to achieve the necessary transfer of learning from the training situation to the real world, a detailed analysis of responses inherent in a task or learning objective are necessary in order to be effectively applied into instructional technology (Platt, 1984). Once these tasks or learning objectives are studied from the point of view of inherent psychological responses of the Soldier, then they could become be effectively incorporated into the instructional technologies available. Unfortunately, far too often, instructional media is built based on an expert operating the equipment, where true psychological responses of Soldier trainees are often not incorporated into the learning model (Platt, 1984). Current training practices emphasize self-discipline and initiative, and a belief in both individual uniqueness and in skilled teams.

In today's Army, the Aviation Officer must be able to perform Warrior Tasks and Battle Drills (WTBD) to Army standards and to operate in any Operational Environment (OE) during the completion of the Initial Entry Rotary Wing (IERW) course, Instructor Pilot (IP) course, Method of Instruction (MOI) course, or Rotary Wing Instrument Flight Examiner Course (RWIFEC) before reporting to their assignment (Office of the Dean, n.d.). With unconventional threats, modern day challenges, as well as the advances in information technologies, it is not surprising that the military continues to leverage instructional technology applications that can meet the global challenges of the military (Platt, 1984). The instructional technology products used today through distributed learning include simulators, simulations, correspondence courses, audio conferencing, video teletraining (VTT), web-based instructor facilitated training (WBIFT), and Interactive Multimedia Instruction (IMI). This brief history reveals some significant differences between the academic learning community and the military learning community (Branson, 1976). Apart from the military mission being the most obvious difference, the conventional academic learning community has difficulty with a systematic approach to a solution, which can take years to identify a problem, develop alternative solutions, and finally implementing those solutions (Branson, 1976).

In the military, systematic approach to instruction is accomplished on a much shorter time line due to the criticality of its mission. Training must expeditiously prepare the total force of Active and Reserve components, civilians, and contractors, to learn, improvise and adapt to constantly changing threats. Military instructional technology is enhanced through an integrated systematic approach across the military services, private organizations, and multinational partners. The development of inter-service instructional technology development, the success of technical extension courses, and the continued development of distributed learning applications represent the military's commitment to educational technology (Branson, 1976).

Levels of Integration

Designing learning environments and experiences should be carefully planned for the type of cognitive processing we hope to foster. Applying Bloom's Taxonomy, Revised helps to clarify the levels of technology integration with respect to differences in levels of cognition. Bloom's Taxonomy, Revised (includes six cognitive levels; remember, understand, apply, analyze, evaluate, and create). As is the case with Bloom's Taxonomy, there are lower and higher level objectives (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths and Wittrock, 2001). The lower two levels of remember and understand involve using computers to store or display material, and where technology is placed in a passive role for students to use. The lower levels of cognition are foundational to any of the higher levels of cognition, where technology takes on a much more active and constructive role for students to use (Anderson, et al., 2001).

Today, computer applications often employ technology as an individual endeavor where the process of learning is internal and personal. However, collaborative and interactive skills are increasingly occurring through the use of the World Wide Web, engendering higher order cognitive skills (Ramsden, 1997). The key to understanding Bloom's Taxonomy, Revised is not to focus on the technology itself that are being used, but instead to focus on the cognitive process that the technology tool is supporting. As States and school systems with computers continue to adjust their own implementation and integration efforts, a measurement tool was developed to standardize technology progress that could be used to compare where each school stood as compared to other states and school systems (Ramsden, 1997).

One of the most well-known frameworks for measuring the use of instructional technology in the classroom is called the Levels of Technology Implementation (LoTi) scale, developed in 1999 by Dr. Christopher Moersch (Anderson et al., 2001). According to Anderson et al. (2001), "the real challenge to integrating effective instructional technology is to ensure it is purposeful, and uses problem solving; performance-based assessment practices, and provides interactive learning" (p. 5). The LoTi scale emphasizes interactive learning because interactivity, or learning by doing, has the greatest impact on supporting higher levels of learning as supported by Bloom's Taxonomy Revised (Anderson et al., 2001).

The LoTi framework can be used in any classroom to measure instructor implementation of instructional technologies and provides seven levels of assessment to measure the use of instructional tools and resources:

1) 0–Non-Use. It occurs when no instructional technology is used except for ditto sheets, chalkboards, and overhead projectors,

2) 1–Awareness. It occurs when instructional technology is used in learning labs, computer literacy classes, and central word processing labs, but where computer-based instruction in the classroom is non-existent,

3) 2–Exploration. It occurs when instructional technology serves only to supplement an existing instructional program. At this level instructional technology is simply an extension of activities used to enrich classroom instruction in the form of tutorials, educational games, and simulations, but requires only lower cognitive skills,

4) 3–Infusion. It occurs when instructional technologies include databases, spreadsheets, graphing packages, probes, multimedia applications, desktop publishing, and telecommunications to reinforce problem solving, reasoning, decision-making, and scientific inquiry. This level requires higher cognitive skill development and often takes

the form of spreadsheets and graphs to analyze results, or involves data sharing among schools through telecommunications,

5) 4A–Integration (mechanical). It occurs when instructional technology is used as a tool to identify and solve problems, but where technology is integrated in a mechanical manner. At this level technology is an often prepackaged material and is used to help the instructor in their instruction,

6) 4B–Integration (routine). It occurs when instructors create and use technology based tools that are integrated routinely into the curriculum, with little intervention from outside resources and provides rich context for student learning,

7) 5–Expansion. It occurs when instructional technology is extended beyond the classrooms, where instructors can implement technology to network to business enterprises, governmental agencies, research institutions, and universities. Students experience problem solving and issues resolution, and

8) 6–Refinement. It occurs when students solving authentic problems related to the "real-world" utilize instructional technology. (Anderson et al., 2001)

At this level, students have a complete understanding of technology-based tools to accomplish information queries, problem solving, and/or product development. In order to determine the levels of technology integration, it must be measurable and observable (Anderson et al., 2001). The LoTi scale is useful in its ability to measure and observe technology implementation as it relates to promoting student interactivity and higher order thinking (Moersch, 1999). Another useful tool for assessing technology integration was developed by the University of South Florida, Center for Instructional Technology and suitably named the Technology Integration Matrix (TIM) (Domine, 2006). The TIM matrix, similar to the LoTi scale represents levels of technology integration ranging from the basic entry level, where the instructor uses technology to deliver curriculum, to the infusion level where the instructor creates a learning environment that infuses technology tools throughout the day (Domine, 2006). The Technology Integration Matrix (TIM) was developed to help guide the difficulties in evaluating technology integration in the classroom. The TIM is envisioned as an Enhancing Education Through Technology (EETT) program resource, which can help support the full integration of technology in Florida schools (Domine, 2006). The TIM matrix focuses on the learning outcomes that can be realized with increasingly effective integration of technology. The TIM matrix includes categories that can be graded based on ranges from active, collaborative, constructive, authentic, and goal directed. Each grade in the rubric comes with a description of what that level of integration would look like, from the conventional use of tool-based software, to selecting a technology tool to accomplish the task at hand (Domine, 2006). The TIM is envisioned as a resource, which can help support the full integration of technology in Florida schools, where LoTi is envisioned to apply more broadly to schools and institutions across all learning endeavors. Both the TIM matrix and the LoTi scale are ideal for measuring technology integration levels that integrates technology based on Bloom's Taxonomy of higher order cognitive skills (Domine, 2006). The ability to measure one's own technology integration level allows school districts to evaluate instructors' current levels of proficiency with technology and can also be used as a professional development planning and needs assessment resource tool.

Barriers to Integration

A major part of the problem related to technology integration is that most instructors have not addressed the pedagogical principles that will guide their use of technology for teaching and learning. The intricate relationship between technology and pedagogy has not been adequately explored. Instructional technology must go beyond focusing on the acquisition of technical skills but should be given "the instructional strategies needed to infuse technological skills into the learning process" (Means, 1994, p.92). Lack of appropriate guidelines often limit instructors' use of instructional technology in their instruction, and inhibits their desire to explore the use of technology beyond basic applications.

The role of the instructor as a facilitator, within a constructivist classroom, should be used to enhance collaboration and cooperative learning where social and intellectual pursuits are supported through problem-based projects where students actively construct knowledge and link knew knowledge with previous knowledge (Jonassen, 1999). Jonassen (1999) wrote, "The [instructor] is the ultimate key to educational change. Therefore, one element of the successful implementation of online learning is related to [instructor] readiness" (p. 20).

According to Swain and Pearson (2002), "Using computers as a productivity tool is one of the six National Educational Technological Standards (NETS) for [instructors], and states that [instructors] will use technology to enhance [both] their productivity and professional practices" (p. 12) A study conducted by Li (2007) found that "[instructors] and students were not sufficiently heard" (p. 34). This research study provided a broader perspective to study instructors and their students in technology-enhanced environments. The results of the research demonstrate that a technology-enhanced environment should be viewed as a system of interacting components that include students, instructors, and administrators (Li, 2007).

Students' and instructors' beliefs about technology and its components directly contribute to the functionality of a technology enhanced learning environment and the system it operates under. Infusing technology into a curriculum is less likely to make an impact on students' learning if technology is not considered as a component of instruction (Morrison, Lowther, &

DeMeulle, 1999). Technology should not be treated as a separate entity but should be considered as an integral part of instructional delivery (Li, 2007). A significant determinant of the instructors' levels of engagement is their confidence level in using technology (Jones, 2003). Overall, it was found that instructors are competent and confident in using a computer for word processing, emailing and using the Internet, but this did not correlate in knowing how to integrate the use of the online learning into their classrooms in a confident and effective manner (Jones, 2003).

While instructors have received some staff development training in technology implementation in the classroom, the training tends to focus on the nature of the software program, its components, and resources, instead of how to integrate technology into teaching strategies and approaches that would be effective in a blended learning environment (Jones, 2003). Educators who do not apply technology effectively will be less likely to achieve success in a technology-based learning environment. Digital technology could not support learning without instructors who know how to use it and integrate it into subject-specific areas (Eby, 1997). The instructor should be able to assess the appropriateness of any technology used for teaching and learning in relation to specific instruction. Such consideration will provide instructors the opportunity to reflect on their practice and reduce the tendency to integrate technology into teaching and learning in ways that do not enhance academic success.

As technology trends advance there will be a continuous need to provide the level of technical support, technology training, and curriculum development integrated with technology that enhances overall student learning. Studies by Li (2007), on student and instructor views of technology integration, developed four major qualitative themes

1) Increased efficiency and the need for change,

2) Pedagogy,

3) Future preparation, and

4) Increased motivation and confidence.

These themes were then used to develop a correlation analysis to produce quantitative statistical data. For example, the first theme of increased efficiency found that 73% of the students commented that they felt technology was both useful and efficient, producing two categories (1) technology allowed easy access to information and cutting-edge research; and (2) it made learning easier (Li, 2007). The belief that the instructor should also consider how the technology selected fits into the objective of the lesson, methods of instruction, evaluation, feedback and follow-up initiatives. The blending of traditional and online learning approaches needs to be more fully understood, in order to affect the appropriate balance between traditional and online learning (Li, 2007).

Knowing how to optimize the role of the instructor and the student in sharing the learning process will help to balance traditional and online learning. In this way, students will take a more active role in their own learning and instructors will need to become facilitators, who guide and/or mentor the students' learning process. Teacher's role as facilitators have been around for some time, but knowing what facilitation looks like has not been adequately explored (Li, 2007). The constructivist methodology is not easy, particularly for those holding fast to the instructor–expert model, because it represents a paradigm shift from the traditional roles of instructors and students and works against well-established roles and practices (Sadik, 2008).

A number of challenges to blending online learning with traditional practices include instructors who feel threatened by changing from whole-class teaching to supporting groups of students learning on their own. One challenge includes fear of losing their own identity and control of the students. Another challenge is convincing instructors that students are capable of taking an active role in the learning process (Sadik, 2008). Digital story telling through technology integrated learning and interviewing instructors who felt that online learning and independent study are for mature and self-motivated students and not appropriate for students of all abilities (Sadik, 2008). Teachers were not technically proficient and could not explain the technical, organizational, and peripheral processes, where the computer instructor was called for technical assistance (Sadik, 2008). The effectiveness of a long-term professional development program, which promoted increased use of technology in the participants' instruction (Brinkerhoff, 2006). Brinkerhoff (2006) further asserts significant gains in participants' self-assessed technology skills and computer self-efficacy, indicating participants felt their teaching had changed. Brinkerhoff (2006) concludes that technology integrated instruction around "participants' teaching interests, using hands-on activities and projects with end products that are shared with the whole group" (p. 40) were shown to enhance participant reactions.

Technologies used for instructional delivery should form part of the cohesive components of instruction; they should not be detachable objects. An educator who does not understand the purpose of technology integration or how it could be applied is less likely to achieve success in a technology-based learning environment (Gopalakrishnan, 2006). The effects that personal support provided to instructors would help them in making technology a seamless part of their teaching and learning (Gopalakrishnan, 2006). The personal support concept provides technical support, personal encouragement, evaluation of new technologies facilitated, and collaboration among staff. Similar to professional development, the need to develop curriculum was integral to the personal support techniques found successful. When the more conventional aspects of professional development are combined with personal support, instructor motivation is enhanced and instructors are then more easily able to make technology a part of their ongoing instruction and classroom environment. As instructors become increasingly techno-savvy, they continue to gain confidence by sharing their experiences with others, seeking out creative uses for existing and new technology solutions, and motivating other instructors (Gopalakrishnan, 2006). It is important that instructors recognize that a relationship exists between technology in education and pedagogical decision-making. Technologies used for instructional delivery should form part of cohesive whole, where instruction and learning are inseparable from each other. The instructor should be able to assess the appropriateness of any technology used for teaching and learning by applying technology pedagogy that best fits into the objective of the lesson (Okojie, Olinzock, & Okojie-Boulder, 2006). According to Anderson and Borthwick (2002), "participants whose technology instruction was integrated in their [class] reported more frequent use of technology for both [instructor] productivity and student projects during . . . actual classroom teaching" (p. 5). When instructors explore the process of technology integration and search for ways that it can be effectively accomplished, the suitability of the technologies they are using and whether they are compatible with their lesson plan and learning outcomes, will be improved (Anderson & Borthwick, 2002).

Summary

The review of literature addressed the technological students in the aspect of delineating digital natives and digital immigrants. The literature review provided a framework for technology in military education, to include information technology, teaching with technology as well as learning with technology. Additionally, the literature review addressed the integration of technology into military classrooms and the levels of integration involved. The section concluded with the barriers to integrating technology into military classrooms that addressed potential problems that could be faced when technology new to students and instructors.

Chapter 3. METHODS

Introduction

Individuals involved with developing curriculum for flight school at all levels should consider the key role instructors play in shaping the students from IERW to RWIFEC and how the level of student attending the school will be able to adapt to digital technology. The examination of the perceptions of digital technology by both instructor and students can lead to a better understanding of how to implement digital technology.

This chapter describes the sample section of the study, data collection methods, and a discussion of the instrument utilized: Perceptions of Digital Technology in the military. The projected research methods for data analysis and interpretation as well as a summary will conclude this chapter.

Purpose of the Study

The purpose of this study was to examine the relationship of perceptions of the use of digital technology in military education by students and instructors. According to Prensky (2010), "digital technology is becoming an important part of students' education . . . [but] figuring out how to use technology meaningfully for technology . . . can help or hinder the educational process" (p. 3). In light of today's rapidly changing technology, instructors have important lessons to teach about technology, such as the meaning of research in an era of data and technical manipulation (Prensky, 2012). Whereas, students will teach instructors about technology and the 21st century life in general, and we can learn from them every day (Prensky, 2012). If students and instructors respond to, use and deliver technology differently, then it follows that the instructional technology used in course materials may have an impact on their satisfaction or frustration with the learning environment. This ultimately could impact their levels of learning, which this study seeks to examine through further inquiry and analysis.

Research Questions

The following questions were used in this study:

1) What are the perceptions of digital technology in military education by students?
2) What are the perceptions of digital technology in military education by Instructors?
3) What is the relationship, if any, between the perceptions of students and Instructors with digital technology in military education?

Methods

The researcher initiated the research process by completing the Collaborative Institutional Training Initiative (CITI) models as a criterion for obtaining approval from Auburn University's Institutional Review Board (IRB) (See Appendix A). The researcher researched several qualitative and quantitative instruments and developed the instrument used for this study.

After development of the instrument, the researcher contacted several representatives from a military installation in the southeast region of Alabama to obtain permission to use the instrument for dissertation research. The researcher submitted instrument and information documents through the Judge Advocate General (JAG) to ensure regulations were maintained, as participants could be a military member. The researcher agreed to use the data solely for research purposes and present a copy of finding to JAG, as prescribed by regulation.

Letters of consent were handed out to each participant (See Appendix A), which included a unique identifier, so no two participants would be counted twice, and the web page where the instrument could be taken on Qualtrics (See Appendix B). The website was given in two ways, long URL form, copied from the website and a short form, derived from tinyurl.com. The short form was for ease of participant access. Upon completion of the instrument, the items were entered into Qualtrics: Online Survey Insight & Platform, which export the data into SPSS Predictive Analytic Software for analysis and interpretation. A brief section for demographic information was also added to the beginning of the Qualtrics survey to obtain information regarding the participants' gender and age.

Sample

This study was conducted using students and instructors from a military installation in the southeast region of Alabama. The sample consisted of 213 participants. All of the 213 participants were at least 19 years of age or older. Each one of the participants were self-selected volunteers and took time to complete the instrument. The student participants were in the Army's flight training program and the instructor participants taught the very same program. The total number of participants in the study was 213. Of the 213 participants, 7 or 3.3% completed between 40% to 70% of the survey, 39 or 18.3% completed 80% of the survey, 61 or 28.6% completed 90% of the survey, and 106 or 49.8% completed 100% of the survey. The Perception of Technology in Military Education had a response rate of 98% as 213 participants completed it.

Instrumentation

The examination of existing archival data is a common technique used for gathering data, especially in cases where the participants are no longer available, so therefore cannot be observed, surveyed, or interviewed (Mason, 1996). Surveys are extremely useful when gathering quantitative and qualitative information form specific participants, allowing both demographics and frequencies to be captured that describe them as a group, as well as their perceptions of various elements of an environment (Fowler, 1988; Gall, Borg, & Gall, 1996; Patton, 2001). The analysis of both individual and summary data is commonly referred to as meta-analysis and has been routinely used various application to combine multiple data sets into a single unified interpretation and has more recently come to applied to survey data analysis (Rao, Graubard, Schmid, Morton, Louis, Zaslavsky, & Finkelstein, 2008).

The survey data obtained was collected as a matter of standard administration of the Technology in military Education survey at a military installation in the southeast region of Alabama. The data was gathered from students attending one of the following flight school programs as an Army Officer: a) Initial Entry Rotary Wing Course, b) Flight School XXI (FS XXI) Course, c) Instructor Pilot Course (IPC), d) Method of Instruction (MOI) Course, and the Rotary Wing Instrument Flight Examiner Course (RWIFEC).

Students provided their information voluntarily after receiving an information letter, which outlined the purpose of the study and additional information required by the Auburn IRB (See Appendix A). A demographic question set was developed to obtain information on the participant variables relevant to the study. Participants were asked to enter a unique alphanumeric identifier and then respond to a brief series of question pertaining to digital technology experience level, instructional delivery, gender, age, owning a computer, use of a computer, and if a computer were issued as they affected the dependent variable of satisfaction of digital technology (See Appendix B). These questions were not meant to cause any stress or anxiety to the participants.

Data Collection

The researcher obtained permission from the Auburn University Institutional Review Board for the Use of Human Subjects in Research (IRB) (See Appendix A). The written consent detailed the project abstract, purpose, participant selection, and methodology of the study. Once the approval was granted, participants were sought. In order to obtain participants, the researcher solicited students at a military base the southeast region of Alabama. The researcher presented participants with an information letter (See Appendix A) and wrote the web link to the Technologies in Military Education survey in Qualtrics on a white board for the students.

Details of the study were explained to the Commandant of flight school and Branch Chiefs of the training locations. If a participant decided to partake in the study, the data they provided served as his/her agreement to do so. The Participant Information Letter described the nature and purpose of the study, along with providing a description of the instrument that was used to collect data, and the approximate length of time it would take to complete the instrument.

The investigator sought permission and approval from the Branch Chiefs of each flight school section that agreed to participate in the study. Participating sections included both mix of students and instructors from IERW (Undergraduate) to RWIFEC Graduate/Post-Graduate). The instructions (See Appendix C) for taking the on-line assessments were handed to the participants. The participants were given a unique identifier to protect their identity, while enabling the researcher to correlate the responses on the instrument. The participants were coded using an alphanumeric scale.

The participants were notified that there would be no financial compensation for participating in the study and individual results from the study were not disclosed. The participants were given an opportunity to ask questions before, during, and after the administration of the instruments. The researcher distributed the information paper to participants at a time that was agreed upon by the Branch Chiefs of each section and times for survey distribution varied by site. After the participants completed the instrument, they closed their web browser. Participants were notified the results were stored in an on-line database prior to taking the instrument.

The data were coded with the participant's unique identifier, so when the data was analyzed, it could be compared with each participant's experience level, instructional delivery, gender, age, owning a computer, use of a computer, and if a computer were issued, were reported. Some sections of flight school had more participation and received strong encouragement to participate in the study from their Branch Chiefs, while others seemed unrestricted from persuasion and/or Branch Chief supervision.

Data Analysis

The data were initially analyzed using descriptive statistics in SPSS. The means and standard deviations for years of experience level, instructional delivery, gender, age, year born, if a computer were issued by the military for educational purposes, and preferred instructional delivery method were reported. The researcher first looked at means among the independent variables, years of experience level, instructional delivery, gender, age, year born, if a computer were issued by the military for educational purposes, and preferred instructional delivery method. Further analyzes was conducted to obtain the means of the independent variables compared to the dependent variables of technology knowledge, technology importance, and technology satisfaction.

Summary

In this chapter, the research questions and methods were described. This chapter also identified the sample used in the study. Instrumentation using the Technology in Military Education Survey was described, along with the data collected in accordance with Auburn University Institutional Research Board. Statistical procedures for data analysis include descriptive statistics to report sample size, frequencies, and standard deviations.

Chapter 4. FINDINGS

Introduction

This chapter presents the findings of the research study. Data regarding the research questions will be presented and analyzed. The analysis will be preceded by an explanation. The SPSS statistical system was used for the computation in the analysis of the data.

Purpose of the Study

The purpose of this study was to examine the relationship of perceptions of the use of digital technology in military education by students and instructors. According to Prensky (2010), “digital technology is becoming an important part of students’ education . . . [but] figuring out how to use technology meaningfully for technology . . . can help or hinder the educational process” (p. 3). In light of today’s rapidly changing technology, instructors have important lessons to teach about technology, such as the meaning of research in an era of data and technical manipulation (Prensky, 2012). Whereas, students will teach instructors about technology and the 21st century life in general, and we can learn from them every day (Prensky, 2012). If students and instructors respond to, use and deliver technology differently, then it follows that the instructional technology used in course materials may have an impact on their satisfaction or frustration with the learning environment. This ultimately could impact their levels of learning, which this study seeks to examine through further inquiry and analysis.

Research Questions

The following questions were used in this study:

1) What are the perceptions of digital technology in military education by students?

2) What are the perceptions of digital technology in military education by Instructors?

3) What is the relationship, if any, between the perceptions of students and Instructors with digital technology in military education?

Description of Sample

The sample for this study was selected from student pilots and instructors at a military installation in the southeast region of Alabama. Included in the sample were male and female students, who were at least 19 years old, enrolled in a valid flight school program, and in current good academic standing. The instructors were male and female, who were at least 19 years old, instructor certified in accordance with TRADOC regulations, and currently employed by the Army's flight school. Of the 213 participants, 202 or 94.8% completed all parts of the study. The question not answered by 37.5% of the participants in the survey was,

- Upon graduation from my current course, I feel the technology implemented throughout the course will help me with my job

Student and Instructor Participants

The participants (N=213) in the study were 67.6% students in a flight program and 32.4% instructors, certified to teach a flight program at a military installation in southeast Alabama. Distribution of participants in this study by student and instructor is shown in Table 1.

Table 1

Distribution of Participants by Student and Instructor

Participant Category	*n*	%
Student	144	67.6
Instructor	69	32.4

Note: N=213

Gender of Participants

The participants in the study were predominantly male (86.9%) with females comprising 13.1%. Distribution of participants in the study is provided in Table 2.

Table 2

Distribution of Participants by Gender

Gender	Student (*n*=144)		Instructor (*n*=69)		Combined (N=213)	
	n	%	*n*	%	*n*	%
Male	126	87.5	59	85.5	185	86.9
Female	18	12.5	10	14.5	28	13.1

Note: N=213

Age of Participants

The participants ranged from 19 to 65 years of age. The mean age was 32.45 years with the largest for both student and instructor falling between 19 and 26 years of age (46.9%). It is notable that no students exceed the 36 to 45 years of age range. Distribution of participants in this study by age is provided in Table 3.

Table 3

Distribution of Participants Age

Age Range	Student (*n*=144)		Instructor (*n*=69)		Combined (N=213)	
	n	%	*n*	%	*n*	%
19-26	72	50	28	40.6	100	46.9
27-35	48	33.3	5	7.2	53	24.9
36-45	24	16.7	11	15.9	35	16.4
46-55	0	0	15	21.7	15	7.0
56-65	0	0	10	14.5	10	4.7

Note: N = 213

Participants Born Before and After 1980

The survey consisted of 213 participants, of which 28.7% were born after 1980, which places them into the category referred to as digital native, while the remaining 71.3% were born before 1980, falling into the category referred to as digital immigrant. Distribution of participants in this study by year in which they were born, and further by student and instructor, is provided in Table 4.

Table 4

Distribution of Participants by Year Born

	Student (*n*=144)		Instructor (*n*=69)		Combined (N=213)	
Characteristic	*n*	%	*n*	%	*n*	%
Born Before 1980						
Male	26	18.1	26	37.7	52	24.4
Female	2	1.4	7	10.2	9	4.3
Born After 1980						
Male	100	69.4	33	47.8	133	62.4
Female	16	11.1	3	4.3	19	8.9

Note: N=213

Participants Experience with a Computer

The participants reported experience with a computer ranging from 2 to 36 years. The means years of experience for the participants was 17.1, and the mode was 15, which accounted for 35 participants (16.4%). Table 5 provides the distribution of participant's experience with a computer. One hundred five of the study participant's reports having 14-20 years of computer experience. It is notable to point out that the instructors did not have any participants with less than six years' computer experience.

Table 5

Distribution of Participants Experience with a Computer

	Student (*n*=144)		Instructor (*n*=69)		Combined (N=213)	
Years of Experience	*n*	%	*n*	%	*n*	%
<6 Years	8	5.6	0	0	8	3.8
7-13 Years	39	27.1	13	18.8	52	28.2
14-20 Years	77	53.5	28	40.6	105	49.3
21-27 Years	16	11.1	14	20.3	30	14.1
>28 Years	4	2.8	14	20.3	18	8.5

Note: N = 213

Issued a Computer for Military Education

Of the 213 participants in the study 168 (79.6%) reported being issued a computer for military education. The remainder of the 43 participants (20.4%) were not issued a computer. Distribution of participants issued a computer for military education is shown in Table 6.

Table 6

Distribution of Participants Issued a Computer for Military Education

	Student (*n*=142)		Instructor (*n*=69)		Combined (N=211)	
Issued a Military Computer	*n*	%	*n*	%	*n*	%
Yes	130	90.3	38	55.1	168	79.6
No	12	8.3	31	44.9	43	20.4

Note: N=211

Participants Instructional Delivery Method Preference

The participants reported and instructional delivery method preference of face-to-face at 87.2%. Web-based instruction and digital instruction have a combined preference of 12.8% by the participants. The distribution of participant's instructional delivery method preference is provided in Table 7.

Table 7

Distribution of Participants Instructional Delivery Method Preference

	Student (*n*=144)		Instructor (*n*=69)		Combined (N=213)	
Delivery Preference	*n*	%	*n*	%	*n*	%
Face-to-Face Instruction	127	88.2	57	82.6	184	87.2
Web-Based Instruction	7	4.9	5	7.2	12	5.7
Digital Instruction	8	5.6	7	10.1	15	7.1

Note: N=213

Participants Perceptions of Technology

Three areas covered within the participant perception of technology are technology knowledge, technology importance, and technology satisfaction. The Likert scale is a set of items, composed of approximately an equal number of favorable and unfavorable statements concerning the attitude object, is given to a group of subjects. They are asked to respond to each statement in terms of their own degree of agreement or disagreement. Typically, they are instructed to select one of five responses: poor, fair, good, very good, or excellent (other scales are used in this study). The specific responses to the items are combined so that individuals with the most favorable attitudes will have the highest scores while individuals with the least favorable (or unfavorable) attitudes will have the lowest scores. While not all summated scales are created according to Likert's specific procedures, all such scales share the basic logic associated with Likert type scaling (Gliem & Gliem, 2003).

The participants in the study reported a perception of technology knowledge in four categories, a laptop computer, smart phone, tablet device, and printer. 99.9% of the participants responded with their perception of technology knowledge. One instructor abandoned giving a perception for a smart phone. The mean and standard deviation for both students and instructors is provided in Table 8.

Table 8

Participants Perceptions of Technology Knowledge

	Student (*n*=144)		Instructor (*n* =69)		Combined (N=213)	
Technology Knowledge	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Laptop	4.05	.847	4.09	.853	4.06	.847
Smart Phone	4.18	.898	3.90	1.081	4.09	.967
Tablet Device	4.06	.902	3.67	1.184	3.93	1.017
Printer	3.92	.932	4.03	.874	3.96	.913

Note: N=213

The participants in the study reported a perception of technology importance in six categories, a desktop computer, laptop computer, cell phone, tablet device, printer, and clicker or presenter. An average of 120.5 of 144 (83.7) student and 53.2 of 69 (77%) instructor participants responded with their perception on any technology importance. The mean and standard deviation for both students and instructors is provided in Table 9.

Table 9

Participants Perceptions of Technology Importance

	Student (*n*=144)		Instructor (*n* =69)		Combined (N=213)	
Technology Importance	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Desktop Computer	3.04	1.219	3.80	1.071	3.28	1.223
Laptop Computer	4.17	1.011	3.81	1.100	4.06	1.049

Cell Phone	3.46	1.291	2.78	1.254	3.25	1.315
Tablet Device	3.52	1.223	2.98	1.336	3.35	1.278
Printer	4.02	1.109	4.11	1.013	4.05	1.079
Clicker or Presenter	3.18	1.308	3.49	1.265	3.28	1.299

Note: N=213

The participants in the study reported a perception of technology satisfaction in five categories, level of training, ease of use, computer quality, computer updates, and computer usage. An average of 142 of 144 (98.6) student and 66.8 of 69 (96.8%) instructor participants responded with their perception on any technology satisfaction. The mean and standard deviation for both students and instructors is provided in Table 10.

Table 10

Participants Perceptions of Technology Satisfaction

	Student (*n*=144)		Instructor (*n* =69)		Combined (N=213)	
Technology Satisfaction	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Level of Training	3.19	.978	3.24	.836	3.20	.934
Ease of Use	3.08	1.123	3.21	.826	3.12	1.037
Computer Quality	2.77	1.134	3.18	.991	2.90	1.105
Computer Updates	2.85	1.127	2.93	1.091	2.88	1.114
Computer Usage	3.23	.953	3.15	.723	3.21	.885

Note: N=213

Quality of Military Education is Enhanced with Digital Technology

The participants in the study reported a perception of the quality of military education being enhanced with digital technology. Of the 213 participants, 210 (98.6%) responded to this question. The mean and standard deviation for both students and instructors is provided in Table 11.

Table 11

Participants Perception of Technology Enhancing Military Education

	Student (*n*=140)		Instructor (*n* =68)		Combined (N=210)	
Technology Enhanced	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
The Quality of Military Education is Enhanced Through use of Digital Technology	3.73	1.066	3.75	.983	3.53	1.029

Note: N=211

The participants in the study reported a perception of the implemented will technology help with their job. Of the 213 participants, 209 (98.1%) responded to this question. The mean and standard deviation for both students and instructors is provided in Table 12.

Table 12

Participants Perception of Implemented Technology Helped with Job

	Student (*n*=142)		Instructor (*n* =67)		Combined (N=209)	
Technology Help with Job	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
The Implemented Technology Will Help with Job	3.46	1.131	3.68	.762	3.73	1.038

Note: N=209

Reliability of Scales

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ >

.6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable” (p. 231). While increasing the value of alpha is partially dependent upon the number of items in the scale, it should be noted that this has diminishing returns. It should also be noted that an alpha of .7 is probably a reasonable goal. The findings of the three technology knowledge, technology importance, and technology satisfaction scales indicated a reliability statistic larger than .692. Therefore, the researcher was able to report the results with confidence.

The reliability of technology knowledge shows a Cronbach’s alpha of .913, which is in the range of excellent and confidence of this scale being compared to all variables established. The reliability of scale for perception of technology knowledge is shown in Table 13.

Table 13

Reliability of Perception of Technology Knowledge Scale

	N	$\bar{X}$	Variance	SD
Statistics for Scale	4	16.04	11.183	3.344

	$\bar{X}$	Minimum	Maximum	Range	Max/Min	Variance
Item Means	4.009	3.929	4.090	.160	1.041	.006
Item Variances	.882	.721	1.033	.312	1.432	.018
Inter-Item Correlations	.727	.594	.855	.262	1.441	.007

Item Total Statistics	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected If Total Correlation	Squared Multiple Correlation	Alpha If Item Deleted
Knowledge on Computer	11.98	6.772	.835	.727	.879
Knowledge of Smart Phone	11.95	6.286	.817	.772	.882
Knowledge on Tablet Device	12.11	5.974	.841	.770	.874
Knowledge of Printer	12.08	6.861	.727	.629	.912

	Alpha	Standardized Item Alpha
Reliability Coefficients for Knowledge	.913	.914

The reliability of technology importance shows a Cronbach's alpha of .692, which is borderline acceptable range and confidence of this scale being compared to all variables established. The reliability of scale for perception of technology knowledge is shown in Table 14.

Table 14

Reliability of Perception of Technology Importance Scale

	N	$\bar{X}$	Variance	SD		
Statistics for Scale	6	21.19	21.011	4.584		
	$\bar{X}$	Minimum	Maximum	Range	Max/Min	Variance
Item Means	3.532	3.234	4.048	.814	1.252	.159
Item Variances	1.482	1.130	1.764	.634	1.561	.072
Inter-Item Correlations	.276	.041	.609	.568	14.904	.019
Item Total Statistics	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected If Total Correlation	Squared Multiple Correlation	Alpha If Item Deleted	
Desktop Computer	17.96	16.691	.285	.116	.695	
Laptop Computer	17.14	15.811	.481	.266	.636	
Cell Phone	17.92	14.301	.492	.467	.627	
Tablet Device	17.84	14.156	.539	.422	.610	
Printer	17.15	15.899	.452	.232	.644	
Clicker or Presenter	17.94	16.081	.312	.207	.690	
	Alpha	Standardized Item Alpha				
Reliability Coefficients for Importance	.692	.696				

The reliability of technology satisfaction shows a Cronbach's alpha of .866, which is in the range of good, nearing excellent and confidence of this scale being compared to all variables established. The reliability of scale for perception of technology knowledge is shown in Table 15.

Table 15

Reliability of Perception of Technology Satisfaction Scale

	N	$\bar{X}$	Variance	SD	
Statistics for Scale	5	15.34	16.858	4.106	

	$\bar{X}$	Minimum	Maximum	Range	Max/Min	Variance
Item Means	3.069	2.884	3.213	.329	1.114	.026
Item Variances	1.035	.780	1.229	.449	1.576	.041
Inter-Item Correlations	.566	.424	.703	.279	1.659	.009

Item Total Statistics	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected If Total Correlation	Squared Multiple Correlation	Alpha If Item Deleted
Level of Training	12.14	11.975	.616	.459	.855
Ease of Use	12.20	10.580	.778	.607	.815
Computer Quality	12.44	10.451	.725	.588	.829
Computer Updates	12.46	10.628	.692	.548	.838
Computer Usage	12.13	12.114	.645	.468	.849

	Alpha	Standardized Item Alpha
Reliability Coefficients for Importance	.866	.867

Results of Study

Descriptive and inferential statistics were used to analyze the collected data. The research questions used descriptive statistics to report findings regarding the perception of digital technology in military education according to the participants' gender, age, year born, years of computer experience, if issued a military computer for education, and preferred instructional deliverer method. Further analysis with inferential statistics were conducted using one analysis of variance (ANOAVA) to examine the relationship between technology knowledge, technology importance, and technology satisfaction with regard to the participants' gender, age, year born, years of computer experience, type of operating system, if issued a military computer for education, and preferred instructional deliverer method.

A one-way analysis of variance (ANOVA) was conducted to show the effect of gender with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .508 for students and a *p*-value of .283 for instructor's therefore equal variances were assumed. The one-way ANOVA showed that the effect of gender on the perception of technology knowledge for was not significant, F (1, 142) = 0.307, p=.508, for the student participants. The one-way ANOVA showed that the effect of gender on the perception of technology knowledge was not significant, F (1, 67) = 2.266, p=.137, for the instructor participants. The mean, standard deviation, and results of the one-way ANOVA for the effects of gender on the perceptions of technology knowledge is shown in Table 16.

Table 16

Means, Standard Deviation, and One-Way Analysis of Variance of Student and Instructor Perceptions of Technology Knowledge, by Gender

Technology Knowledge	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	144	4.05	.808	(1, 142)	0.307	.580	.002
Male	126	4.04	.824				
Female	18	4.15	.692				
Instructor	69	3.92	.887	(1, 67)	2.266	.137	.033
Male	59	3.86	.904				
Female	10	4.31	.695				

Note: N=213

A one-way analysis of variance (ANOVA) was conducted to show the effect of gender with regard to student and instructor perceptions and the participant's technology importance. A Test of Homogeneity of Variances resulted in a *p*-value of .444 for students and a *p*-value of .996 for instructor's therefore equal variances were assumed. The one-way ANOVA showed that the effect of gender on the perception of technology importance was not significant, F (1, 120) = 0.415, p=.521, for the students. The one-way ANOVA showed that the effect of gender on the perception of technology importance was not significant, F (1, 53) = 0.024, p=.877, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for effects of gender on the perceptions of technology importance is shown in Table 17.

Table 17

Means, Standard Deviation, and One-Way Analysis of Variance Student and Instructor Perceptions of Technology Importance, by Gender

Technology Importance	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student	122	3.58	.789	(1, 120)	0.415	.521	.003
Male	105	3.59	.772				
Female	17	3.46	.906				
Instructor	55	3.53	.710	(1, 53)	0.024	.877	.001
Male	47	3.52	.720				
Female	8	3.56	.690				

Note: N=177

A one-way analysis of variance (ANOVA) was conducted to show the effect of gender with regard to student and instructor perceptions and the participant's technology satisfaction. A Test of Homogeneity of Variances resulted in a *p*-value of .786 for students and a *p*-value of .361 for instructor's therefore equal variances were assumed. The one-way ANOVA showed that the effect of gender on the perception of technology satisfaction was not significant, F (1, 141) =

0.673, *p*=.413, for the students. The one-way ANOVA showed that the effect of gender on the perception of technology satisfaction was not significant, F (1, 65) = 0.386, *p*=.536, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of gender on the perceptions of technology satisfaction is shown in Table 18.

Table 18

Means, Standard Deviation, and One-Way Analysis of Variance Student and Instructor Perceptions of Technology Satisfaction, by Gender

Technology Satisfaction	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	143	3.02	.865	(1, 141)	0.673	.413	.005
Male	125	3.00	.855				
Female	18	3.18	.943				
Instructor	67	3.14	.713	(1, 65)	0.386	.536	.006
Male	58	3.16	.713				
Female	9	3.00	.735				

Note: N=210

A one-way analysis of variance (ANOVA) was conducted to show the effect of age with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .828 for students and a *p*-value of .241 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of age on the perception of technology knowledge was not significant, F (2, 141) = 1.433, *p*=.242 for the students. The one-way ANOVA showed that the effect of age on the perception of technology knowledge was not significant, F (4, 64) = 2.490, *p*=.052 for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of age on the perceptions of technology knowledge is shown in Table 19.

Table 19

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Knowledge, by Age

Technology Knowledge	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	143	.405	.808	(2, 141)	1.433	.242	.020
19-26	72	4.14	.743				
27-35	48	4.04	.787				
36-45	24	3.82	1.001				
Instructor (Total)	68	3.92	.887	(4, 64)	2.490	.052	.135
19-26	28	4.03	.716				
27-35	5	4.50	.586				
36-45	11	4.27	.884				
46-55	15	3.55	1.053				
56-65	10	3.50	.928				

Note: N=211

A one-way analysis of variance (ANOVA) was conducted to show the effect of age with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .033 for students therefore, equal variances were not assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .699 for instructors therefore, equal variances were assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the students therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for students *p*-value was .106, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of age on the perception of technology importance was not significant, F (2, 119) = 1.393, p=.252, for the students. The one-way ANOVA showed that the effect of age on the perception of technology importance was not significant, F (4, 50) = 0.497, p=.445, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of age on the perceptions of technology importance is shown in Table 20.

Table 20

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Importance, by Age

Technology Importance	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	122	3.58	.789	(2, 119)	1.393	.252	.023
19-26	61	3.48	.754				
27-35	40	3.59	.930				
36-45	21	3.81	.541				
Instructor (Total)	55	3.53	.710	(4, 50)	0.497	.445	.070
19-26	18	3.31	.603				
27-35	4	3.62	.886				
36-45	10	3.83	.643				
46-55	14	3.58	.886				
56-65	9	3.49	.593				

Note: N=177

A one-way analysis of variance (ANOVA) was conducted to show the effect of age with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .303 for students and a *p*-value of .163 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of age on the perception of technology satisfaction was not significant, F (2, 140) = 1.187, p=.308, for the students. The one-way ANOVA showed that the effect of age on the perception of technology satisfaction was not significant, F (4, 62) = 0.954, p=.439, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of age on the perceptions of technology satisfaction is shown in Table 21.

Table 21

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Satisfaction, by Age

Technology Satisfaction	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	143	3.02	.865	(2, 140)	1.187	.308	.017
19-26	71	2.92	.782				
27-35	48	3.06	.961				
36-45	24	3.22	.891				
Instructor (Total)	67	3.14	.713	(4, 62)	0.954	.439	.058
19-26	27	3.19	.751				
27-35	5	3.12	.110				
36-45	11	2.82	.697				
46-55	14	3.36	.556				
56-65	10	3.04	.713				

Note: N=210

A one-way analysis of variance (ANOVA) was conducted to show the effect of year born with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .995 for students therefore, equal variances were assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .015 for instructors therefore, equal variances were not assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the instructors therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for instructors *p*-value was .103, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of year born on the perception of technology knowledge was not significant, F (1, 142) = 2.917, p=.090, for the students. The one-way ANOVA showed that the effect of year born on the perception of technology knowledge was not significant, F (1, 67) = 2.654, p=.108, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for s the effects of year born on the perceptions of technology knowledge is shown in Table 22.

Table 22

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Knowledge, by Year Born

Technology Knowledge	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	144	4.05	.808	(1, 142)	2.917	.090	.020
Before 1980	28	3.82	.933				
After 1980	116	4.11	.768				
Instructor (Total)	69	3.92	.887	(1, 67)	2.654	.108	.038
Before 1980	36	3.76	1.004				
After 1980	33	4.10	.710				

Note: N=213

A one-way analysis of variance (ANOVA) was conducted to show the effect of year born with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .038 for students therefore, equal variances were not assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .719 for instructors therefore, equal variances were assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the students therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for students *p*-value was .069. The one-way ANOVA showed that the effect of year born on the perception of technology importance was not significant, F (1, 120) = 2.018, p=.158, for the students. The one-way ANOVA showed that the effect of year born on the perception of technology importance was not significant, F (1, 53) = 1.955, p=.168, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of year born on the perceptions of technology importance is shown in Table 23.

Table 23

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Importance, by Year Born

Technology Importance	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	122	3.58	.789	(1, 120)	2.018	.158	.017
Before 1980	22	3.79	.537				
After 1980	100	3.53	.829				
Instructor (Total)	55	3.53	.710	(1, 53)	1.955	.168	.036
Before 1980	33	3.63	.737				
After 1980	22	3.36	.650				

Note: N=177

A one-way analysis of variance (ANOVA) was conducted to show the effect of year born with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .712 for students and a *p*-value of .937 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of year born on the perception of technology satisfaction was not significant, F (1, 141) = 0.770, p=.382, for the students. The one-way ANOVA showed that the effect of year born on the perception of technology satisfaction was not significant, F (1, 65) = 0.222, p=.639, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of year born on the perceptions of technology satisfaction is shown in Table 24.

Table 24

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Satisfaction, by Year Born

Technology

Satisfaction	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	143	3.02	.865	(1, 141)	0.770	.382	.005
Before 1980	28	3.15	.912				
After 1980	115	2.99	.855				
Instructor (Total)	67	3.14	.713	(1, 65)	0.222	.639	.003
Before 1980	35	3.10	.741				
After 1980	32	3.18	.690				

Note: N=210

A one-way analysis of variance (ANOVA) was conducted to show the effect of computer experience with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .714 for students and a *p*-value of .103 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of computer experience on the perception of technology knowledge was not significant, F (4, 139) = 0.994, p=.413, for the students. The one-way ANOVA showed that the effect of computer experience on the perception of technology knowledge was not significant, F (3, 65) = 0.894, p=.449 for the instructors. The mean, standard deviation, and results of the one-way ANOVA for effects of computer experience on the perceptions of technology knowledge is shown in Table 25.

Table 25

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Knowledge, by Computer Experience

Technology Knowledge	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	144	4.05	.808	(4, 139)	0.994	.413	.028
<6 Years	8	3.88	.945				
7-13 Years	39	3.97	.769				
14-20 Years	77	4.10	.784				
21-27 Years	16	4.27	.901				
>28 Years	4	3.50	1.000				

Instructor (Total)	69	3.92	.887	(3, 65)	0.894	.449	.040
7-13 Years	13	3.71	.923				
14-20 Years	28	4.07	.817				
21-27 Years	14	4.04	.699				
>28 Years	14	3.70	1.136				

Note: N=213

A one-way analysis of variance (ANOVA) was conducted to show the effect of computer experience with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .407 for students and a *p*-value of .244 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of computer experience on the perception of technology importance was not significant, F (4, 117) = 0.096, p=.984, for the students. The one-way ANOVA showed that the effect of computer experience on the perception of technology importance was not significant, F (3, 51) = 0.667, p=.576, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of computer experience on the perceptions of technology importance is shown in Table 26.

Table 26

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Importance, by Computer Experience

Technology Importance	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	122	3.58	.789	(4, 117)	0.096	.984	.003
<6 Years	5	3.43	.596				
7-13 Years	29	3.63	.736				
14-20 Years	69	3.58	.823				
21-27 Years	16	3.51	.914				
>28 Years	3	3.56	.096				
Instructor (Total)	55	3.53	.710	(3, 51)	0.667	.576	.038
7-13 Years	8	3.33	.333				

14-20 Years	20	3.43	.724
21-27 Years	13	3.71	.931
>28 Years	14	3.61	.622

Note: N=177

A one-way analysis of variance (ANOVA) was conducted to show the effect of computer experience with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .379 for students therefore, equal variances were assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .020 for instructors therefore, equal variances were not assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the instructors therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for instructors *p*-value was .673, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of computer experience on the perception of technology satisfaction was not significant, F (4, 138) = 0.742, p=.565, for the students. The one-way ANOVA showed that the effect of computer experience on the perception of technology satisfaction was not significant, F (3, 63) = 0.305, p=.822, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of computer experience on the perceptions of technology satisfaction is shown in Table 27.

Table 27

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Satisfaction, by Computer Experience

Technology Satisfaction	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student (Total)	143	3.02	.865	(4, 138)	0.742	.565	.021
<6 Years	7	2.80	.653				

7-13 Years	39	2.99	.752				
14-20 Years	77	3.08	.885				
21-27 Years	16	3.05	1.024				
>28 Years	4	2.40	1.254				
Instructor (Total)	67	3.14	.713	(3, 63)	0.305	.822	.014
7-13 Years	12	3.22	.439				
14-20 Years	28	3.19	.704				
21-27 Years	14	2.99	.541				
>28 Years	13	3.11	1.070				

Note: N=210

A one-way analysis of variance (ANOVA) was conducted to show the effect of the issuance of a military computer with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value less than .001 for students therefore, equal variances were not assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .273 for instructors therefore, equal variances were assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the students therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for students *p*-value was .172, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of the issuance of a military computer on the perception of technology knowledge for students was significant, F (1, 140) = 14.788, p=<.001, η^2 =.096. The effect is large and resulting in a practical value with regard to the issuance of a military computer. The one-way ANOVA showed that the effect of the issuance of a military computer on the perception of technology knowledge for instructors was not significant, F (1, 67) = 0.127, p=.722, which was not significant for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the issuance of a military computer on the perceptions of technology knowledge is shown in Table 28.

Table 28

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Knowledge, by Issuance of Military Computer

Technology Knowledge	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student	142	4.05	.809	(1, 140)	14.788	.001	.096
Yes	130	4.13	.715				
No	12	3.23	1.259				
Instructor	69	3.92	.887	(1, 67)	0.127	.722	.002
Yes	38	3.96	.950				
No	31	3.88	.816				

Note: N=211

A one-way analysis of variance (ANOVA) was conducted to show the effect of the issuance of a military computer with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .310 for students therefore, equal variances were assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .029 for the instructors therefore, equal variances were not assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the instructors therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for instructors *p*-value was .502, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of the issuance of a military computer on the perception of technology importance for students was significant, F (1, 119) = 4.180, p=.043, η^2 =.034, The effect is small to medium and resulting in little practical value with regard to the issuance of a military computer. The one-way ANOVA showed that the effect of the issuance of a military computer on the perception of technology importance for instructors was not significant, *F* (1, 53) = 0.436, *p*=.512, which was not significant for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the issuance of a military computer on the perceptions of technology importance is shown in Table 29.

Table 29

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Importance, by Issuance of Military Computer

Technology Importance	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	121	3.57	.790	(1, 119)	4.180	.043	.034
Yes	113	3.53	.793				
No	8	4.11	.533				
Instructor	55	3.53	.710	(1, 53)	0.436	.512	.008
Yes	26	3.46	.525				
No	29	3.59	.847				

Note: N=176

A one-way analysis of variance (ANOVA) was conducted to show the effect of the issuance of a military computer with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .319 for students therefore, equal variances were assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .025 for the instructors therefore, equal variances were not assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the instructors therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for instructors *p*-value was .650, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances.

The one-way ANOVA showed that the effect of issuance of a military computer on the perception of technology satisfaction was not significant, *F* (1, 140) =0.002, *p*=.960, for the students. The one-way ANOVA showed that the effect of issuance of a military computer on the perception of technology satisfaction was not significant, *F* (1, 67) = 0.184, *p*=.670, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the issuance of a military computer on the perceptions of technology satisfaction is shown in Table 30.

Table 30

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Satisfaction, by Issuance of Military Computer

Technology Satisfaction	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	142	3.02	.868	(1, 140)	0.002	.960	.001
Yes	130	3.02	.875				
No	12	3.03	.822				
Instructor	67	3.14	.713	(1, 65)	0.184	.670	.003
Yes	38	3.11	.837				
No	29	3.18	.713				

Note: N=209

A one-way analysis of variance (ANOVA) was conducted to show the effect of the instructional delivery method with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .412 for students and a *p*-value of .404 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of instructional delivery method on the perception of technology importance was not significant, *F* (2, 139) = 0.176, *p*=.839, for the students. The one-way ANOVA showed that the effect of instructional delivery method on the perception of technology importance was not significant, F (2, 66) = 2.206, p=.118, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the instructional delivery method on the perceptions of technology knowledge is shown in Table 31.

Table 31

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Knowledge, by Instructional Delivery Method

Technology Knowledge	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	142	4.05	.809	(2, 139)	0.176	.839	.003
Face-to-Face	127	4.04	.795				
Web-Based	7	4.18	1.125				
Digital	8	4.16	.823				
Instructor	69	3.92	.887	(2, 66)	2.206	.118	.063
Face-to-Face	57	3.91	.865				
Web-based	5	4.60	.576				
Digital	7	3.54	1.075				

Note: N=211

A one-way analysis of variance (ANOVA) was conducted to show the effect of the instructional delivery method with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a p-value of .645 for students and a p-value of .742 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of instructional delivery method on the perception of technology importance was not significant, F (2, 118) = 0.731, p=.484, for the students. The one-way ANOVA showed that the effect of instructional delivery method on the perception of technology importance was not significant, F (2, 52) = 1.168, p=.319, for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the instructional delivery method on the perceptions of technology importance is shown in Table 32.

Table 32

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Importance, by Instructional Delivery Method

Technology Importance	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student	121	3.57	.790	(2, 118)	.731	.484	.012
Face-to-Face	109	3.55	.792				
Web-Based	5	3.47	.931				
Digital	7	3.47	.671				
Instructor	55	3.53	.710	(2, 52)	1.168	.319	.043
Face-to-Face	45	3.58	.676				
Web-based	5	3.53	.711				
Digital	5	3.07	.990				

Note: N=176

A one-way analysis of variance (ANOVA) was conducted to show the effect of the instructional delivery method with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .869 for students and a *p*-value of .551 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of the instructional delivery method on the perception of technology satisfaction for students was significant, F (2, 139) = 3.162, p=.045, η^2=.044, The effect is low to medium and resulting in little practical value with the regard to instructional delivery methods. The one-way ANOVA showed that the effect of the instructional delivery method on the perception of technology satisfaction for students was significant, F (2, 64) = 2.281, p=.110, which was not significant for the instructors. The mean, standard deviation, and results of the one-way ANOVA for the effects of the instructional delivery method on the perceptions of technology satisfaction is shown in Table 33.

Table 33

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Satisfaction, by Instructional Delivery Method

Technology Satisfaction	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student	142	3.02	.868	(2, 139)	3.162	.045	.044
Face-to-Face	127	3.08	.858				
Web-Based	7	2.31	.847				
Digital	8	2.73	.807				
Instructor	67	3.14	.713	(2, 64)	2.281	.110	.067
Face-to-Face	56	3.22	.656				
Web-based	5	2.76	.876				
Digital	6	2.70	.953				

Note: N=209

A one-way analysis of variance (ANOVA) was conducted to show the effect of technology enhancing military education with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .270 for students therefore, equal variances were assumed. A Test of Homogeneity of Variances resulted in a *p*-value of .015 for the instructors therefore, equal variances were not assumed. The researcher could not make conclusive inferences from the error of variance with Test of Homogeneity of Variances $p<.05$ for the instructors therefore, the researcher conducted a Welch ANOVA and a Robust Test of Equality of Means for instructors *p*-value was .443, which can be interpreted in the same manner as a one-way ANOVA Test of Homogeneity of Variances. The one-way ANOVA showed that the effect of perception technology enhancing military education for students was significant, F (4, 116) = 3.411, p=.011, η^2=.105. The effect size is medium to large and resulting in a practical value of technology enhancing military education. The one-way ANOVA showed that the effect of perception technology enhancing military education for instructors was not significant, *F* (4, 50) = 1.416, *p*=.242. The mean, standard deviation, and results of the one-way ANOVA for the effects of technology enhancing military education is shown in Table 34.

Table 34

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions of Technology Enhancing Military Education

Technology Enhancement	*n*	$\bar{X}$	SD	*df*	*F*	*p*	η^2
Student	121	3.60	.757	(4, 116)	3.411	.011	.105
Instructor	55	3.53	7.10	(4, 50)	1.416	.242	.102

Note: N=176

A one-way analysis of variance (ANOVA) was conducted to show the effect of implemented technology would help with their job with regard to student and instructor perceptions and the participant's technology knowledge. A Test of Homogeneity of Variances resulted in a *p*-value of .362 for students and a *p*-value of .651 for instructors therefore, equal variances were assumed. The one-way ANOVA showed that the effect of implemented technology will help with job for students was significant, *F* (4, 115) = 5.749, *p*=.001, η^2=.167. The effect size is large and resulting in practical value that technology will help with the student's job. The one-way ANOVA showed that the effect of implemented technology will help with job for instructors was not significant, *F* (3, 51) = 2.382, *p*=.080, which was not significant. The mean, standard deviation, and results of the one-way ANOVA for the effects of implemented technology will help with their job is shown in Table 35.

Table 35

Means, Standard Deviation, and One-Way Analysis of Variance for Student and Instructor Perceptions for Implemented Technology Will Help with Their Job

Implemented Technology	*n*	$\overline{X}$	SD	*df*	*F*	*p*	η^2
Student	120	3.60	.760	(4, 115)	5.749	.001	.167
Instructor	55	3.53	.710	(3, 51)	2.382	.080	.123

Note: N=209

Inter-Rater Reliability

The participants were posed with the question, if you could change the way digital technology is used in military education, what would you do? Reporting results requires assessing inter-rater reliability. A number of statistics can assess to what degree a set of texts were consistently coded by different coders (Krippendorff 1980; Carey, Morgan, & Oxtoby 1996). The commonly used “coefficient of agreement,” which measures the proportion of decisions where coders agree, can dramatically overestimate the true degree of inter-rater reliability by not taking chance agreement into account (Neumark-Sztainer & Story 1997; Wang, Lin, & Ing-Tau Kuo 1997). Therefore, Cohen’s kappa, which prevents the inflation of reliability scores by correcting for chance agreement, although other statistics also satisfy these criteria (Cohen 1960; Potter & Levine-Donnerstein 1999). The kappa measure can range from 1 to negative values no less than –1, with 1 signaling perfect agreement and 0 indicating agreement no better than chance (Liebetrau 1983).

Several different taxonomies have been offered for interpreting kappa values that offer different criteria, although the criteria for identifying “excellent” or “almost perfect” agreement tend to be similar (Liebetrau 1983). Landis and Koch (1977) proposed the following convention: 0.81– 1.00 = almost perfect; 0.61–0.80 = substantial; 0.41–0.60 = moderate; 0.21– 0.40 = fair;

0.00–0.20 = slight; and < 0.00 = poor. Adapting Landis and Koch’s work, Cicchetti (1994) proposed the following: 0.75–1.00 = excellent; 0.60–0.74 = good; 0.40–0.59 = fair; and < 0.40 = poor.

For this study the three categories were developed, increase technology, decrease technology, and do not change technology to categorize participant responses. The first category, increase technology, is defined as responses, which include information, which leads to benefiting either the student or instructor from the increase or implementation of technology. The second category, decrease technology, is defined as responses, which include information, which eliminates technology use of limits it uses in some form, by either the student or instructor. The third category, do not change technology, is defined as responses, which include information that does not change the way technology is currently being utilized.

The inter-rater reliability for this study for the students is .873 and instructors is .839, both falling into the almost perfect range (.81-1.0). Three colleagues were used to categorize the participant’s responses. Examples of student participant responses given and categories to which they were assigned is proved in Table 36.

Table 36

Examples of Student Participant Responses given and Categories Assigned

Category	Response
Increase Technology	We need more technology in flight school. Learning should be driven primarily through practical exercise on appropriate visual/mechanical training devices, rather than death by PowerPoint.
Increase Technology	Allow more digital equipment to be utilized in the training in order to familiarize students with what they will predominantly use outside of the training environment.
Decrease Technology	Stop online only based distanced learning.
Decrease Technology	Replace classes with PowerPoints and handouts online.

Not Change Technology	I think the use was sufficient.
Not Change Technology	They do a pretty good job.
No Category Assigned	This laptop is ballast and to more evenly distribute the total load of flight publications that I already carry. This laptop and how the military applies it to my educational process is completely worthless outside of using for a vehicle chock or leveling the legs of a small breakfast table.

Examples of student participant responses given and categories to which they were assigned is proved in Table 37.

Table 37

Examples of Instructor Participant Responses given and Categories Assigned

Category	Response
Increase Technology	I would increase the use of digital technology in the classroom to enhance the learning environment. Technology is readily available to us and it is important that we use it in order to facilitate a learning environment that produces Soldiers who are more prepared for the mission of tomorrow. That being said, technology is a double edge sword, we also need to be flexible and able to teach information with technology. Too much technology can be just as bad as not enough technology. There are a lot of great methodologies out there to use in a classroom to teach soldiers, it is up to developers and instructors to find the right mix in order to produce to the learning outcome the lesson is aiming to achieve. In the end, as instructors we are here to train soldiers who are able to be flexible in an ever changing world and technology helps us met that mission.
Increase Technology	I'd like to look for more innovative ways of implementing the use of technology into education. I'd like to increase the level of interactivity as well as the degree of original learning. I'd like for the use of technology to support education and increase the ability to critically think.
Decrease Technology	Use it as a supplement to other learning. As an instructor I have difficulty getting the students to pay attention to me because they have their heads buried in the computers...probably sending emails and Facebook surfing. Too much emphasis has been placed on digital tech

	instead of quality material. Our soldiers don't know what it means to soldier. Technology is good but the Army has so many restrictions on how the computers are used that it makes the computers and networks unreliable. Some people learn differently. If I had to go through this course with all digital media, then I would fail.
Decrease Technology	Remove Laptops from the class rooms. Students should have handout.
Not Change Technology	Would not change
Not Change Technology	I don't think I would change anything significant.

With regard to the participant's responses to changing the way technology is used in military education. A Chi-Square distribution test showed a significance, $\chi^2 = 18.195$, $df = 2$, $p = .001$. It is noted that students want to see an increase to technology more than the instructors and the instructors would prefer to not change technology. The Chi-Square distribution of technology in military education by student and instructors is shown in Table 38.

Table 38

Chi-Square Distribution of Technology in Military Education by Student and Instructor

If you could change the way Technology is used in Military education, how?	Increase Technology	Decrease Technology	Not Change Technology	χ^2	*df*	*p*
Student	38 (12.7)	29 (3.7)	9 (-23.4)	18.195	2	.001
Instructor	14 (-1.7)	19 (2.7)	16 (-.4)			

Note: Adjusted standardized residuals appear in parentheses beside group frequency.

Summary

The findings in this study indicate there was statistical significance with regard to the perception of technology knowledge and a student being issued a military computer, $F(1, 140) = 14.788$, $p = .001$. This study indicated significance with regard to the perception of technology importance and a student being issued a military computer, F (1, 119) = 4.180, p=.043. The instructional delivery method was significant to students in technology satisfaction, F (2, 139) = 3.162, p=.045. This study indicated significance from students with regard to technology enhancing military education, F (4, 116) = 3.411, p=.011. This study indicated significance from students with regard to the implemented technology helping with their job, F (4, 115) = 5.749, p=.001. This study also indicated instructors are more apt to leaving technology unchanged in military education, whereas the student would prefer the increase of technology in military education. Chi-Square distribution test showed a significance, χ^2 = 18.195, df = 2, p= .001.

Chapter 5. LIMITATIONS, SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

Chapter 1 provides the rationale for the research to examine the relationship between student and instructor perceptions with the use of digital technology us in military education. This quantitative, correlational study examined differences between the perceptions of students and instructors with the implementation of digital technology in military education. The expectation of findings that will contribute positively to the Army education system and help instructors in formulating and implementing initiatives to implement digital technology was the justification of this study. Chapter 2 contains a relevant review of the literature pertaining to digital technology and how it pertains to military and other education systems. The methods used to conduct the study, including the instrumentation of the Technologies in Military Education survey are addressed in Chapter 3. Research findings and results are presented in Chapter 4. The final chapter of this study provides a summary of the study, along with implications and recommendations for future research recommendations for future studies and research. This chapter is divided into the following sections: research questions, acknowledgment of limitations, a summary of the study, implications related to digital technology in military education, and is concluded with recommendations for future research.

Purpose of the Study

The purpose of this study was to examine the relationship of perceptions of the use of digital technology in military education by students and instructors. According to Prensky (2010), "digital technology is becoming an important part of students' education . . . [but] figuring out how to use technology meaningfully for technology . . . can help or hinder the educational process" (p. 3). In light of today's rapidly changing technology, instructors have important lessons to teach about technology, such as the meaning of research in an era of data and technical manipulation (Prensky, 2012). Whereas, students will teach instructors about technology and the 21st century life in general, and we can learn from them every day (Prensky, 2012). If students and instructors respond to, use and deliver technology differently, then it follows that the instructional technology used in course materials may have an impact on their satisfaction or frustration with the learning environment. This ultimately could impact their levels of learning, which this study seeks to examine through further inquiry and analysis.

Research Questions

The following questions were used in this study:

1) What are the perceptions of digital technology in military education by students?
2) What are the perceptions of digital technology in military education by instructors?
3) What is the relationship, if any, between the perceptions of students and instructors with digital technology in military education?

Limitations of the Study

This study was conducted using students and instructors from a military installation in the southeast region of Alabama. The sample consisted of 213 participants. All of the 213 participants were at least 19 years of age or older. Each of the participants were self-selected volunteers and took time to complete the instrument. The student participants were in the Army's flight training program and the instructor participants taught the very same program; therefore, generalization beyond this region should be instigated with caution.

Summary

The significance of this study includes helping military installations assess its' technology perceptions from both students and instructors and bring together the wealth of technology knowledge the military employs. The military is looked as the leading edge on most aspects of technology and teaching and learning with technology is no different.

The sample consisted of 213 participants, 144 students and 69 instructors. The instrument used was an online survey to collect perception of technology in military education. The questionnaire was administered to gather demographic data, such as gender, age, year born, if issued a military computer, and preferred instructional delivery method. The majority of the study was male (86.9%) and 13.1% of the population was female. The mean age was 32.45 with a majority falling in the range of 19-26. The study was mainly comprised of participants born after 1980 (71.3%) with 24.4% of the remaining being instructors. The mean for experience with a computer for this study was 17.1 years. Of the 213 participants, 79% (170) were issued a military computer for educational purposes. 87.2% of this study prefers the face-to-face instructional delivery method, while only 7.1% would rather have some type of digital delivery method.

The purpose of this study was to determine if there was a relationship between the perceptions of students and instructor with digital technology in military education on a military installation in the southeast region of Alabama. This study found there was statistical significance with regard to the perception of technology knowledge and a student being issued a military computer. There was a statistical significance with regard to the perception of technology importance and a student being issued a military computer and the instructional delivery method used in military education. This study found significance from students with regard to technology enhancing military education and whether implementing technology helped with their job.

Implications

This research study examined the relationship between the perceptions of students and instructors with digital technology in military education. Perhaps understanding the perceptions of students by instructors for delivering material for learning may help the learning process. Knowing how the material is going to be presented, whether digital or face-to-face can help the teaching method by instructors. Students understanding the different methods of delivery and asking for the technology to implemented into more training may lead to more instructors teaching with digital technology. Ultimately, both the student and instructor will be the beneficiary of the use of digital technology in the military classroom. The instructor wants the student to learn – the student wants to learn. Implications of this study could also impact how technology is used in military classrooms in the future with Unmanned Aerial Systems (UAS) technology advancing. Today, military instructors stand in front of a class and present educational materials – the future may hold students signing into a class from around the globe to hear educational material being presented. General Omar Bradley once said, “If we continue to develop our technology without wisdom or prudence, our servant may prove to become our executioner” (Moss, 2008, p. 56).

Recommendations for Future Research

Additional studies to determine if there is a perception of digital technology in military education by either the student or instructor are needed. Derived from the findings of this study, future research might include:

1) Replicate this study using a larger sample size at on military training installation outside of southeast Alabama.
2) Replicate this study on two or more military training installations and compare the perceptions between the different regions.
3) Gather research to examine the relationship of student perceptions and instructor perceptions of the distributed learning in military education.
4) Gather research to examine the relationship of student perceptions and instructor perceptions of gaming and simulations in military education.

The current study indicated there was statistical significance with regard to the perception of technology knowledge and a student being issued a military computer, $F(1, 140) = 14.788$, $p=.001$. The study indicated significance with regard to the perception of technology importance and a student being issued a military computer, $F(1, 119) = 4.180$, $p=.043$. The instructional delivery method was significant to students in technology satisfaction, $F(2, 139) = 3.162$, $p=.045$. This study indicated significance from students with regard to technology enhancing military education, $F(4, 116) = 3.411$, $p=.011$. This study indicates significance from students with regard to the implemented technology helping with their job, $F(4, 115) = 5.749$, $p=.001$. A Chi-Square distribution test showed significance, $\chi^2 = 18.195$, $df = 2$, $p= .001$.

The future holds no bounds for technology. Course material presented to students can be altered rapidly and will be perfectly tailored to individual needs based on biometric signals from students. Physical traits such as facial expression, heart rate, skin moisture and even odor can be used to create detailed reports of student understanding and performance. Behavioral signs such as typing rhythm, gait, and voice can let instructors know when students are in need of additional assistance as well as help them understand what teaching techniques work best for individual students (Grantham, 2016).

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Appendix A – Information Letter

Your unique identification number is <u>AVNXXX</u>

AUBURN UNIVERSITY
COLLEGE OF EDUCATION
EDUCATIONAL FOUNDATIONS, LEADERSHIP AND TECHNOLOGY

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMATION LETTER
for a Research Study entitled
"***Digital Natives and Digital Immigrants: Perceptions of Technology in Military Education***"

You are invited to participate in a research study to examine the relationship between digital natives and digital immigrants: perceptions of technology in Military education. James Joseph Martin is conducting the study under the direction of Dr. Maria M. Witte, Professor, in the Auburn University Department of Educational Foundations, Leadership, and Technology. You are invited to participate because you are a certified instructor or enrolled student in the Military education system. The sample includes both male and female instructors and students in the southeast region of Alabama, who are 19 years of age or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a Technology in Military Education survey. The Technology in Military Education survey will be administered in Qualtrics, and it will take 15-20 minutes to complete. The Technology in Military Education survey will be administered via the Internet. The participants will be given a web address, online access code, and a password in order to take the instrument online, and the total time commitment will be approximately 15-20 minutes.

Are there any risks or discomforts? You should not encounter any reasonable risks if you decide to participate in this research study because there are no known risks or discomforts.

Are there any benefits to yourself or others? If you participate in this study, please don't expect to receive any personal benefits. All benefits will be for research and body of knowledge.

Will you receive compensation for participating? There is no compensation for participating in this study. Participating is voluntary.

Are there any costs? If you decided to participate, you will not have to pay anything.

4036 Haley Center, Auburn, AL 3684-5221; Telephone: 334-844-4460: Fax: 334-844-3072
www.auburn.edu

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University.

Any data obtained in connection with this study will remain anonymous. A number will be assigned to you, and it can be located on the handout that contains the web address to take the online surveys. That number is to be entered as the unique identifier on Qualtrics survey. Information collected through your participation may be used to fulfill an educational requirement, published in a professional journal, and/or presented at a professional meeting. If so, none of your identifiable information will be included.

If you have questions about this study, please ask them now. If you have questions later, contact James Joseph Martin at jjm0027@tigermail.auburn.edu or Dr. Maria M. Witte at wittemm@auburn.edu. A copy of this document is yours to keep.

For more information about your rights as a research participant you, may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.

MARTIN.JAMES.JOSEPH.1152578152 Digitally signed by MARTIN.JAMES.JOSEPH.1152578152 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=MARTIN.JAMES.JOSEPH.1152578152 Date: 2015.10.06 14:19:05 -05'00'

Investigator's signature

6 October, 2015
Date

The Auburn University Institutional Review Board has approved this document for use from 10/5/15 to 10/4/18
Protocol # 15-374 EX 1510

James Martin
Print Name

Maria Witte
Co-Investigator

The Auburn University Institutional Review Board Has Approved this document for use from October 5, 2015 to October 4, 2018. Protocol #15-374 EX 1510.

4036 Haley Center, Auburn, AL 3684-5221; Telephone: 334-844-4460: Fax: 334-844-3072

w w w . a u b u r n . e d u

Appendix B – Survey Instrument

Technology in Military Education Survey

Please answer the following question as accurately as possible. All responses will be anonymous. The results will be compiled to examined perceptions of digital technology between student learners and instructors at Fort Rucker.

What is your Unique Code Identifier provided to you? ___________

Browser Meta Info (Not shown to the participant)

Browser (1)

Version (2)

Operating System (3)

Screen Resolution (4)

Flash Version (5)

Java Support (6)

User Agent (7)

What is your Gender?

- ❍ Male (1)
- ❍ Female (2)

What is your age? ________

Over_35 Were you born after 1980?

- ❍ Yes (1)
- ❍ No (2)

How many years' experience do you have operating a computer? ________

How would you rate your knowledge on

	Poor (1)	Fair (2)	Good (3)	Very Good (4)	Excellent (5)
the use of a personal computer or laptop? (1)	❍	❍	❍	❍	❍
the use of a smart phone? (2)	❍	❍	❍	❍	❍
the use of a tablet device, such as an iPad? (3)	❍	❍	❍	❍	❍
the use of a printer (black & white or color) (4)	❍	❍	❍	❍	❍

Do you own a computer, either desktop or laptop?

- ❍ Yes (1)
- ❍ No (2)

Answer If Do you own a computer? Yes Is Selected

Do you use your computer for military education?

- ❍ Yes (1)
- ❍ No (2)

Answer If Do you own a computer, either desktop or laptop? Yes Is Selected
What type of operating system (OS) does your computer or laptop have?

- ❍ Windows 7 (1)
- ❍ Windows 8/8.1 (2)
- ❍ Mac (3)
- ❍ Other (4) ____________________

Answer If Do you own a computer, either desktop or laptop? Yes Is Selected
Your personal computer compatible with the digital lesson material provided to you by the military?

- ❍ Strongly Disagree (1)
- ❍ Disagree (2)
- ❍ Neither Agree nor Disagree (3)
- ❍ Agree (4)
- ❍ Strongly Agree (5)

Answer If Do you own a computer? Yes Is Selected
Which of the follow do you use your computer for (Select all that apply)?

- ❑ Web Browsing (1)
- ❑ Entertainment (2)
- ❑ Research (3)
- ❑ Gaming (4)
- ❑ Video Streaming (5)
- ❑ Audio Streaming (6)
- ❑ Budgeting (7)
- ❑ Chatting (8)
- ❑ Education (9)
- ❑ Banking (10)

- ❑ Stock Market (11)
- ❑ First Aid (12)
- ❑ Microsoft Office or Similar (13)
- ❑ Email (14)
- ❑ News (15)
- ❑ Work Related (16)
- ❑ Shopping (17)
- ❑ Other (18) ____________________

Were you issued a military computer for educational purposes?

- ❍ Yes (1)
- ❍ No (2)

What type of instructional delivery do you prefer during classes taught in residency by the military?

- ❍ Face-to-Face Instruction (1)
- ❍ Web-Based Instruction (2)
- ❍ Digital Instruction (3)

I am satisfied with the

	Very Dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very Satisfied (5)
level of training I received on the military issued computer. (1)	❍	❍	❍	❍	❍
easy of use of the military issued computer. (2)	❍	❍	❍	❍	❍
quality of computer issued by the military to me. (3)	❍	❍	❍	❍	❍
how the military keeps the computer updated. (4)	❍	❍	❍	❍	❍
the amount of time the computer is used during military education. (5)	❍	❍	❍	❍	❍

During classroom lessons, I use the military issued computer for? (List what you do most often with the computer during class)

With military computers for education, what purposes do you use it? (Computers could be in the Technical Library, Computer Lab, Issued to you, etc.)

- ❑ Convenience - I don't always bring my personal computer with me (1)
- ❑ Access to library resources (2)
- ❑ Access to printing resources (3)
- ❑ Access to faster or more stable Internet connectivity (4)
- ❑ Build academic network (5)
- ❑ I don't use the computer issued by the military (6)

Which device have you used and how important is it to your learning in military education?

	How often have you used this type of device?			The importance to military Education				
	Never (1)	Somtimes (2)	Frequently (3)	Very Unimportant (1)	Unimportant (2)	Neutral (3)	Important (4)	Very Important (5)
Desktop Computer (1)	❍	❍	❍	❍	❍	❍	❍	❍
Laptop Computer (2)	❍	❍	❍	❍	❍	❍	❍	❍
Cell Phone (3)	❍	❍	❍	❍	❍	❍	❍	❍
Tablet Device (4)	❍	❍	❍	❍	❍	❍	❍	❍
Printer (5)	❍	❍	❍	❍	❍	❍	❍	❍
Clicker or Presenter (6)	❍	❍	❍	❍	❍	❍	❍	❍

The quality or military education is enhanced through the use of digital technology

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

Upon graduation from my current course, I feel the technology implemented throughout the course will help me with my job.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

If you could change the way digital technology is used in military education, what would you do?

Briefly explain the hardest part with using digital technology in military education.

Appendix C – Letter of Consent

DEPARTMENT OF THE ARMY
XXX AVIATION BRIGADE
XXXX ANDREWS AVENUE
FORT RUCKER ALABAMA 36362-5015

REPLY TO
ATTENTION OF

ATZQ-XXX 16 June 2015

MEMORANDUM FOR INSTITUTIONAL REVIEW BOARD, C/O OFFICE OF RESEARCH COMPLIANCE, 115 RAMSEY HALL, AUBURN UNIVERSTY, AL 36849

SUBJECT: LETTER OF CONSENT FOR JAMES J. MARTIN

1. After reviewing the proposed study, **"Perceptions of digital technology in Military Education,"** presented by James J. Martin, a Ph.D Candidate at Auburn University, I have granted permission for the study to be conducted at the Department of Defense, United States Army Aviation Initial Entry Rotary Wing (IERW) and Instructor Pilot (IP) Courses, Fort Rucker, Alabama 36362-5015.

2. The sponsoring unit is Auburn University Institutional Review Board (IRB), Auburn University, 115 Ramsey Hall, Auburn, AL 36849, 334-844-5966.

3. The purpose of the study is to determine the perceptions of digital technology and the methods to which it is used in Military classrooms with regard to gender, age, education level, number of Military classes, and teaching experience. The primary activity will be completion of an online survey. Both Instructors and Students will be able to participate in the collection of data. Research in the use of Technology in Education has been conducted at the K-12 school level, but not in a Military environment, therefore, this study will further research conducted in this field, expanding overall perceptions of technology in education.

4. This is a study of the *Perceptions of Digital Technology in Military Education*. Approximately 400 participants, with a minimum of 200, will be asked to participate in the study. The sample will include male and female instructor and students, who are at least 19 years of old, and either a certified instructor in a Military school or a student enrolled in a Military school.

5. I understand that the online survey distribution will occur around the confines of scheduled classes, i.e. during break time, before class, or after class. Mr. Martin will be allowed to distribute online access during the allotted times above. This event has a total time commitment of less than 5-8 minutes. I expect that this project will end not later than November 15, 2016. Mr. Martin will contact Sections to collect data at the Initial Entry Rotary Wing (IERW) and Instructor Pilot (IP) Courses.

6. Upon completion of the survey, a statistical analysis will be conducted to analyze the variation between student responses and an analysis between the instructor responses. The statistical analysis will be conducted using an Analysis of Variation (ANOVA) process with IBM Statistical Package for the Social Science (SPSS) predictive analytics software.

7. I understand that Mr. Martin will receive consent for all participants and confirm that he has the cooperation of the classroom Instructors. Mr. Martin has agreed to provide to my office a copy of all Auburn University IRB-approved consent documents, including approved survey

instrument, **before** he recruits participants on Fort Rucker. Any data collected by Mr. Martin will be kept anonymous and stored online in the Qualtrics database. Mr. Martin has also agreed to provide to us a copy of the aggregate results from his study. Mr. Martin will only use complied data for research purposes only

8. A privacy act statement is not required because all information gathered during this research study is anonymous and no personal identifiable information will be attained, stored, or released. A unique identification number, randomly issued during the administration of the survey, will be used for tracking whether responses are from students or instructors in lieu of names or any other identifiable information.

9. This memorandum meets the guidelines outlined within AR 600-49 and if the Auburn University IRB has any concerns about the permission being granted by this letter, please contact me at 334-255-XXXX.

XXXXXXX
GS-XX
Branch Chief