Fall 11-14-2017

The Development of Organizational Training: Identifying Generational Differences and Perceptions in Computerized Learning Systems in Government Organizations

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The Development of Organizational Training: Identifying Generational Differences and Perceptions in Computerized Learning Systems in Government Organizations

A Dissertation by

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School of Education

Submitted in partial fulfillment of the requirements for the degree of

Doctor of Education in Organizational Leadership

October 2017

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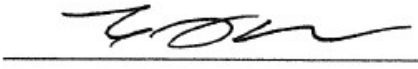

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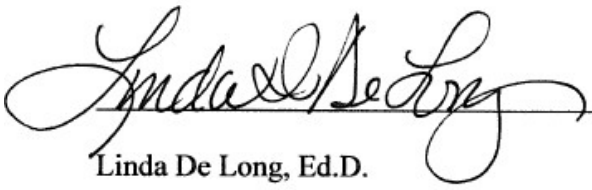

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ABSTRACT

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Purpose: The purpose of this quantitative study was to determine the degree of effectiveness and preferences as it related to various computer-based training (CBT) and instructor-based training (IBT) types as perceived by baby boomer, Generation X, and millennial generational Space and Naval Warfare Systems Center Pacific (SSC Pacific) employees based in San Diego, California, as measured by the Northern Virginia Community College (NVCC) Extended Learning Institute Survey.

Methodology: The study used a descriptive, causal-comparative research design. A survey was administered to collect demographic data and responses that described and determined the degree of difference and effectiveness for various CBT types as perceived by generational groups.

Findings: Participants from all generations had varying attitudes toward training effectiveness and perceptions of training types; however, research suggests that baby boomers continue to adapt and embrace workplace technological changes based on attitudes toward their learning effectiveness and preferences. Generation Xers continue to embrace and reinvent workplace technological changes based on attitudes toward their learning effectiveness and preferences, and learning gaps between the younger, technology-savvy generation and older generations suggest attitudes and behaviors have closed in technologically advanced and diverse organizations.

Conclusions: First, there are varying attitudes toward the degree of training effectiveness and perceptions of training types. Second, generational studies helped to uncover differences between the generational groups and the importance of understanding their training perceptions. Third, the concluding thought of this research is that implementing effective principles of transformational leadership is, foremost, the way to achieve success in training in a rapidly changing technological environment.

Recommendations: This study considered insight into the perceptions of training effectiveness and preferences of government employees in a technologically advanced organization. The study also considered the role of the U.S. Department of the Navy, Naval Education and Training Command, organizational development (OD) professionals, and curriculum development designers with the state of generational group perceptions of CBT effectiveness and the preferred type of CBT instruction. Results could help organizations engage generational employees by developing age-friendly blended teaching methods, such as slower presentations with increased discussion, longer practice sessions, and interactive computer programs to aid learning to close gaps in training and enhance technological proficiency.

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CHAPTER I: INTRODUCTION

In both the private and public sector, it is not considered time or cost-effective to train employees more than once to learn basic job skills and concepts (Hawkins, 2011). Organizations know employees need to be trained on behavior, skills, knowledge, and attitudes necessary to meet strategic and operational objectives of the organization. The military has historically used training as a method of resocialization; for instance, boot camp or recruit training attempts to teach the basic information and training techniques necessary to be an effective service member. The service members are drilled physically, technically, and psychologically; however, the reverse is true for service members transitioning to the civilian workforce from a life of rigid social order or who transition from a life as a combat soldier. It is apparent that training is important in all organizations. D. L. Anderson (2015) suggested that changing demographics are one major trend facing organizations today. The author cited "slowing population growth rates, increasing proportion of older workers, and a diverse and global workforce are all converging to change the face of the workforce" (D. L. Anderson, 2015, p. 391). Eversole et al. (2012, as cited in D. L. Anderson, 2015) stated, "Individual employees, especially those from different generations or at different life stages, have different needs, goals, and motivators" (p. 395); therefore, the training needs of individuals from different generational groups are a key factor in determining organizational success, but this comes at a cost.

The increasing costs of traditional instructor-based training (IBT) or classroom training include manpower, audio/visual equipment and maintenance, hard copy course materials, writing instruments, employee travel cost reimbursement, and funding for

contractor-provided training, which all impact an organization's cost control mandates. Computer-based training (CBT), on the other hand, is a centrally managed, cost-effective, and flexible option for large or disparately located organizations (Hawkins, 2011; Scannell & Donaldson, 2000). CBT can be applied locally or virtually, and training requirements can be tracked and monitored at central human resources locations through online programs with minimal human interaction. In government agencies such as Space and Naval Warfare Systems Center Pacific (SSC Pacific), learning methods are becoming increasingly computer based to reduce costs associated with traditional classroom training. Historically, the military has progressed out of necessity to overcome training challenges in new technology. According to Marc Prensky (2001), the military has a history of technology training dating back to 1934. Four years earlier in 1930, Edwin Link had invented a flight simulator and attempted to sell it to the U.S. Army. It took 4 years, but the Army saw the flight simulator as a valuable training tool, and thus the flight simulator became the beginning of CBT in the military and, to this day, continues to evolve as a cost-savings and motivational tool to train and prepare military and civil service professionals (Prensky, 2001).

Space and Naval Warfare Systems Center (SPAWARSYSCEN) employs over 9,500 active duty military and civil service professionals. SPAWARSYSCEN is a Department of the Navy Systems Command agency and headquarters to SSC Pacific, the Navy's premier research, development, test, and evaluation (RDT&E) laboratory for command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). SSC Pacific provides complete lifecycle development and support for military C4ISR systems from concept to fielded capability with its robust and

diverse military and civilian workforce of more than 4,000 employees in 10 competency-aligned departments. SSC Pacific is a technologically advanced organization answering the call for keeping pace with rapid increase in technology. The result is the "research, development, delivery, and support of integrated command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), cyber, and space systems across all warfighting domains" (U.S. Navy, Space and Naval Warfare Systems Command, n.d.-b, para. 1).

The U.S. Navy has always been on the cutting edge of technology out of necessity. One can follow history from the birth of the United States when the Continental Navy was established by the Continental Congress on October 13, 1775, agreeing to build a navy to defend the colonies from the Royal Navy during the American Revolutionary War (Symonds, 2016). Navy ships of the past and those of today continue to evolve as innovative technology increases. Eventually, technology became a dominating factor in determining successful outcomes of major naval battles and campaigns mainly due to the invention of technology such as Radio Detection and Ranging (RADAR) that allowed shipboard operators to provide early warnings of approaching enemy aircraft and ships at long distances. In 1961, the U.S. Department of the Navy decided it was time to digitize the Navy and introduced the Naval Tactical Data System (NTDS; Boslaugh, 1999). This system was not well received by naval officers at first, but now variations of NTDS in the 21st century are widely accepted as the norm, resulting in a transformation into sophisticated technological combat systems (Boslaugh, 1999).

The U.S. Navy continues to thrive as a technological leader in the world through its involvement in RDT&E, but now it is challenged to keep pace with the rapid increase in technology. Since the information technology (IT) boom of the 21st century has exponentially increased, organizations large and small have either embraced or struggled to keep pace with emerging technology. Some successful organizations such as Apple have embraced change and taken advantage of the technological explosion. Most organizations have either collapsed due to financial challenges or competition or simply refused to give in to technological change (Friedman & Mandelbaum, 2011). Transformational leadership is a key element for any existing or new organization to support emerging technology development and has been proven in studies to be effective in an IT environment. The transformational leader's role is important in creating an atmosphere of "support" through the organization's "vision," mission, and "strategic goals" (Daly, 2011, pp. 61-62). Survival of an organization depends on keeping pace with competitors, realizing implications of staying competitive, and planning for future growth. Finally, organizations must be cognizant of adult learning behaviors in a diverse workforce consisting of baby boomers, Generation Xers, millennials, and Generation iYers as they expand the use of computerized learning technology (Ellison, 2014). This creates a need that must be addressed within learning organizations to overcome challenges in workforce education. Therefore, training and development will secure a highly technical and qualified workforce to respond to the demands of the 21st-century naval fleet forces.

Addressing the future of organizational development, D. L. Anderson (2015) stated that there are three major challenges that organizations face: "increasing

complexity[,] changing workforce demographics[, and the] changing nature of work" (p. 389). Government organizations facing rapid increases in technology historically have shown that these challenges are compounded by a diverse workforce within the organizations. SSC Pacific has four generations of employees with varying attitudes and behaviors toward CBT. "Individual interventions" to overcome complex generational challenges "can be . . . influential to [improve] personal growth, development, and change" (D. L. Anderson, 2015, p. 209).

Background

Since the IT boom of the 21st century has exponentially increased, organizations large and small have either embraced or struggled to keep pace with emerging technology. Successful organizations have embraced organizational change and taken advantage of the technological explosion. Government organizations such as the Department of the Navy's SSC Pacific must keep pace out of necessity to support and defend the United States against threats and to preserve interests; however, many other organizations such as IBM, failing to understand the implications of the "PC" (Friedman & Mandelbaum, 2011, p. 374), have either collapsed due to financial challenges or competition or refused to give in to rapid technological change. In generational research by Ellison (2014), the author discussed future research to address technology challenges, stating, "With the growth of technology, generations will stay complacent or change with innovations. Additionally, with the increased retirement of the Baby Boomers, Generation X, Millennials, and Generation iY will be forced to lead organizations" (p. 39). Therefore, the importance of organizations' adapting to the rapid change of technology will benefit learning in organizations.

Transformational leadership is a key element for any existing or new organization to support emerging technology development and has been proven in studies to be effective in an IT environment (Daly, 2011). The transformational leader's role is important in creating an atmosphere of "support" through the organization's "vision," mission, and "strategic goals" (Daly, 2011, pp. 61-62). The qualities and characteristics of transformational, transactional, and servant leaders should be understood in order to make distinctions between all leaders in an organization to determine their strengths and challenges (D. Anderson & Anderson, 2010; Greenleaf Center for Servant Leadership, n.d.). Therefore, the challenges for leaders in new or emerging technologically advanced organizations include infrastructure, capability to support the infrastructure, cost considerations, and recognition of limitations (Ribes & Finholt, 2009). The organization must have the support from its leaders through a shared vison to support the mission and overall strategic goals. Survival of an organization depends on keeping pace with competitors, realizing implications of staying competitive, and planning for future growth. Finally, organizations must be cognizant of adult learning behaviors in a diverse workforce consisting of millennials and baby boomers as they expand technology (D. Anderson & Anderson, 2010). Digital native, digital settler, and digital immigrant are metaphors used to describe differences in technology adaptation based on age. This creates a gap that must be addressed within learning organizations to overcome challenges in the workforce.

New Technology Challenges in Learning Organizations

Infrastructure. In Peter Senge's (2006) book *The Fifth Discipline*, he described how companies can overcome learning disabilities that threaten their productivity and

success. Senge coined the concept of the learning organization through research to describe a company that facilitates learning of its employees and continually transforms itself.

IT infrastructure in a learning organization, as opposed to a new or emerging organization, has its advantages. Ribes and Finholt (2009) explained that "infrastructure is intended to last for the long term and designing information infrastructure is a visionary process. Technology will continue to evolve minute by minute and the successful organization must keep pace if it is to continue being successful" (pp. 376-389). The authors also explained that "instability of funding and the enactment of experimental systems are additional factors for consideration" (Ribes & Finholt, 2009, p. 393). Organizations with existing information infrastructure including a chief information officer (CIO) may weather the change, but without the support of the leadership, the challenges become even more evident in new or emerging organizations and especially small business enterprises. In fast-changing environments, organizations facing uncertainty and ambiguity could employ strategic planning methods, using environmental tools to enhance decision making (Chermack, 2011).

Capability and limitations. The maintenance and customer support of IT capabilities in any high-capacity and high-growth organizational environment is crucial to the needs of the organization's personnel and the customers it serves. In high-performance organizations, capabilities in general are the main reason for technical support to the end user, and support is normally both a managerial and technical function. Hollis (2014) explained that organizations in the global environment of today are constantly looking at ways to improve on the delivery of IT and, at the same time,

attempt to cut costs while improving and enhancing IT services. In support of new or emerging technology, capabilities can be enhanced or processes and procedures streamlined; therefore, leaders must be ready to bring stakeholders through the change process to eliminate misunderstanding and maintain the organization's vision.

Cost considerations. IT improvements in any organization can be a costly endeavor. Hollis (2014) stated that conducting a cost/benefit analysis (CBA) prior to making an IT investment is paramount for leaders in both IT and senior management positions. Choosing between not doing anything and taking full advantage of technological benefits can be the life or death for any organization. In a typical IT organization, technical refresh updates are required about every 2 years. Successful organizations budget for such expenses, however, through the recent introduction of management functions such as the risk management framework, created to ensure effectively designed security controls mitigate risk to an acceptable level based on a CBA and return on investment (ROI). Systems incorporating risk processes earlier in the developmental cycle ensure implementation is "baked in," realizing cost savings as the system technologically matures.

Technological Advances

Keeping pace. The rapid growth in technology is recognized by almost everyone in the world today. People hear things about it in the news, and they experience it with their cell phones, computers, automobiles, jobs, and military technology. There has been an explosion of information and innovation, and everyone wants in on it. Organizations need a "wake-up call" to realize that IT is progressing at an exponential rate; news of this technological boom has been around for quite some time (D. Anderson & Anderson,

2010, p. 60). In an article published in 1981, William Stockton, then the *New York Times* director of science news, said it best:

> The computer, the most visible example of modern technology, will proliferate beyond most people's imaginings. Computers will become smaller and faster and appear in virtually every machine humans use. The revolution in information processing, already well under way, will accelerate. (p. 2)

In a *Time Magazine* article, Rana Foroohar (2016) cited "a famous quip . . . [by] Robert Solow, one of the world's pre-eminent labor economists . . . : 'You can see the computer age everywhere but in the productivity statistics'" (para. 1). Solow's paradox, according to Foroohar, was "top of mind at [the 2016] World Economic Forum (WEF) in Davos, Switzerland" (para. 2). The challenges of technology and how it "is changing nearly every aspect of our lives—from how individuals earn a paycheck to how states fight wars" (Foroohar, 2016, para. 2)—point to a shift in technology identified by the WEF as "the fourth industrial revolution" (para. 4). The technology is "evolving more quickly than ever before," impacting "socioeconomic and demographic changes" (Foroohar, 2016, para. 4). The bottom line is that "companies and governments alike will have to spend more money and time training workers of the future" (Foroohar, 2016, para. 10).

Implications. Long-term planning for IT reduces risk and should be a part of high-performance organizations. Yesterday's novel solutions quickly become today's staple resources and even more quickly become tomorrow's relics (Ribes & Finholt, 2009). Common problems revealed in the study by Ribes and Finholt (2009) were science policy, funding, organizing work, and maintaining technical systems, and other

concerns were changing technologies, emerging standards, and uncertain institutional trajectories. The implications of unnecessary risk taking in an IT environment go counter to best practices (Enterprise Networking Solutions, Inc., n.d.). An organization's future growth in technology impacts employees' and customers' needs.

Future growth. Organizations must continually evaluate IT growth. According to the U.S. Department of Labor, Employment and Training Administration (2016),

> The computer systems design and related services industry is among the economy's largest and fastest sources of employment growth. . . . [T]he main growth catalyst for this industry is expected to be the persistent evolution of technology[,] and . . . [e]mployment of computer and information systems managers [was] expected to grow between 18 to 26 percent for all occupations through the year 2014. (para. 1-3)

Counter to U.S. Department of Labor statistics, Bill Novelli (2006), CEO of AARP, said, "The United States is facing a shortage of younger employees" (p. 97). The largest part of the U.S. workforce is made up of individuals between the ages of 65 and 74, but they are quickly retiring annually. The "casual observation of various industries may mask the reality, but a shortage of workers is definitely on the way" (Novelli, 2006, p. 97). Kogan et al. (2013) noted,

> The United States is in the midst of a demographic transformation [due to d]ecreasing birth rates and increasing life expectancy. . . . It is estimated that, by 2020, workers 55 and over will make up 25 percent of the U.S. civilian [work]force, up from only 13 percent in 2000. . . . [I]t is projected that workers

> 65 and over will make up more than 7 percent of the total [workforce] labor. (p. ES-1)

When this changing workforce is coupled with technology that is advancing at an exponential rate, many organizations struggle to adapt (Kogan et al., 2013).

Leader Roles in Supporting New Technology

Bass (2008) defined the leader's vision as "goals that are forward-looking and meaningful to followers and provide a road map to the future with emotional appeal to the followers" (p. 629). Miles (1997) said,

> Transformational change is vision led. . . . It involves the creation of goals that stretch the organization beyond its current comprehension and capabilities. . . . The leader is tasked to create a clear and compelling vison of a desirable future state. . . . An effective vision not only helps [a] corporation transform itself; it also enables the enterprise to transform its competitive situation. (pp. 5-6, 27, 29)

Daly (2011) explained that effective leadership within the virtual environments includes the understanding to use old and new technologies in a socially adapted manner to share the vision and inspire the followers. Leadership makes the work life of employees more meaningful. Hollis (2014) argued that leadership has been an integral component in the successful execution of providing efficient and effective IT to accomplish the mission and meet objectives of an organization. Burns (1978, as cited in Hollis, 2014) stated that leaders "in military organizations that do not have clearly defined goals often find themselves with motivation and moral challenges within their organization" (p. 10). Despite the leadership style or characteristics, it is apparent that a clear vision for the

organization is paramount; the mission must be realistic, and strategic or tactical goals must be achievable.

The Role of Transformational Leadership

According to L. A. Anderson and Anderson (2010), "Change is the essence of innovation, growth, and transformation. Organizations that can change quickly and successfully will win in the dynamic twenty-first century marketplace" (p. 17). It is apparent that organizations in the 21st century require transformational leaders to forge visions that will not only enable but also embrace constant change if they are to remain competitive. Change is often viewed by employees as a "negative experience," a setback (D. Anderson & Anderson, 2010, pp. 18-19). However, change capability as a "Twenty-First Century Competitive Advantage" is a key point in the literature; the ability for organizations to implement change strategies demonstrates the importance to seek out or create successful transformational leaders (D. Anderson & Anderson, 2010, p. 17). D. Anderson and Anderson (2010) stated that for organizations implementing new technology, the central leader or leaders must display transformational leadership characteristics to support change management efforts to assess course corrections, enable change predictors, address change issues, and create the shared visions the organization expects and deserves.

Learning Groups and Learning Styles

Adult learners. A learning gap exists in organizations between a younger generation of technology-savvy computer literates and an older generation of employees struggling to keep pace with the rapid growth of IT systems, such as upgrades to outdated computer systems, manual applications, and CBT technology replacing classroom-type

training. Hawkins (2011) explained that while many employees are persistent, self-efficacious adult learners, their learning preferences and lack of experience may make CBT a difficult method to develop new skills and knowledge, which limits their ability to learn efficiently. The metaphors of digital natives and digital immigrants were used in an article by Prensky (2001) to describe the differences in learning between a younger generation of students and their teachers.

Intergenerational group dynamics. Survival of an organization depends on keeping pace with competitors, realizing implications of staying competitive, planning for future growth, and being cognizant of adult learning behaviors in a diverse workforce as the organization expands the use of computerized learning technology (Ellison, 2014). Organizations that fail to recognize intergenerational group differences face difficulties in managing and engaging their teams, but "organizations that understand how to successfully address generational conflict and leverage each generation's strengths will be better able to keep employees motivated and productive" to retain those employees (Birkman, 2016, p. 4). Today's organizations consist of four generations working together, more than any other time in history (Meister & Willyerd, 2010). Senge (2006) stated that leaders will be emerging from unexpected places, from cultural, economic, and demographic periphery: women, the poor, and the young. Focusing on youth leadership, systemic change is coming from young people, those who have a strong stake in the future.

Digital natives, digital immigrants, and digital settlers. Digital natives, according to Haugen and Musser (2013), were all born after 1980, when social digital technology came online, and major aspects of their lives, such as social interaction,

friendship, and civic activities, are mediated by digital technologies. Digital settlers are older people who helped shape the digital age but still rely heavily on the analog world, and digital immigrants, according to Haugen and Musser, are less familiar with the digital environment and learned how to use e-mail and Internet late in life. Prensky (2001) argued that "today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV)" (p. 1). Alternatively, "Digital Immigrants learn—like all immigrants, some better than others—to adapt to their environment, [but] they always retain, to some degree, their 'accent,' that is, their foot in the past" (Prensky, 2001, p. 2). Stoerger (2009) suggested the "melting pot" metaphor and argued, "The melting pot also symbolizes the bridge between the two cultures that the digital native–digital immigrant dichotomy creates" (para. 35).

Closing the Gap

It is essential that organizations address adult learner challenges, provide effective interventions and training based on needs analysis, and invest the time to support training. One solution is to conduct a needs analysis, a systemic way of determining the gap that exists between where the organization is and where it wishes to be, followed by a front-end analysis, a collection of techniques that can be used in various combinations to help bridge the gap by determining what solution(s) will be required (Lee & Owens, 2004). Hawkins (2011) argued that corporations and government organizations are continuously seeking ways to provide just-in-time training to their workforce while at the same time trying to reduce or at least minimize cost increases in training budgets. Technology is increasingly being used to deliver content to a wide audience on an as-

needed basis to enable the workforce to learn and relearn skills and concepts in a dynamic work environment.

In a research survey conducted by Hawkins (2011), respondents complained that frequent interruptions at work made it difficult to absorb and retain information and that they felt rushed if they attempted to conduct training during business hours. Many commented that they had to conduct training outside of work hours or outside the workplace because of the lack of time or because of a poor learning environment at the workplace. Several participants suggested that organizations provide a training center or a location away from the job site for employees to conduct training during business hours (Hawkins, 2011). In a paper by Ertmer and Newby (1996), the authors wrote that "reflection on the process of learning is believed to be an essential ingredient in the development of expert learners" (p. 1). They suggested "employing reflective thinking skills to evaluate the results of one's own learning efforts"; therefore, the knowledge that the expert learners have gained is used to "achieve desired learning goals" for novice learners (Ertmer & Newby, 1996, p. 1).

Addressing the future of organizational development, D. L. Anderson (2015) identified three major challenges that organizations face: "increasing complexity[,] changing workforce demographics[, and] changing nature of work" (p. 389). In government organizations facing rapid increases in technology, history has shown that these challenges are compounded by a diverse workforce. Today's organizations may have up to four generations of employees with varying attitudes toward CBT. "Individual interventions" to overcome complex generational challenges "can be . . .

influential to [improve] personal growth, development, and change" (D. L. Anderson, 2015, p. 209).

Statement of the Research Problem

A problem exists fueled by the rapid and noticeable increase in IT over the past 25 years impacting today's diverse workforce. As a result of the increase in technology growth and innovation, mandated employee training in government agencies has become increasingly computer based to reduce the high cost associated with classroom training. In both the private and public sector, it is not considered time or cost-effective to train employees more than once to learn basic job skills and concepts (Hawkins, 2011).

There are up to four different generations of employees in the workforce, more than any other time in history (Meister & Willyerd, 2010). In government organizations facing rapid increases in technology, history has shown that these challenges are compounded by a diverse workforce (D. L. Anderson, 2015). Recognizing the differences in learning styles of generational groups and how groups adapt to the change in technology enhances the survival of successful organizations (Ellison, 2014). The rapid increase in technology coupled with a more diverse workforce creates barriers to achieving a highly trained technical workforce to effectively respond to increasing work demands.

Among intergenerational groups, older generation employees are not as comfortable with technology or the substitution of traditional classroom training. Their reluctance to embrace new technologies can impact the ability of some to effectively apply and/or transfer knowledge and skills while other technology-savvy groups embrace the new technologies. This quantitative study examined the differences and the

effectiveness of various CBT types as perceived by baby boomer, Generation X, and millennial employees. The problem is compounded by the increase of older generation employees remaining in the workforce longer, slower population growth rates, and a diverse and global workforce. According to Blair (2016), "Today turning 65 is no guarantee that you will be willing to retire. Most seasoned (mature) workers are living longer, healthier lives and have a different economic challenge than their parents before them" (p. 15). In 1990, workers age 55 and over comprised 11.5% of the working population; this number is expected to rise to 25.2% by 2020 (D. L. Anderson, 2015). By 2027, this population is expected to grow to 55% (Novelli, 2006).

Fueled by the rapid and noticeable increase in IT over the past 25 years, organizations continue to address the complex needs of a changing workforce to provide a more cost-effective computerized-type training to employees. The increase in computerized training also supports the organizations' need to rapidly train employees to meet the demands of stakeholders. This increase in demand from a more diverse generational workforce impacts the ability of some to effectively apply and/or transfer knowledge and skills while other technology-savvy groups embrace new learning. While transformational leadership is a key element for any organization to support emerging technology development, it will be essential for current leaders to understand generational group attitudes toward CBT in the workplace. Leadership's awareness and understanding of these generational differences will be critical to the success of overall organization growth and development (D. L. Anderson, 2015; D. Anderson & Anderson, 2010; Hawkins, 2011).

Purpose Statement

The purpose of this quantitative study was to determine the degree of effectiveness and preferences as it related to various computer-based training (CBT) and instructor-based training (IBT) types as perceived by baby boomer, Generation X, and millennial generational Space and Naval Warfare Systems Center Pacific (SSC Pacific) employees based in San Diego, California, as measured by the Northern Virginia Community College (NVCC) Extended Learning Institute Survey.

Research Questions

Four primary research questions focused and guided the dissertation research related to the preferred CBT types by baby boomer, Generation X, and millennial generational SSC Pacific employees:

1. To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
2. To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
3. To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
4. To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?

Significance of the Study

Numerous studies have described the importance of the rapid increase in technology in 21st-century organizations and the impact on cost and productivity

(D. Anderson & Anderson, 2010; Daly, 2011). Other studies have compared and contrasted the significance of a rapidly changing and diverse workforce in present-day organizations, the role of leadership, and recommended solutions and organizational development (OD) interventions (D. L. Anderson, 2015; Miles, 1997; Ribes & Finholt, 2009). What do not appear to have been researched thoroughly are the intergenerational group perceptions of differences and effectiveness of various CBT types in government organizations. This research may be valuable to government and private organizations eager to develop cost-effective "just-in-time" computerized training with generational group needs in mind.

The present study will provide the U.S. Department of the Navy, Naval Education and Training Command, OD professionals, and curriculum development designers with insight into generational group perceptions of CBT effectiveness and the preferred type of CBT instruction. Policymakers, curriculum developers, and computerized training designers will be provided with the empirical data necessary to better understand the learning needs of today's diverse workforce during a training needs analysis. Results could help organizations engage generational employees by developing age-friendly teaching methods, such as slower presentations with increased discussion, longer practice sessions, and interactive computer programs to aid learning. Alternatively, developing coaching programs where older workers share their knowledge and experience with the next generation could also serve to increase teamwork and communication among groups (D. L. Anderson, 2015; Novelli, 2006).

The rapid increase in technology in government and private organizations over the last 25 years, coupled with an increasingly diverse workforce, has significantly

impacted the employment landscape and requires organizational planning, leadership, and support. In fast-changing environments, organizations employ strategic planning to enhance decision making, build long-term solutions by taking advantage of technology infrastructure, and are aware of their capabilities and limitations (Chermack, 2011; Hollis, 2014; Ribes & Finholt, 2009). The leaders' role in supporting new technology to make work life more meaningful through effective use of vision, mission, and goals is critical to the success of 21st-century organizations. Leaders who share an understanding of technology in a socially adapted manner also inspire followers and provide efficient IT (Daly, 2011; Hollis, 2014).

The argument that rapid technology growth in the global community should serve as a "wake-up call" to organizations if they intend to keep pace and stay competitive was persuasive throughout the literature (D. Anderson & Anderson, 2010, p. 60; see also D. L. Anderson, 2015; Friedman & Mandelbaum, 2011; Novelli, 2006; Ribes & Finholt, 2009; Stockton, 1981). In 1981, Stockton futuristically spoke about the proliferation of computers, and in 2016, Foroohar, reporting for *Time Magazine*, wrote that technology is "evolving more quickly than ever before" (para. 4). Implications associated with the rapid increase in technology involve long-term planning as a necessity for IT to reduce risk, which should be a part of high-performance organizations (Ribes & Finholt, 2009). Novelli, CEO of AARP, said, "The United States is facing a shortage of younger employees" (p. 97). Kogan et al. (2013) noted, "The United States is in the midst of a demographic transformation [due to d]ecreasing birth rates and increasing life expectancy" (p. ES-1). When this changing workforce is coupled with technology that is

advancing at an exponential rate, many organizations struggle to adapt (Kogan et al., 2013).

Different learning styles and learning methods, such as CBT, among generational employees create gaps among groups struggling to keep pace with the rapid growth of IT systems. Research has suggested that learning preferences and experiences may negatively impact adult learners' ability to transfer knowledge efficiently while other research has revealed differences in learning between younger generation students and their teachers (Knight, 2016). Organizations that fail to recognize generational group differences face difficulties in managing and engaging teams, which affects their ability to keep employees motivated and productive (Birkman, 2016; Ellison, 2014; Hawkins, 2011; Meister & Willyerd, 2010; Prensky, 2001). In a paper by Ertmer and Newby (1996), the authors wrote that "reflection on the process of learning is believed to be an essential ingredient in the development of expert learners" (p. 1). The results of this study suggest that with appropriate strategy, employing appropriate individual and group interventions may be the key to developing cost-effective "just-in-time" computerized training with generational group needs in mind.

Definitions

The specific terms and definitions pertaining to learning, technology, and the target population referenced throughout this study are listed below.

Baby boomer. Generation of learners born between the years of 1946 and 1964 (Culture Coach International, n.d.).

Blended learning. Traditional blended learning supports the idea that classroom training can be augmented with online training in ways that shorten classroom time (efficiency) by moving basic content online (Stolovitch & Keeps, 2011).

Computer-based training (CBT). Also called a computer-based learning environment, for the purpose of this study, CBT describes self-paced instruction via a computer.

Digital immigrant. Individuals who were born before digital technology was widespread and adopted. "Digital Immigrants learn—like all immigrants, some better than others—to adapt to their environment, [but] they always retain, to some degree, their 'accent,' that is, their foot in the past" (Prensky, 2001, p. 2).

Digital native. Individuals who were born or brought up after digital technology was adopted and became a part of everyday life. Digital natives were all born after 1980 when social digital technology came online, and major aspects of their lives, such as social interaction, friendship, and civic activities, are mediated by digital technologies (Haugen & Musser, 2013; Prensky, 2001).

Digital settler. Individuals viewed as old-world settlers who lived in an analog world but migrated to the digital world. Digital settlers are older people who helped shape the digital age but still rely heavily on the analog world, and digital immigrants are less familiar with the digital environment and learned how to use e-mail and Internet late in life (Haugen & Musser, 2013; Prensky, 2001).

Effectiveness. "The degree to which objectives are achieved and the extent to which targeted problems are solved" ("Effectiveness," n.d., para. 1).

Generation X. Generation of learners born between the years of 1965 and 1976 (Culture Coach International, n.d.).

Generation Y. Generation of learners born between the years of 1977 and 1997 (Culture Coach International, n.d.).

Generation 2020. Generation of learners born between the years of 1997 and 2020 (Friedrich, Peterson, Coster, & Blum, 2010).

Generational learners. Adult learners over the age of 18 representing one of the generational classifications (i.e., traditionalist, baby boomer, Generation X, Generation Y, etc.; Baker College, 2004).

Instructor-based training (IBT). Also called experiential or hands-on training, for the purpose of this study, IBT describes classroom learning through an instructor or facilitator.

Internet of things (IoT). "A computing concept that describes the idea of everyday physical objects being connected to the internet and being able to identify themselves to other devices" ("Internet of Things (IoT)," n.d., para. 1).

Leader role. Transformational leadership requires characteristics to support change management efforts to assess course corrections, enable change predictors, address change issues, and create the shared visions the organization expects and deserves (D. Anderson & Anderson, 2010).

Learning style. Different approaches or ways of learning ("Learning Styles," n.d.).

Preference. "A feeling of liking or wanting one . . . thing more than another . . . thing. . . . [S]omething that is preferred" ("Preference," n.d., def. 6, 8).

Transformational leadership. "Transformational leaders motivate their followers to do more than the followers originally intended and thought possible. [They] set[] challenging expectations and achieve[] higher standards of performance . . . [and] look[] to higher purposes" (Bass, 2008, p. 618).

Delimitations

This study was delimited to a random selection of SSC Pacific Command and Control (C2) Department employees located in the San Diego, California region. Employees came from six occupational fields including engineers, scientists, IT specialists, logisticians, and contract specialists. These government staff members represented the three generations currently in the workplace—baby boomers, Generation X, and Generation Y—who have received CBT.

Organization of the Study

This study is structured in five chapters, including the literature review, methodology, data analysis, and conclusion. Chapter II contains a thorough review of historical facts and current research that provided a foundation and theoretical framework for this research. Chapter III describes the types of survey instruments used to collect data for this study. Chapter IV provides an analysis of the data collected and a narrative of the findings. Finally, Chapter V outlines a summary of the entire study, offers conclusions, and makes recommendations for future research. Both the references and appendices are included as final documentation for this study.

CHAPTER II: REVIEW OF THE LITERATURE

The following literature review thoroughly examines the information technology (IT) challenges in a fast-paced environment, leader roles to support new technology, components of learning and learning style theory, an overview of adult and generational learning method preferences, learning with computer-based technology, and specifically, training received via digital technology. This chapter also reviews the blended learning style models and inventories used to assess individual learning method preferences that impact adult learners.

Different learning styles and learning methods, such as computer-based training (CBT), among generational employees create gaps among groups struggling to keep pace with the rapid growth of IT systems. Research has suggested that learning preferences and experiences may negatively impact adult learners' ability to transfer knowledge efficiently while other research has revealed differences in learning between younger generation students and their teachers (Knight, 2016). Organizations that fail to recognize generational group differences face difficulties in managing and engaging teams, which affects their ability to keep employees motivated and productive (Birkman, 2016; Ellison, 2014; Hawkins, 2011; Meister & Willyerd, 2010; Prensky, 2001). In a paper by Ertmer and Newby (1996), the authors wrote that "reflection on the process of learning is believed to be an essential ingredient in the development of expert learners" (p. 1). The results of this study suggest that with appropriate strategy, employing appropriate individual and group interventions may be the key to developing cost-effective "just-in-time" computerized training with generational group needs in mind.

Naval History and Technology

The U.S. Navy has always been on the cutting edge of technology out of necessity. One can follow history from the birth of the United States when the Continental Navy was established by the Continental Congress on October 13, 1775, agreeing to build a navy to defend the colonies from the Royal Navy during the American Revolutionary War (Symonds, 2016). Navy ships of the past evolved and those of today continue to evolve as innovative technology increases. The invention of the submarine torpedo is a historical example that proved to be a turning point for the United States during the War of 1812 with England. On May 29, 1813, a blockade was established to prevent English naval forces from advancing on New England through improvements of the submarine torpedo by Bushnell to drive the enemy from the coast. The submarine torpedo was seen as the most terrible of offensive weapons (Abbott, 1890).

Eventually, improvements in technology resulting from the Industrial Revolution in the 19th century to the technological revolution of the 21st century, what some call "the fourth industrial revolution" (Foroohar, 2016, para. 4), became a dominating factor in determining successful outcomes of major naval battles and campaigns mainly due to the invention of technology such as Radio Detection and Ranging (RADAR; Boslaugh, 1999). This invention allowed shipboard operators to provide early warnings of approaching enemy aircraft and ships at long distances. In 1961, the U.S. Department of the Navy decided it was time to digitize the Navy and introduced the Naval Tactical Data System (NTDS). This system was not well received by naval officers at first, but now variations of NTDS in the 21st century are widely accepted as the norm, resulting in a

transformation into sophisticated technological combat systems onboard every naval vessel and fighter aircraft (Boslaugh, 1999).

The U.S. Navy continues to thrive as a technological leader in the world through its involvement in research, development, test, and evaluation (RDT&E), but now the challenge to keep pace with the rapid increase in technology continues. Since the IT boom of the 21st century has exponentially increased, organizations large and small have either embraced or struggled to keep pace with emerging technology. Successful organizations such as Apple have embraced change and taken advantage of the technological explosion (D. L. Anderson, 2015; U.S. Navy, Space and Naval Warfare Systems Command, n.d.-a). Government organizations such as the U.S. Department of the Navy's Space and Naval Warfare Systems Center Pacific (SSC Pacific) must keep pace out of necessity to support and defend the United States against threats and to preserve interests, but many other organizations have either collapsed due to financial challenges or competition or simply refused to give in to technological change (Friedman & Mandelbaum, 2011). With the rapid growth of technology, generations will either stay complacent or change with the innovations; therefore, the importance for organizations to adapt to the change of technology will benefit learning for organizations. Additionally, with the increased retirement of the baby boomers, Generation Xers, millennials, and Generation Zers will be forced to lead organizations (Ellison, 2014). It is obvious that technology is allowing the world to become more connected as more organizations use technology to connect their employees around the world. D. L. Anderson (2015) argued that technology in itself is not the end, but it is often the means to engage people in a new, collaborative way.

Organizational development (OD) practitioners are also challenged by IT trends in the workplace. Technology has changed how practitioners conduct interventions, requiring them to become familiar with new and evolving technologies in social networking and distance collaboration. The OD practitioners' familiarity with employees' use of technology should explain "when and why employees abstain from interventions using technology and what trade-offs exist in conducting interventions virtually versus face-to-face" (D. L. Anderson, 2015, pp. 398-399). The digital universe was defined by Meister and Willyerd (2010) as information that is created, captured, or replicated in digital form by such means as the social web and a host of other social media tools including blogs, wikis, and video-sharing sites. The digital workplace in organizations will continue to impact how employees contribute or learn new knowledge, how they communicate on and off the job, and how the organization manages the types of policies, standards, and guidelines necessary with the increased pace of technology. Organizations will need to balance employees' usefulness and access to data content and still manage the security of the data (Meister & Willyerd, 2010).

Technological Race

In *The Second Machine Age*, Brynjolfsson and McAfee (2014) traced human development of technology over time and population. Relatively speaking, over thousands of years of human development, nothing technologically exciting happened until the Industrial Revolution and the invention of Watt's steam engine during the second half of the 18th century. There "was a very gradual upward trajectory. . . . But just over two hundred years ago, something sudden and profound arrived and bent the curve of human history—of population and social development—almost ninety degrees"

(Brynjolfsson & McAfee, 2014, p. 6). Brynjolfsson and McAfee stated, "These technological developments underlie the sudden, sharp, and sustained jump in human progress" (p. 6). Figure 1 demonstrates what bent the curve of human history, that is, "the Industrial Revolution, which was the sum of several nearly simultaneous developments in mechanical engineering, chemistry, metallurgy, and other disciplines" (p. 6).

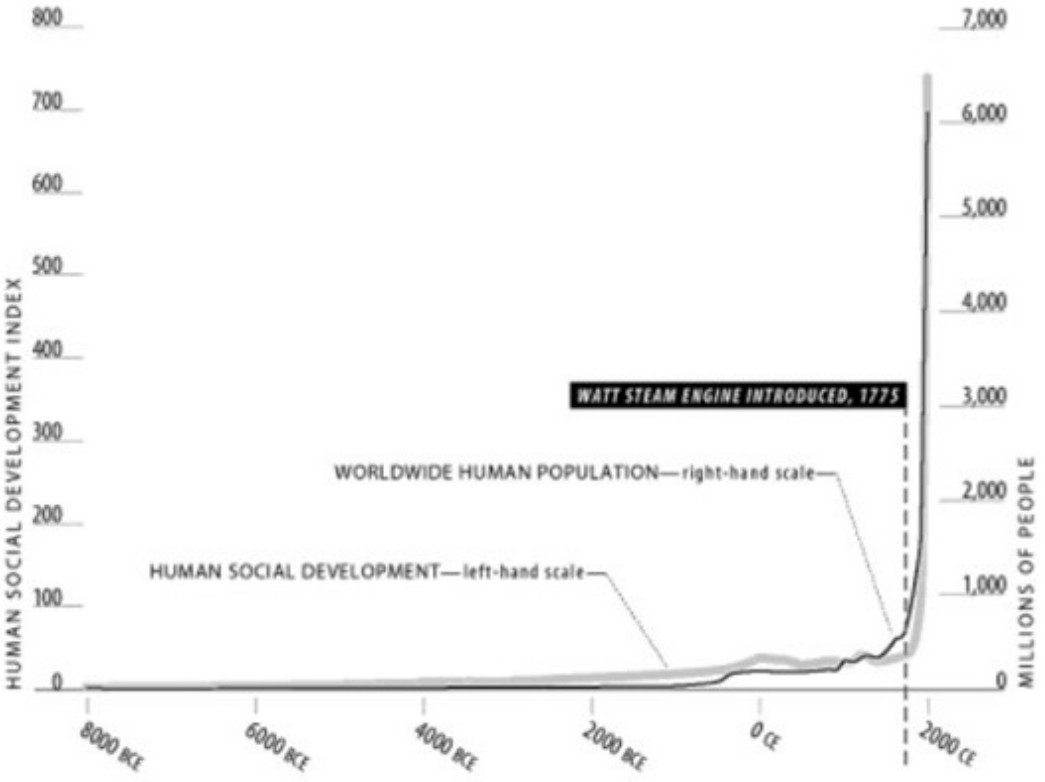

Figure 1. History of technological revolution. From *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (p. 7), by E. Brynjolfsson and A. McAfee, 2014, New York, NY: W. W. Norton & Company. Copyright 2014 by W. W. Norton & Company. Reprinted with permission.

The Second Machine Age

Brynjolfsson and McAfee (2014) explained that "computers and other digital technologies are doing for mental power—the ability to use our brains to understand and

shape our environment—what the steam engine and its descendants did for muscle power" (pp. 7-8). This brain "power is at least important for progress and development—for mastering our physical and intellectual environment to get things done" (Brynjolfsson & McAfee, 2014, p. 8). Schmidt and Cohen (2013) agreed when they stated, "This is our future and these remarkable things, such as driverless cars, thought-controlled robotic motion, artificial intelligence (AI), and fully integrated augmented reality are already beginning to take shape" (p. 5). The *Second Machine Age* (Brynjolfsson & McAfee, 2014) is a story about the rapid increase of technology since the Industrial Revolution and its impact on generations past, present, and future.

Moore's law is the technology industry's rule of thumb. According to Brynjolfsson and McAfee (2014), "The thought is that processor chips—the small circuit boards that form the backbone of every computing device—double in speed every 18 months" (p. 48); this means a computer in 2028 will be 64 times faster than it was in 2016. Figure 2 is a logarithmic scale showing the many dimensions of Moore's law over time.

Moore's statement while working at Fairchild Semiconductor in 1965, "complexity for minimum component costs," according to Brynjolfsson and McAfee (2014),

> essentially means the amount of integrated circuit computing power you could buy for one dollar. Moore observed that over the relatively brief history of his industry this amount had doubled each year: [for instance] you could buy twice as much power per dollar in 1963 as you could in 1962, twice as much again in 1964, and twice as much again in 1965. Moore predicted this state of affairs

would continue, perhaps with some change to timing, for at least another ten years . . . however, Moore's biggest mistake was in being too conservative. (p. 40)

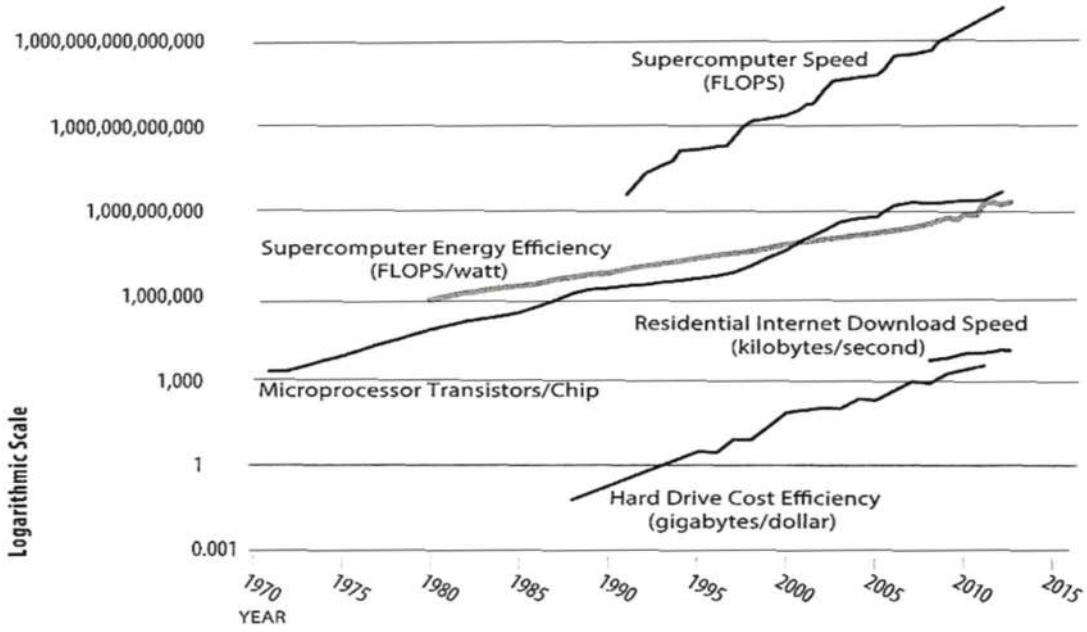

Figure 2. The many dimensions of Moore's law. From *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (p. 48), by E. Brynjolfsson and A. McAfee, 2014, New York, NY: W. W. Norton & Company. Copyright 2014 by W. W. Norton & Company. Reprinted with permission.

According to the authors, Moore's "'law' has held up [relatively] well for over four decades. . . . In 1975, Moore revised his estimate upwards from one year to two, and [currently] it's common to use eighteen months as the doubling [time frame] for generating computing power" (Brynjolfsson & McAfee, 2014, pp. 40-41).

Furthermore, Schmidt and Cohen (2013) similarly argued that Moore's law, the rule of thumb in the technology industry, tells us that processor chips double in speed every eighteen months. Another predictive law of photonics (regarding the transmission of information), tells us that the amount of data coming out of

> fiber-optic cables, the fastest for connectivity, doubles roughly every nine months. (p. 5)

The authors stated that Moore's law promises

> exponentially miniature processors in just a matter of years, for example every two days we create as much digital content as we did from the beginning of civilization until 2003. There is promise and challenges in the most fast-paced and exciting period in human history. The future is now and information technology will continue to eventually be everywhere. As billions of people continue to join the technological realm, technology will soon be involved in every challenge in the world as aspects of our lives. (Schmidt & Cohen, 2013, pp. 253-254)

Organizations will inevitably make technology a part of every solution, such as the presentation of new technology involving the constant upgrade of IT infrastructure and workforce considerations to stay competitive and keep pace.

New Technology Challenges in Learning Organizations

Theoretical Framework

Infrastructure refers to the formal systems and processes that reinforce the intentions of an organization's structure and strategies. Miles (1997) stated that successful corporate transformation processes share a few fundamental attributes: they thrive on energy, they are embedded in a comprehensive implementation process, and they demand a transformational leader. This framework was the basis for this study. Figure 3 displays the author's general framework for leading corporate transformation.

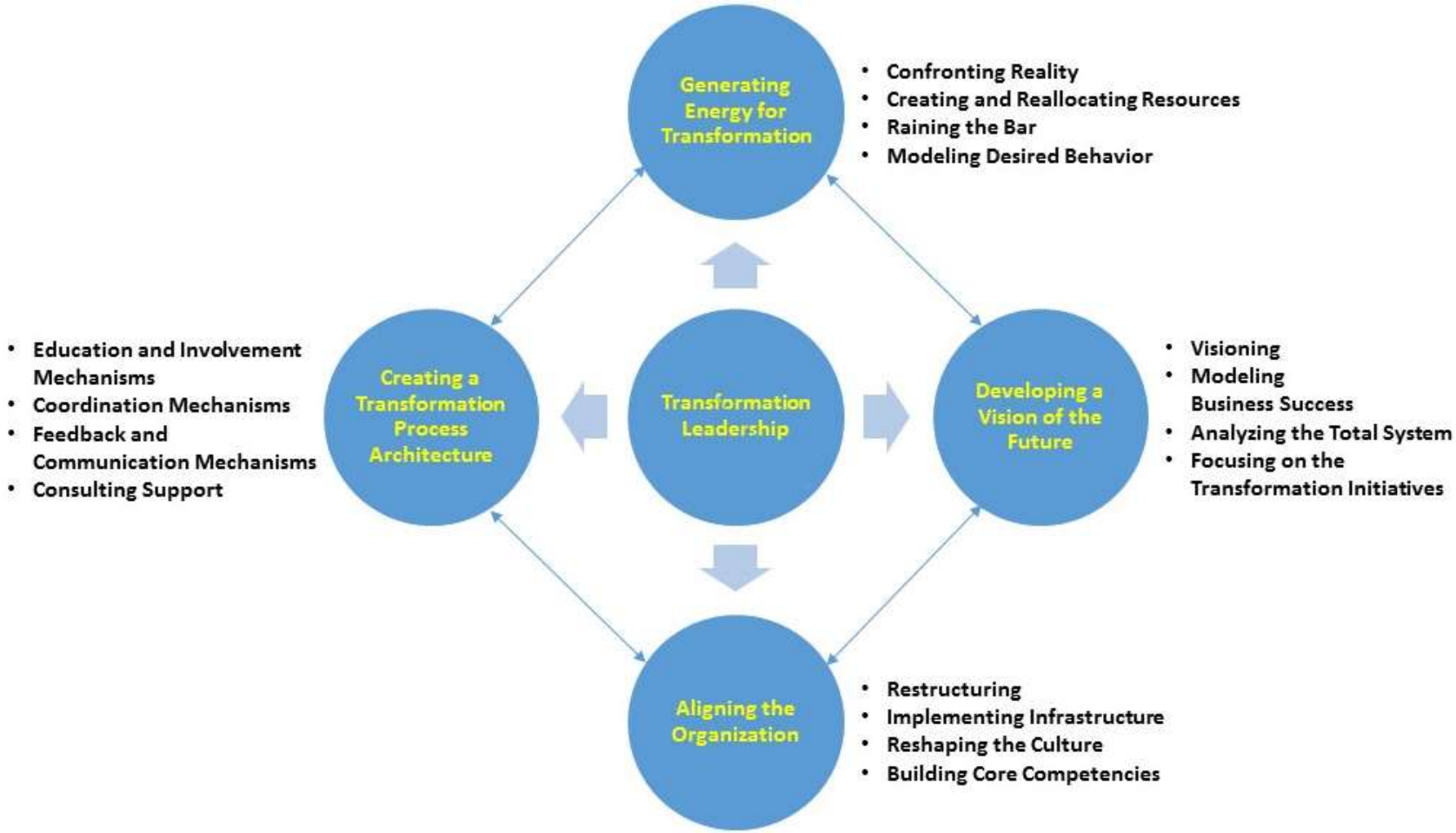

Figure 3. Framework for leading corporate transformation. From *Leading Corporate Transformation: A Blueprint for Business Renewal* (p. 6), by R. H. Miles, 1997, San Francisco, CA: Jossey-Bass. Copyright 1997 by John Wiley and Sons. Reprinted with permission.

Miles (1997) created the framework in Figure 3 to offer a process for leading organizations through successful transformation. He redefined this work based on intense environment in practice and knowledge of the literature since 1977. Miles expanded on the elements of the framework as follows:

- Generate energy to launch and sustain the process of corporate transformation. . . . Confront all levels of the organization with reality, create or reallocate resources, raise the standards of performance, and encourage leaders at all levels to model required new behaviors. To generate energy necessary for change, transformational leaders must understand the personal dynamics of change. That energy must be focused on clear, concise, and compelling vision of a highly desirable future state. A compelling vision can help people release hold of the status quo. (pp. 7, 16-27)
- Develop a vision of the future. . . . Transformational change is vision led. . . . It involves the creation of goals that stretch the organization beyond its current comprehension and capabilities. . . . The leader is tasked to create a clear and compelling vison of a desirable future state. . . . An effective vision not only helps [a] corporation transform itself; it also enables the enterprise to transform its competitive situation. (pp. 5-7, 27, 29) [The visioning process is the core of organizational transformation and is discussed and analyzed in more detail later in this chapter.]
- Align the organization to the vision. . . . [Miles stated requirements for] Restructuring[,] Implementing Infrastructure[,] Reshaping the Culture[, and] Building Core Competencies. (pp. 6-7)

- Create a transformation process architecture to orchestrate a swift but safe passage from current to [future] state. [Miles identified] Education and Involvement Mechanisms[,] Coordination Mechanisms[,] Feedback and Communication Mechanisms[, and] Consulting Support. (pp. 6-7)

IT infrastructure in a learning organization, as opposed to a new or emerging organization, has its advantages. Ribes and Finholt (2009) explained that "infrastructure is intended to last for the long term and designing information infrastructure is a visionary process" (pp. 376-389). Technology will continue to evolve minute by minute and the successful organization must keep pace if it is to continue being successful. The authors also explained that "instability of funding and the enactment of experimental systems are additional factors for consideration" (Ribes & Finholt, 2009, p. 393). Organizations with existing information infrastructure including a chief information officer (CIO) may weather the change, but without the support of the leadership, the challenges become even more evident in new or emerging organizations and especially small business enterprises.

Another concern that Brynjolfsson and McAfee (2014) stated was the increasing "questions about catastrophic events, genuine existential risks, freedom versus tyranny, and other ways that technology can have unintended or unexpected side effects" (p. 251). The authors explained, "The sheer density and complexity of our digital world brings risk with it" (Brynjolfsson & McAfee, 2014, p. 251). For instance, "technological infrastructure is becoming ever more complicated and interlinked" (Brynjolfsson & McAfee, 2014, p. 251). There are two related weaknesses that are the outcome of tightly coupled systems (i.e., Internet, intranet, etc.). The first is that these systems are "subject

to seeing minor flaws cascade via an unpredictable sequence into something much larger and more damaging" (Brynjolfsson & McAfee, 2014, p. 251). Brynjolfsson and McAfee cited sociologist Charles Parrow, who "labeled a 'system accident' or 'normal accident,' [and] characterized the 1979 meltdown of the Three Mile Island nuclear plant, [or] the August 2003 electrical blackout that affected forty-five million people throughout the U.S. Northeast" (p. 251). The second weakness is that these systems "make tempting targets for spies, criminals, and those who seek to wreak havoc" (Brynjolfsson & McAfee, 2014, p. 251). An example is the

> Stuxnet computer worm, which may have been incubated in government labs. In 2010 Stuxnet hobbled at least one Iranian nuclear facility by perverting the control system of its Siemens industrial equipment. The worm . . . spread through them [Microsoft Operating System] by jumping harmlessly from PC to PC; when it spotted an opportunity, it crossed over to the Siemens machines and did its damage there. (Brynjolfsson & McAfee, 2014, p. 251)

Schmidt and Cohen (2013) described the event in their book, *The New Digital Age*: When the Stuxnet worm attacked Iranian nuclear facilities in 2012, it operated by compromising the industrial control processes in nuclear centrifuge operations. Brynjolfsson and McAfee (2014) concluded that "until recently, our species did not have the ability to destroy itself. Today it does" (pp. 251-252).

In an article written for *WIRED*, titled "An Unprecedented Look at Stuxnet, The World's First Digital Weapon," Kim Zetter (2014) said,

> Stuxnet, as it came to be known, was unlike any other virus or worm that came before. Rather than simply hijacking targeted computers or stealing information

> from them, it escaped the digital realm to wreak physical destruction on equipment the computers controlled. (para. 3)

The article provided an excerpt from Zetter's book, *Countdown to Zero Day: Stuxnet and the Launch of the World's First Digital Weapon*, which read,

> It's June 2009—a year or so since Stuxnet was first released, but still a year before the covert operation will be discovered and exposed. . . . Stuxnet has already been at work silently sabotaging centrifuges at the [Iranian] Natanz plant for about a year. An early version of the attack weapon manipulated valves on the centrifuges to increase the pressure inside them and damage the devices as well as the enrichment process. (Zetter, 2014, para. 4-5)

Since the Iranian PCs were not connected to the Internet, it is widely suspected that the virus was created by countries aiming to cripple Iranian nuclear ambitions and introduced to the computer system. The Stuxnet worm was more than likely transmitted by internal cyber criminals and introduced via flash drive. *Cyber warfare* such as this will be inevitable in organizations. The technological implications evidenced in the virtual and physical world will require employees, from novice to expert users, to have the skills and tools necessary to counter malicious activities. Schmidt and Cohen (2013) cautioned,

> It is hard enough to get this right in a world that is just physical, but in the new digital age error and miscalculation will occur often. The result will be more cyber conflict and new types of physical wars and new digital revolution. (p. 120)

In fast-changing environments, organizations facing uncertainty and ambiguity could employ strategic planning methods, using environmental tools to enhance decision making (Chermack, 2011). In his scenario planning theory, Chermack (2011) discussed

six key domains to establish a theoretical foundation of scenario planning that leads to change (pp. 30-31):

- Dialogue, conversation quality, and engagement
- Learning
- Mental models
- Decision making
- Leadership
- Organization performance and change

Each element of the scenario planning theory is crucial to establishing an effective infrastructure to ensure technological challenges are considered in the decision-making process (Chermack, 2011).

Chermack (2011) stated that dialogue, conversation quality, and engagement are critical to scenario planning. The *Merriam-Webster Dictionary* defines dialogue as "a conversation between two or more people" ("Dialogue," n.d., def. 9). Dialogues, conversation quality, and engagement allow people to experiment with ideas and perceptions by taking facts and data into imaginative and speculative worlds (Chermack, 2011). Learning, defined as "the process of gaining knowledge or skill" ("Learning," 2001, p. 247), is critical in scenario planning. Learning theory is a critical theory domain, that is, "learning is a key driver of organizational performance," according to sources cited in Chermack (2011, p. 35; i.e., de Geus, 1988; Schwartz, 1991; van der Heijden, 1997), by planning experts who have described planning as essentially a learning activity. Mental models were defined by Senge (2006) as "deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world

and how we take action" (p. 8). Allee (1997, as cited in Chermack, 2011) stated that mental models are "important cornerstones for building knowledge and defining some of the cognitive processes that support change and learning" (p. 48).

Leadership theory is key in any organization's change and development efforts including infrastructure to support technological challenges. The risk of failure is high in any organizational effort without support from leadership. Performance occurs in four core domains: organization, process, group, and individual. The organizational level involves "organization goals, design and management" (Chermack, 2011, p. 55). Chermack (2011) stated, "The organization level of performance provides the foundation for understanding, analyzing, and managing performance at the process and individual levels" (p. 55). The process level, according to Chermack, is largely "ignored and often misunderstood" (p. 55). However, organizations that have in place "Continuous Process Improvement (CPI)" initiatives should have an easier time identifying performance processes needed to support organizational performance and change, according to sources cited in Chermack (2011, p. 55; i.e., Rummler & Brache, 1995). Finally, at the job/performer level, Chermack suggested jobs must be designed to support process steps, enabling the achievement of process goals and, in turn, organizational goals. Job management is considered a function of performance specifications, task support, consequences, feedback, skills and knowledge, and individual capacity to effectively address and aid job performers in achieving process goals leading to fulfillment of organizational goals, according to sources cited in Chermack (2011; i.e., Rummler & Brache, 1995).

Miles (1997) explained the importance for organizations to focus on implementing core elements such as basic measurements, for instance, planning that supports developing infrastructure. Chermack (2011) provided a tool for surfacing assumptions so that changes can be made in how decision makers see the environment and also for changing and improving the quality of people's perceptions.

Capability and Limitations

The maintenance and customer support of IT capabilities in any high-capacity and high-growth organizational environment is crucial to the needs of the organization's personnel and the customers it serves. In high-performance organizations, capabilities in general are the main reason for technical support to the end user, and support is normally both a managerial and technical function. Hollis (2014) explained that organizations in the global environment of today are constantly looking at ways to improve on the delivery of IT and, at the same time, attempt to cut costs while improving and enhancing IT services. In support of new or emerging technology, capabilities can be enhanced or processes and procedures streamlined; therefore, leaders must be ready to bring stakeholders through the change process to eliminate misunderstanding and maintain the organization's vision. Consequently, technological progress is going to leave some people behind as technology races ahead. There has never been a better time to be a worker with special skills or the right education, because people can use technology to create and capture value. However, there has never been a worse time to be a worker with only "ordinary" skills and abilities to offer, because computers, robots, and other digital technologies are acquiring these skills and abilities at an extraordinary rate (Brynjolfsson & McAfee, 2014).

Cost Considerations

IT improvements in any organization can be a costly endeavor. Hollis (2014) said conducting a cost/benefit analysis (CBA) prior to making an IT investment is paramount for leaders in both IT and senior management positions. Choosing between not doing anything and taking full advantage of technological benefits can be life or death for any organization. In a typical IT organization, technical refresh updates are required about every 2 years. Successful organizations budget for such expenses.

Leader Roles in Supporting New Technology

According to L. A. Anderson and Anderson (2010), "Change is the essence of innovation, growth, and transformation. Organizations that can change quickly and successfully will win in the dynamic twenty-first century marketplace" (p. 17). It is apparent that organizations in the 21st century require transformational leaders to forge visions that will not only enable but also embrace constant change if they are to remain competitive. Change is often viewed by employees as a "negative experience," a setback (D. Anderson & Anderson, 2010, pp. 18-19). However, nothing could be further from the truth in organizations today. Change capability as a "Twenty-First Century Competitive Advantage" is a key point in the literature; the ability for organizations to implement change strategies demonstrates the importance to seek out or create successful transformational leaders (D. Anderson & Anderson, 2010, p. 17). D. Anderson and Anderson (2010) stated that in organizations implementing new technology, the central leader or leaders must display transformational leadership characteristics to support change management efforts to assess course corrections, enable change predictors,

address change issues, and create the shared visions the organization expects and deserves.

Bass (2008) stated that "leadership is central to the organizational change process" (p. 656). Management is typically directed from a top-down approach. Alternatively, it may work its way up as recommendations from supervisors, middle management, or subordinates (Bass, 2008). Bennis (2009) stated, "Change cannot be viewed as the enemy—instead, it is the source of both personal growth and organizational salvation" (p. 166). Many organizations fail to embrace change but claim to welcome it. According to Bennis, there are four major forces working in the world today: technology, global interdependence, demographics, and values. Each force carries both positive and negative influences that shape the future, resulting in a revolution (Bennis, 2009).

Schmidt and Cohen (2013) stated, "The most important pillar behind innovation and opportunity—education—will see tremendous positive change in the coming decades as rising connectivity reshapes traditional routines and offers new paths for learning" (p. 21). The authors added that students will be highly technologically literate as schools continue to integrate technology into lesson plans and, in some cases, replace traditional lessons with more interactive workshops. Critical thinking and problem-solving skills will become the focus in many school systems as ubiquitous digital-knowledge tools (Schmidt & Cohen, 2013). Despite the inevitable progress toward technological advances in the future, challenges remain in the workforce as the demographics continue to evolve. Bringing attention to OD and technology, D. L. Anderson (2015) cautioned,

> As technology changes and new forms of communication continue to grow and evolve, OD practitioners must remain attuned to the ways in which people

> collaborate and connect, and we must be sensitive to the implications for our technology choices in our engagement. (p. 399)

Vision, Mission, and Goals

Bass (2008) defined a leader's vision as "goals that are forward-looking and meaningful to followers and provide a road map to the future with emotional appeal to the followers" (p. 629). The development of a mission statement forms the basis for an organization's vision, but the mission is separate from the vision. The vision represents an optimistic view of the future while the mission adds meaning and purpose (Bass, 2008). Bennis (2009) discussed the manifestations of a leader's judgment and character: "Leaders manage the dream, [and] all leaders have the capacity to create a compelling vision, one that takes people to a new place, and then translate the vision into reality" (p. 188). Miles (1997) said,

> Transformational change is vision led. . . . It involves the creation of goals that stretch the organization beyond its current comprehension and capabilities. . . . The leader is tasked to create a clear and compelling vison of a desirable future state. . . . An effective vision not only helps [a] corporation transform itself; it also enables the enterprise to transform its competitive situation. (pp. 5-6, 27, 29)

Daly (2011) explained that effective leadership within the virtual environments includes the understanding to use old and new technologies in a socially adapted manner to share the vision and inspire the followers. Leadership makes the work life of employees more meaningful. Hollis (2014) argued that leadership has been an integral component in the successful execution of providing efficient and effective IT to accomplish the mission and meet objectives of an organization. Burns (1978, as cited in

Hollis, 2014) stated that leaders "in military organizations that do not have clearly defined goals often find themselves with motivation and moral challenges within their organization" (p. 10); the same can be said of public and private organizations. Despite the leadership style or characteristics, it is apparent that a clear vison for the organization is paramount; the mission must be realistic, and strategic or tactical goals must be achievable. Bass (2008) argued that the formulation of strategies based on threats and opportunities is another aspect of envisioning that is relevant in complex organizations.

Miles (1997) referred to the total-system framework centered on the vision—the purpose and mission of the organization and the supporting business success model—that is the object of a corporate transformation effort (Figure 4). He explained the importance for organizations to focus on implementing core elements such as basic measurements, control, planning, information, human resources, operations, communications, and resource allocation systems to be implemented early to allow for agreement on the vision and transformation initiatives. Miles also examined the importance of vision to the mission by noting that an organization's mission is a clear and compelling goal that serves to unify and focus its efforts. A good mission statement must stretch the organization and take it into a new frontier of activity and performance that is achievable (Miles, 1997).

Table 1 lists the actual SSC Pacific vision and mission statements. In view of the total-system approach, focusing on the transformational initiatives in the initial phases of organizational transformation is crucial to identify major "gaps" in each of the design elements between the current and future vision statements and priorities (Miles, 1997,

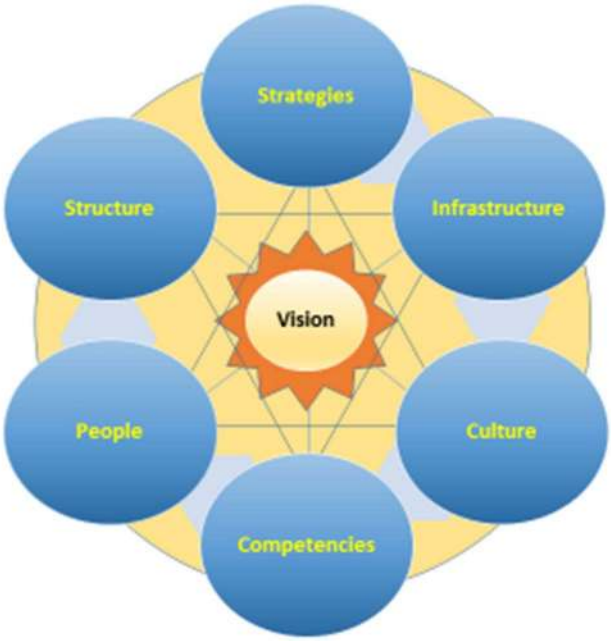

Figure 4. A total-system approach to organizational planning, built upon corporate vision. From *Leading Corporate Transformation: A Blueprint for Business Renewal* (p. 35), by R. H. Miles, 1997, San Francisco, CA: Jossey-Bass. Copyright 1997 by John Wiley and Sons. Reprinted with permission.

Table 1

SSC Pacific Vision and Mission Statement

Type	Statement
Vision	SSC Pacific will be the Nation's Technical Leader for Integrated Information Warfare Solutions.
Mission	Conduct research, development, delivery, and support of integrated command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), cyber, and space systems across all warfighting domains.

Note. From "SPAWAR Systems Center Pacific (SSC Pacific)," by U.S. Navy, Space and Naval Warfare Systems Command, n.d.-b (http://www.public.navy.mil/spawar/Pacific/Pages /Organization.aspx).

p. 38). Miles (1997) explained that for greater urgency and clarity about needed changes in the softer elements, infrastructure must be in place to complement structure. Under stretch performance goals, people are compelled to assume risks in reinventing the way

they get their work done. Related to well-developed vision and mission outcomes, such performance expectations cause people to proactively search for different ways to perform their jobs (Miles, 1997). Stretch goals and quantum change objectives are critical in launching and sustaining any corporate transformation effort.

The total-system approach model described by Miles (1997) articulates the importance of the initial change condition and the transformational leader in the general framework for leading corporate transformation and is applicable to a wide variety of corporate transformation challenges. The author asked, "Are you up to the challenge?" (Miles, 1997, p. 211). With the speed of change simultaneously increasing on so many fronts, even the healthiest organization is able to enjoy only brief moments of satisfaction before needing to reexamine everything and embark on a new phase of transformation.

Technological Advances Forcing Organizational Change

Keeping Pace

The rapid growth in technology is recognized by almost everyone in the world today. People hear things about it in the news, and they experience it with their cell phones, computers, automobiles, jobs, and military technology. There has been an explosion of information and innovation, and everyone wants in on it. Organizations need a "wake-up call" to realize that IT is progressing at an exponential rate; news of this technological boom has been around for quite some time (D. Anderson & Anderson, 2010, p. 60). In an article published in 1981, Stockton, then the *New York Times* director of science news, said it best:

> The computer, the most visible example of modern technology, will proliferate beyond most people's imaginings. Computers will become smaller and faster and

> appear in virtually every machine humans use. The revolution in information processing, already well under way, will accelerate. (p. 2)

In a *Time Magazine* article, Foroohar (2016) cited "a famous quip . . . [by] Robert Solow, one of the world's pre-eminent labor economists. . . : 'You can see the computer age everywhere but in the productivity statistics'" (para. 1). Solow's paradox, according to Foroohar, was "top of mind at [the 2016] World Economic Forum (WEF) in Davos, Switzerland" (para. 2). The challenges of technology and how it "is changing nearly every aspect of our lives—from how individuals earn a paycheck to how states fight wars" (Foroohar, 2016, para. 2)—point to a shift in technology identified by the WEF as "the fourth industrial revolution" (para. 4). The technology is "evolving more quickly than ever before," impacting "socioeconomic and demographic changes" (Foroohar, 2016, para. 4). The bottom line is that "companies and governments alike will have to spend more money and time training workers of the future" (Foroohar, 2016, para. 10).

Implications

Long-term planning for IT reduces risk and should be a part of high-performance organizations. Yesterday's novel solutions quickly become today's staple resources and even more quickly become tomorrow's relics (Ribes & Finholt, 2009). Common problems revealed in the study by Ribes and Finholt (2009) were science policy, funding, organizing work, and maintaining technical systems, and other concerns were changing technologies, emerging standards, and uncertain institutional trajectories. The implications of unnecessary risk taking in an IT environment go counter to best practices (Enterprise Networking Solutions, Inc., n.d.). An organization's future growth in technology impacts employees' and customers' needs.

Future Growth

Organizations must continually evaluate IT growth. According to the U.S. Department of Labor, Employment and Training Administration (2016),

> The computer systems design and related services industry is among the economy's largest and fastest sources of employment growth[;] . . . the main growth catalyst for this industry is expected to be the persistent evolution of technology[,] and . . . [e]mployment of computer and information systems managers [was] expected to grow between 18 to 26 percent for all occupations through the year 2014. (para. 1-3)

Counter to U.S. Department of Labor statistics, Novelli (2006), CEO of AARP, said, "The United States is facing a shortage of younger employees" (p. 97). The largest part of the U.S. workforce is made up of individuals between the ages of 65 and 74, but they are quickly retiring annually. The "casual observation of various industries may mask the reality, but a shortage of workers is definitely on the way" (Novelli, 2006, p. 97). Kogan et al. (2013) noted,

> The United States is in the midst of a demographic transformation [due to d]ecreasing birth rates and increasing life expectancy. . . . It is estimated that, by 2020, workers 55 and over will make up 25 percent of the U.S. civilian [work]force, up from only 13 percent in 2000. . . . [I]t is projected that workers 65 and over will make up more than 7 percent of the total [workforce] labor. (p. ES-1)

When this changing workforce is coupled with technology that is advancing at an exponential rate, many organizations struggle to adapt (Kogan et al., 2013). Bennis

(2009) agreed: "The American population is aging" (p. 169). According to the 2000 census, 77 million Americans were 50 or older, an increase of 21% in a decade. Bennis stated that those over 50 are the nation's fastest growing age group that will require many goods and services. In 2008, 38.7 million Americans were 65 or older—12.7% of the population—and this number is expected to increase to 88.5 million by 2050 (Bennis, 2009). In comparison, in 2011, the U.S. Census Bureau reported,

> There were 40.3 million people who were 65 years and over on April 1, 2010. . . . This is an increase of 5.3 million over Census 2000, when this population numbered 35.0 million. The percentage of the population 65 years and over also increased from 2000 to 2010. In 2010, the older population represented 13.0 percent of the total population, an increase from 12.4 percent found in 2000. (Werner, 2011, p. 3)

According to the U.S. Bureau of Labor Statistics, some possible explanations for the rise in labor force participation among older populations include changes to Social Security laws, changes to private retirement plans, increased life expectancy, rising healthcare costs, and increased educational attainment of older adults (Toossi, 2012). Bennis (2009) stated, "The transformation in America . . . took place between 1890 and 1910, when the modern corporation was forged and operated with two primary characteristics: multiple operating units and managerial hierarchies" (p. 173). He argued that it is clear that "it is time for another transformation, and the key to such transformation is the organization's attitude toward its workers" (Bennis, 2009, p. 173).

Generational Learning Groups

Today's workforce comprises three generations, which include the baby boomers (born 1946-1964), Generation Xers (born 1965-1976), and millennials (born 1977-1997), with a future Generation Z (born 1997-present) also laying the groundwork for the 2020 workplace. The workforce is diverse, and each generation is motivated by a different set of workplace training expectations stemming from a distinct set of reference points, characteristics, and historical contexts. Given the time periods in which the four generational groups were born, the historical happenings of their time, and their involvement in and exposure to technology, their perceptions about learning with technology may differ (Culture Coach International, n.d.; Marston, 2007).

Baby Boomers

Baby boomers, born between the years of 1946 and 1964, grew up during the Cold War, Vietnam War, Space Race, and the Civil Rights Movement (Bass, 2008; Meister & Willyerd, 2010; Smith, 2016). This generation fought for the rights of people including women, African Americans, and the disabled. The rise of the television shaped this generation perhaps more than anything else, and it became the most powerful communication medium available at the time. Events such as the Vietnam War, Watergate, the first man on the moon, and the assassinations of the Kennedy brothers were revealed through the visual medium of television (Meister & Willyerd, 2010). The television may have had the most impact on the home lives of baby boomers, but it was the personal computer that directly impacted their jobs in the workplace (Meister & Willyerd, 2010). Individuals from this generation value independence in the workplace. They also tend to embrace technology more than previous generations and were one of

the first generations to begin relying on it to make office work more efficient, according to Ashleigh Jensen, who gave a report to the Idaho State Legislature's Change in Employee Compensation Committee on January 13, 2016 (as cited in Smith, 2016).

Generation X

Generation Xers were born between the years of 1965 and 1976 and make up a smaller population than the previous baby boomer generation due to the adoption of birth control in the 1960s and baby boomers' desire to wait to have children until later in life (Bass, 2008; Meister & Willyerd, 2010; Smith, 2016). With baby boomer parents both working, Generation Xers are frequently referred to as "latchkey" children (Meister & Willyerd, 2010, p. 49; Smith, 2016). Due to their self-sufficiency in their youth, they are now known for thinking like entrepreneurs, thriving in situations where they can be independent thinkers, and expecting work-life balance. Generation Xers are reliable; therefore, they have expectations that others will respond to work in a like manner (Marston, 2007). They started their careers in a period of social and economic change and have witnessed the spread of AIDS, the Persian Gulf War, and the effect of the stock market crash on their families. The work habits of this generation most resemble how millennials use technology, and Generation Xers are aware that millennials are waiting in the wings for their jobs (Meister & Willyerd, 2010).

Millennials

The millennials, also referred to as Generation Y, digital natives, the net generation, and the Google generation, were born between the years of 1977 and 1997, have been living on the web for as long as they could write, and are the best educated generation to date (Bass, 2008; Blair, 2016; Meister & Willyerd, 2010). According to the

2010 census data, millennials are the fastest growing population, representing nearly 27% of the U.S. population (Meister & Willyerd, 2010; Toossi, 2012). By 2014, millennials were expected to "account for 36% of the American workforce" and by 2025, 75% globally (Schawbel, 2013, para. 1). According to a Pew Research analysis of the U.S. Census data, 53.5 million millennials are in the workforce, and that number is expected to rise (Blair, 2016). Millennials are living during a time of rapid globalization, technological advancement, and diversity. Marston (2007) found, "Millennials are adept at all communication technology. In fact, they are dependent on it. They are accustomed to their text messages and emails being acknowledged or answered instantly and are daily users of social networking and social media" (p. 1). Defining moments for millennials include the Oklahoma City bombings, the Columbine massacre, and the 9/11 attacks. This generation was born to parents from multiple generations, including baby boomers and Generation Xers, and they had the most child-centered parents in history. Individuals in this generation have reaped the most from privilege and have had more money spent on them then previous generations. According to Marston, "In some cases, Millennials can appear demanding of or 'entitled' to involvement in leadership and privileges that usually comes after years of experience" (p. 1).

Generation Z (Generation 2020)

Dubbed digital natives, Generation Z or Generation C, defined as "connected, communicating, content-centric, computerized, community-oriented, always clicking," is expected to "transform the world as we know it" (Friedrich et al., 2010, pp. 4-6). Born since 1997, individuals in this generation are expected to be exceptional future employees

due to their natural skills with technology and easy acceptance of new ideas. Also known as the iGeneration (Birkman, 2016), individuals in this generation

> are realists . . . [and] materialists. They are culturally liberal, if not politically progressive. They are upwardly mobile, yet they live with their parents longer than others ever did. Many of their social interactions take place on the Internet, where they feel free to express their opinions and attitudes. (Friedrich et al., 2010, p. 5)

Their influences include

> Harry Potter, [former President] Barack Obama, and iEverything—iPods, [iPads,] iTunes, iPhones. Technology is so intimately woven into their lives that the concept of early adopter is essentially meaningless. . . . By 2020, they will make up 40 percent of the population in the U.S., Europe, and the BRIC [Brazil, Russia, India, and China] countries [urban and suburban], and 10 percent in the rest of the world. (Friedrich et al., 2010, pp. 5-6)

Friedrich et al. (2010) explained,

> As they grow up, this highly connected generation will live "online" most of their waking hours, comfortably participate in social networks with several hundred or more contacts, generate and consume vast amounts of formerly private information, and carry with them a sophisticated "personal cloud" that identifies them in the converged online and offline worlds. [Consequently,] this generation will expect fast, reliable connectivity through which they will create direct commercial links with a multitude of online business partners . . . with no [central Internet] control points. (p. 4)

The rise of Generation C will help drive changes and transform how individual industries and society as a whole make use of technology (Friedrich et al., 2010).

Table 2 provides an overview of the three generations represented in today's workplace and the one promising future generation. It includes historical contexts and influencers, their view of technology, and generational characteristics.

Intergenerational Group Dynamics

Survival of an organization depends on keeping pace with competitors, realizing implications of staying competitive, planning for future growth, and being cognizant of adult learning behaviors in a diverse workforce as the organization expands the use of computerized learning technology (Ellison, 2014). Organizations that fail to recognize intergenerational group differences face difficulties in managing and engaging their teams, but "organizations that understand how to successfully address generational conflict and leverage each generation's strengths will be better able to keep employees motivated and productive" to retain those employees (Birkman, 2016, p. 4). Today's organizations consist of four generations working together, more than any other time in history (Meister & Willyerd, 2010). Senge (2006) stated that leaders will be emerging from unexpected places, from cultural, economic, and demographic periphery: women, the poor, and the young. Focusing on youth leadership, systemic change is coming from young people, those who have a strong stake in the future.

Digital Natives, Digital Immigrants, and Digital Settlers

According to Haugen and Musser (2013), digital natives were all born after 1980, when social digital technology came online and became a major aspect of their lives in areas such as social interaction, friendship, and civic activities mediated by digital

Table 2

Four Generational Group Types

Categories	Baby boomers	Generation X	Generation Y or millennials	Generation Z or Generation C or Generation 2020
Birth dates	1943-1964 1946-1964 1946-1965 -	1964-1981 1965-1976 1966-1985 -	1982-1995 1977-1997 1986-2005[a] -	1994-2020[b] 1997-2020[c] - 1990-2020[d]
Population	76 million 78 million	60 million 50 million	74 million 88 million	XX million 41 million
Defining events	Cold War, civil rights, Space Race, Vietnam, television	*Roe v. Wade*, fall of Berlin Wall, Persian Gulf War, AIDS, Challenger disaster, Watergate, computers	World Trade Center, Oklahoma bombings, Internet, globalization, 9/11, Desert Storm, technology	Social games, Harry Potter, Barack Obama, iEverything (iPods, iTunes, iPhones), Iraq War, Great Recession
View of technology	Master it	Enjoy it	Employ it	Hyper connect it
Communication media technology	TV, phonograph, 8 track tapes, touch tone phones, calculators	Video: Atari and Nintendo, cassettes, computer games, desktop publishing, cell phones, beepers, laptops	Internet, laser disk player, DVD, iPod, MP3 player, Palm Pilots, smaller cell phones	Mobility, media savvy, life online starting in preschool, reading books on e-readers, more wired than millennials
View of the future	Now is more important, create it	Uncertain but manageable, hopeless	Optimistic, hopeful	Concern for environmental problems and social issues

Table 2 (*continued*)

Categories	Baby boomers	Generation X	Generation Y or millennials	Generation Z or Generation C or Generation 2020
Characteristics	Educated, desire quality, independent, cause oriented, fitness conscious, question authority, groomed to explore inner world	Neglected by parents, loyal to relationships, serious about life, stressed out, self-reliant, skeptical, highly spiritual, survivors	Lowest parent-to-child ratio in U.S. history, cherished by parents, groomed to achieve, entrepreneurial hard workers who thrive on flexibility, extreme fun, more law abiding, most socially conscious, new confidence, volunteerism high	Highly educated, live with parents longer, social interactions take place on the Internet, seek peer recommendations, comfortable with virtual or face-to-face collaboration, cautious about economic and career decisions

Note. Data compiled and adapted from Bass (2008); The Door Christian Fellowship (n.d.); Friedrich, Peterson, Coster, and Blum (2010); Gaylor (2002); Lancaster and Stillman (2002); Meister and Willyerd (2010); West Midland Family Center (n.d.); Zemke, Raines, and Filipczak (2000).
[a]Bass (2008). [b]Meister and Willyerd (2010). [c]Gaylor (2002), Lancaster and Stillman (2002), Zemke et al. (2000). [d]Friedrich et al. (2010).

technologies. Digital settlers are older people who helped shape the digital age but still rely heavily on the analog world. Haugen and Musser explained that digital immigrants are less familiar with the digital environment and learned how to use e-mail and Internet late in life. Prensky (2001) argued that "today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV)" (p. 1). Alternatively, "Digital Immigrants learn—like all immigrants, some better than others—to adapt to their environment, [but] they always retain, to some degree, their 'accent,' that is, their foot in the past" (Prensky, 2001, p. 2). Stoerger (2009) suggested the "melting pot" metaphor and argued, "The

melting pot also symbolizes the bridge between the two cultures that the digital native–digital immigrant dichotomy creates" (para. 35). Marston (2007) cautioned, "Generational divide[s] are common and a continuing problem that can have an all-encompassing organizational impact and can lead to employee unhappiness and, ultimately, to profit loss" (p. xii).

Learning Style Preference

Adult Learners

In a dissertation study focused on training in the healthcare profession, Knight (2016) stated,

> Enhancing training through the use of technology is important because traditional classroom training often limits exposure to the reality of the work and does not always incorporate the blended approach to learning that is a best practice for lasting learning outcomes. (p. 107)

Furthermore, Knight found,

> Based on this research, individuals participating in healthcare computer-based training learn first by seeing, and then a combination of hearing and doing or practicing and receiving feedback. Nonetheless, it is critical that all staff is exposed to all styles of learning in order to achieve optimal learning outcomes. (p. 107)

Macdonald (2006) and Hermanson (1996) posited that "adult learners, also referred to as lifelong learners, are between the ages of 20 and 40 years old" (as cited in Knight, 2016, p. 45). According to Knight (2016),

> These learners are characterized by their need and appreciation for the flexibility offered through the blended learning approach (Macdonald, 2006). A unique fact for adult learners is they incorporate their personal experiences that can influence their learning success (Billington, 1996). "Students are more likely to learn effectively when they are presented with situations in which they construct meaning for themselves and relate any new information to the experiences they already have" (Macdonald, 2006, p. 122). Adult learners often require a learning environment that is balanced, stimulating and engaging, yet comfortable and enjoyable (Billington, 1996; Finlayson & Francis, 2001, p. 1). The material must have relevance and be presented in a way that makes the learner feel appreciated for experience, time, and effort (Billington, 1996). (p. 45)

Learning gaps exist in organizations between a younger generation of technology-savvy computer literates and an older generation of employees struggling to keep pace with the rapid growth of IT systems, such as upgrades to outdated computer systems, manual applications, and CBT technology replacing classroom-type training. Hawkins (2011) explained that while many employees are persistent, self-efficacious adult learners, their learning preferences and lack of experience may make CBT a difficult method to develop new skills and knowledge, which limits their ability to learn efficiently. D. L. Anderson (2015) wrote that in order to address these challenges, some organizations are developing coaching programs where older generational employees share their knowledge and experience with the next generation, in addition to working closely with universities to hire graduates with relevant skills they need, while others are investing in job training for new hires. Dealing with the implications of adult learning in

an intergenerational workforce, organizations will be faced with decisions on how to best train and motivate their workforce. The blended learning approach is one such tool to allow for a total-force application that will allow every generational employee flexibility.

Learning Theories

This literature review explores three learning style models that were consistently referred to during research for this study. The learning style models focus on identifying learning style preferences for visual, auditory, and kinesthetic (VAK) learners. The following learning style models were reviewed: the Kolb learning cycle model, Honey and Mumford's four learning styles, the VAKBASIC learning style, and the blended learning style.

Kolb Learning Style

David Kolb's learning cycle model was published in Bray's (2006) book based on impacts of learning styles when designing effective training programs. Kolb proposed that people progress around a cycle of learning events, the starting point being determined by a person's own preferred style. His model was based on four stages of the experiential learning cycle that each learner would experience through his or her learning process:

- **Concrete Experience**—Many people like to learn by having a concrete experience, often with limited preparation.

  Example: When faced with a new software program, how many will say: Just let me try it myself—I shouldn't need any help if it's good software.

- **Observation & Reflection**—Others learn by watching someone else performing the task or reflecting on what they have seen.

Example: Software analogy—many people will ask: Would you show me how to do it before I try it myself?

- **Abstract Conceptualization**—Yet others will need to understand the underlying theory before attempting the task themselves.

  Example: Software analogy—Can you let me read the manual first, please?

- **Active Experimentation**—Finally, there are those who prefer practical experimentation to learn.

  Example: I wonder how it might help me to complete that task. (Bray, 2006, pp. 110-111)

Kolb's learning style model encompassed his belief that learning is the process of creating knowledge through experience (Bray, 2006). However, Kolb's work was not without criticism. Bray (2006) stated that in recent years, Kolb's work had come under criticism as it was based on limited research and could be taken to imply that everyone progresses around all four stages of the cycle. Honey and Mumford proposed that there are four distinct learning styles when considered alongside Kolb's learning styles that relate to the underlying concepts (see Figure 5).

Honey and Mumford's Four Learning Styles

Kolb's learning cycle can be combined with Honey and Mumford's four learning styles to develop a learning cycle that many people will be able to relate to. According to Bray (2006), one can appreciate that each of the learning styles relates to a preferred way of learning, and if a training design is to be effective, each style must be catered to. Most people actually experience all four steps; however, personal style dictates how much time

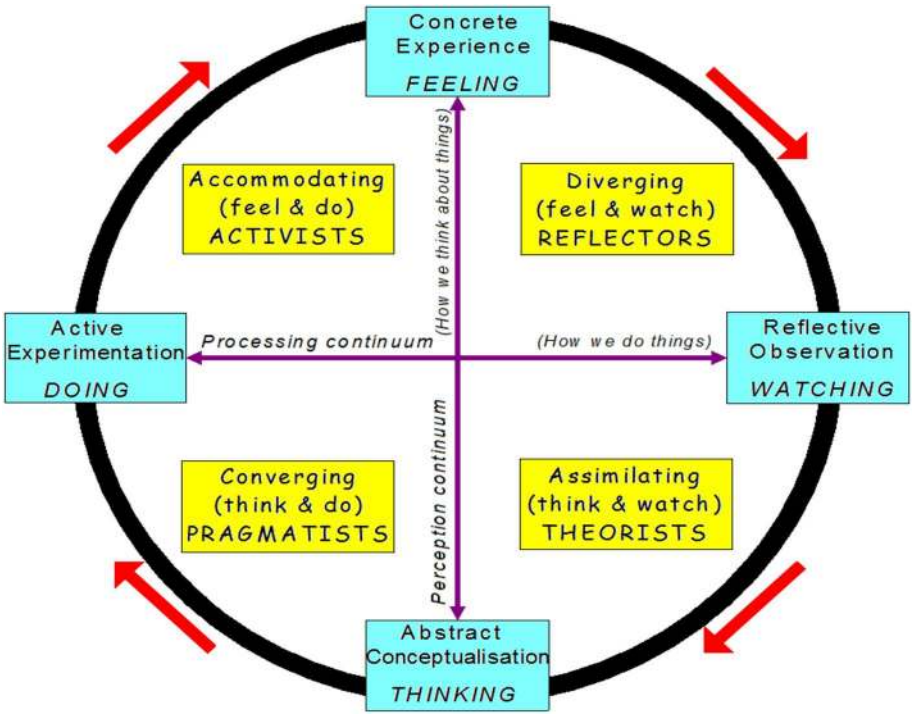

Figure 5. Kolb's learning cycle combined with Honey and Mumford's four learning styles. From *The Training Design Manual* (pp. 111-112), by T. Bray, 2006, London, England: Kogan Page Limited. Copyright 2006 by Kogan Page Limited. Reprinted with permission.

is spent on each (Bray, 2006). Honey and Mumford created a "learning style questionnaire" for those considering their own learning style; however, a less sophisticated but generally reliable method of discovering someone's learning style is to simply ask them before training starts, "How would you like to learn this?" (Bray, 2006, p. 114). Table 3 describes the combined learning cycles, stages associated with experience, and preferences.

VAKBASIC

Designers need to be aware of other potential issues with training design. According to Knight (2016),

Table 3

Kolb's Learning Cycle Combined With Honey and Mumford's Four Learning Styles

Learning style	Associated stage	Likes	Dislikes
Activist	Having an experience	Doing, experiencing, practical activities that are energetic and engaging	Sitting around for too long, working alone, theorizing, and having to listen to others
Reflector	Reviewing experiences	Time to think, observe, take it all in, watching others, time and solitude	Hurried into activity, no time to think, crammed timetables, lack of privacy, time to prepare
Theorist	Concluding from experiences	Knows where something fits into overall ideas and concepts	Frivolity, mindless fun, wasting time, not being able to question, lack of timetable and structure
Pragmatist	Planning the next steps	Practical problem solving, relevance to the real world, applying learning	Anything theoretical, learning that focuses too much on past or future and not present

Note. From *The Training Design Manual* (p. 112), by T. Bray, 2006, London, England: Kogan Page Limited. Copyright 2006 by Kogan Page Limited. Reprinted with permission.

> As research on learning style gained more popularity and notoriety, a general theme emerged that the foundation of all learning style preferences were based on three human senses: sight (visual), hearing (auditory), and touch (kinesthetic) (Kanninen, 2009; Bernier, 2009; [Brown, Roediger, & McDaniel, 2014;] Jain, 1999-2015; "VAK Learning Styles," 2015). Psychologists and theorists from 1920 until now recognized the VAK learning style model as a resource for understanding and explaining an individual's preferred or dominant thinking and learning style and strengths (Bernier, 2009; "VAK Learning Styles," 2015). (p. 40)

Knight explained,

> The VAK learning styles model provides a very easy and quick reference inventory to assess people's preferred learning styles, and then most importantly, to design learning methods and experiences that match people's preferences: Visual learning style involves the use of seen or observed things, including pictures, diagrams, demonstrations, displays, handouts, films, flip-charts, etc. ("VAK Learning Styles," 2015, p. 1). Auditory learning style involves the transfer of information through listening: to the spoken word, of self or others, of sounds and noises ("VAK Learning Styles," 2015, p. 1). (p. 40)

Bray (2006) described filters in the VAK model that allow other information to be filtered out and ignore the need for trainers delivering courses to "fight" through just to reach the processing areas of the brain. The VAKBASIC "fighting the filters" model was illustrated as follows:

> **V–Visual.** Some people conceptualize visually . . .
>
> **A–Auditory.** Some conceptualize in sounds . . .
>
> **K–Kinesthetic.** Some conceptualize in feelings . . .
>
> **B–Big/Small.** Some people see the big picture . . . while others focus on the small detail[s].
>
> **A–Away/Towards.** Negative thinkers will move away from new ideas . . . while positive thinkers will be drawn to them.
>
> **S–Same/Different.** Some people like to have the same as before . . . while others want something different.

I–Internal/External. Some want internal success stories . . . while others value external references.

C–Convince me. What will convince me that you are right? Has it been done before? How often? How long for? How many different sites/users? (Bray, 2006, p. 115)

Visual, auditory, kinesthetic. The VAK learning styles model provides a very easy and quick reference inventory to assess people's preferred learning styles and then, most importantly, to design learning methods and experiences that match people's preferences. In terms of filters associated with personal communication preferences, visual, auditory, or kinesthetic training designers should emphasize personnel training preferences. Since a majority of people, "80% of United Kingdom population have a strong preference for visual language, with auditory and kinesthetic being secondary preferences. Visual people will tend to retain experiences in the form of pictures, so their language will be mainly words associated with images" (Bray, 2006, p. 115). Table 4 illustrates the VAK learning styles.

Table 4

VAK Learning Styles (Visual, Auditory, and Kinesthetic Learners)

Learning style	Traits	Teaching tips
Visual	Seeing, reading	Use graphs, charts, videos
Auditory	Hearing, speaking	Have learner verbalize questions
Kinesthetic	Touching, doing	Use demonstration of skills

Note. Adapted from *The Relationship Between Learning Styles and Online Education Among Entry-Level Doctor of Pharmacy Degree Students* (p. 1), by J. Bernier, 2009 (http://ufdc.ufl.edu/UFE0041054/00001).

VAKBASIC filters. Bray (2006) argued, "We each have our own view of the world, which we . . . reinforce by creating a set of 'filters', which allow through only information [that agrees] with our preconceptions and mindsets" (p. 115). The VAKBASIC filters are termed as follows:

Visual: Visual people will tend to retain experiences in the form of pictures, so their language will be mainly words associated with images. They will say:

- I need to cast light on the subject . . .
- It's getting clearer . . .
- I can see what you mean . . .

Auditory: Auditory people will tend to retain experiences in the form of sounds, so their language will be mainly words associated with hearing. They will say:

- That rings bells for me . . .
- I like the sound of that!

Kinesthetic: Kinesthetic people will tend to retain experiences in the form of feelings, so their language will be mainly words associated with sensations or feelings. They will say:

- I'm under pressure
- Keep in touch
- I can't grasp that yet . . .

Filter B: This continuum runs from big to small. People at the "big" end of the spectrum will tend to see the big picture. People at the "small" end will tend to focus on the smaller elements, the details.

Filter A: This continuum runs away to towards. People at the "away" end of the spectrum will tend to see the negative aspects of a situation. People at the "towards" end will tend to focus on the positive outcomes they can see.

Filter S: This continuum runs from same to different. People at the "same" end of the spectrum will tend to look for things being the same or similar to what they currently have (Threatened by change). People at the "different" end will tend to seek outcomes that are different from the current situation.

Filter I: This continuum runs from internal to external. People at the "internal" end of the spectrum will tend to rely on internal references. People at the external end will tend to welcome the results of "external" trials or how others are using a particular approach.

Filter C: This is the "Convincer Strategy." This tells us about what will be needed to convince the person to change the way they do things.

- Variation 1: Times—How many times will they need to see a result repeated to be convinced?
- Variation 2: Duration—How long will they need to see the proposal in operation before they are convinced? (Bray, 2006, pp. 116-117)

Training designers play an important role in the development of an organization's employees. The VAKBASIC model helps developers strive for balance in their designs. Bray (2006) identified key underlying principles for designers: "Constantly visualize yourself in the target audience and imagine how you would feel moment by moment, taking part in the process you're designing" (p. 118). The following are key points in striving for balance:

- Balance the time spent discussing concepts or theories with trying things in practice.
- Balance the time you spend giving formal input with the time delegates have to formulate their own ideas or share their experiences.
- Balance the time spent working as a whole group with working in small teams.
- Balance the "big picture" and small detail.
- Ensure you provide stimulation for all four learning styles.
- Encourage trainers to use language and examples that will appeal to all three communications styles—visual, auditory, kinesthetic.
- Vary the pace—ideally change the activity or the way you are processing it every 30 minutes. (Bray, 2006, p. 118)

Blended Learning Style

According to Elkins and Pinder (2015), blended learning uses two or more learning events in different formats. For example, training designers may develop asynchronous e-learning modules to present factual information and then invite learners to participate in classroom instruction where they can have face-to-face discussions or hands-on practice. Epignosis LLC (2014) noted, "Blended learning is a combination of offline (face-to-face, traditional learning) and online learning in a way that the one compliments [*sic*] the other" (p. 70; see also Stolovitch & Keeps, 2011).

E-learning can be divided into three main types based on use of instructor, timing of the course, and involvement with others (Elkins & Pinder, 2015). One challenge this addresses in a diverse generational workforce environment is the ability to achieve

flexibility to enhance skills transfer between older and younger group types. This involves the knowledge, learning speed, time available, and geographic separation of organizational employees. The three main types of e-learning are synchronous learning, asynchronous learning, and cohort learning (Elkins & Pinder, 2015).

E-learning. E-learning is any course or structured learning event that uses an electronic medium to meet its objectives. Elkins and Pinder (2015) argued that e-learning can have many of the same elements of more traditional learning (text, audio, tests, homework), but a computer is used to meet or enhance the learning objectives.

Synchronous learning. Synchronous learning occurs when an instructor and learners are together at the same time but not necessarily in the same place, such as traditional classroom learning. Participants meet at a set time, have discussions, and are tested together (Elkins & Pinder, 2015).

Asynchronous learning. Asynchronous learning, or self-paced learning, is the opposite of synchronous learning. It occurs when the instructor and learners do not participate at the same time. Often there is no instructor at all (Elkins & Pinder, 2015).

Cohort learning. Cohort learning is instructor led, and learners complete activities such as readings, videos, discussions, assignments, and projects. There is a specified beginning and end date, but within the course timeframes, participants learn and communicate on their own. This type of learning is similar to a webinar where all students log in at the same time, participate in the presentation at the beginning of the week, take time to read the material, complete the activities, and have a discussion with other classmates at another time of the week (Elkins & Pinder, 2015).

Blended learning has its advantages and disadvantages. For instance, asynchronous e-learning can be viewed anywhere (i.e., computer, Internet, intranet, mobile device, compact disk, etc.). E-learning can be done anytime and anywhere, it is typically less expensive for the organization and user, and it usually includes tracing capabilities, self-pacing, review tool, and performance support for just-in-time learning. The disadvantages are time and cost of development, lack of collaboration, technology, computer literacy, computer availability, device compatibility, and unanswered questions. Organizational decisions are based on types of learning that are best suited to the workforce. Which is better: traditional classroom learning or e-learning? Or is it a blended solution (Elkins & Pinder, 2015)? Organizations researching and addressing the learning technology gap early in any change initiative can help in surfacing diverse workforce challenges.

The Technology Learning Gap

It is essential that organizations address adult learner challenges, provide effective interventions and training based on needs analysis, and invest the time to support training. One solution is to conduct a needs analysis, a systemic way of determining the gap that exists between where the organization is and where it wishes to be, followed by a front-end analysis, a collection of techniques that can be used in various combinations to help bridge the gap by determining what solution(s) will be required (Lee & Owens, 2004). Hawkins (2011) argued that corporations and government organizations are continuously seeking ways to provide just-in-time training to their workforce while at the same time trying to reduce or at least minimize cost increases in training budgets. Technology is increasingly being used to deliver content to a wide audience on an as-

needed basis to enable the workforce to learn and relearn skills and concepts in a dynamic work environment.

In a research survey conducted by Hawkins (2011), respondents complained that frequent interruptions at work made it difficult to absorb and retain information and that they felt rushed if they attempted to conduct training during business hours. Many commented that they had to conduct training outside of work hours or outside the workplace because of the lack of time or because of a poor learning environment at the workplace. Several participants suggested that organizations provide a training center or a location away from the job site for employees to conduct training during business hours (Hawkins, 2011). In a paper by Ertmer and Newby (1996), the authors wrote that "reflection on the process of learning is believed to be an essential ingredient in the development of expert learners" (p. 1). They suggested "employing reflective thinking skills to evaluate the results of one's own learning efforts"; therefore, the knowledge that the expert learners have gained is used to "achieve desired learning goals" for novice learners (Ertmer & Newby, 1996, p. 1).

Addressing the future of organizational development, D. L. Anderson (2015) stated three major challenges that organizations face: "increasing complexity[,] changing workforce demographics[, and the] changing nature of work" (p. 389). In organizations facing rapid increases in technology, history has shown that these challenges are compounded by a diverse workforce. Today's organizations may have up to four generations of employees who, in addition to cultural differences, have varying attitudes toward CBT. "Individual interventions" to overcome complex generational and cultural

challenges “can be . . . influential to [improve] personal growth, development, and change” (D. L. Anderson, 2015, p. 209).

Summary

Differences in generational employees’ learning styles and learning methods, such as CBT, create gaps among groups struggling to keep pace with the rapid growth of IT systems. Research has suggested that learning preferences and experiences may negatively impact adult learners’ ability to transfer knowledge efficiently while other research has revealed differences in learning between younger generation students and their teachers (Knight, 2016). Organizations that fail to recognize generational group differences face difficulties in managing and engaging teams, which affects their ability to keep employees motivated and productive (Birkman, 2016; Ellison, 2014; Hawkins, 2011; Meister & Willyerd, 2010; Prensky, 2001). In a paper by Ertmer and Newby (1996), the authors wrote that “reflection on the process of learning is believed to be an essential ingredient in the development of expert learners” (p. 1).

The results of this study suggest that with appropriate strategy, employing appropriate individual and group interventions may be the key to developing cost-effective just-in-time computerized training with generational group needs in mind.

CHAPTER III: METHODOLOGY

Overview

This chapter examines the research methodology utilized to conduct this study. The problem and purpose statements are restated, and the rationale for selecting the methodology is described in greater detail. The chapter provides an in-depth description of the research design and the procedures for data collection and analysis. The population, sample, and study limitations are also examined. This chapter concludes with a summary of the material presented.

Purpose Statement

The purpose of this quantitative study was to determine the degree of effectiveness and preferences as it related to various computer-based training (CBT) and instructor-based training (IBT) types as perceived by baby boomer, Generation X, and millennial generational Space and Naval Warfare Systems Center Pacific (SSC Pacific) employees based in San Diego, California, as measured by the Northern Virginia Community College (NVCC) Extended Learning Institute Survey.

Research Questions

Four primary research questions focused and guided the dissertation research related to the preferred CBT types by baby boomer, Generation X, and millennial generational SSC Pacific employees:

1. To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
2. To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?

3. To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
4. To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?

Research Design

The study had a descriptive, causal-comparative research design. The study was quantitative because the ratings from Research Questions 1-3 produced interval data in the form of employee ratings, and Research Question 4 produced ratio data in the form of intergenerational group responses. It was also quantitative because a statistical process was used to analyze data from Research Questions 1-4 to determine whether statistical differences existed.

Population

The target population for this study was approximately 4,000 civilian government employees at SSC Pacific in San Diego, California. The sampling frame was approximately 800 civilian government employees from the SSC Pacific 5.0 engineering competency, specifically the Command and Control (C2) Department. This specific population was selected due to the highly technical nature of work, diversity in its demographics, and mix of administrative occupations, which were all representative of the target population.

Sample

The sample size was 160 randomly selected employees from the SSC Pacific C2 Department, which was 20% of the sampling frame ($N = 800$). According to McMillan

and Schumacher (2010), "A major consideration regarding sample size in quantitative studies is how the number of subjects is used in determining statistical significance" (p. 141). The researcher chose 20% of the sampling frame consistent with sample size consideration, rules of thumb (McMillan & Schumacher, 2010), specific demographics, and other related studies. The sample consisted of computer scientists, information technology (IT) specialists, computer engineers, mathematicians, logisticians, contract specialists, financial analysts, and program managers.

The sample was randomly selected using stratified random sampling of employees, thus reducing sampling errors by using multiple strata, such as intergenerational age groups, to select employees identified as baby boomers (born 1946-1964, between the ages of 52 and 70), Generation Xers (born 1965-1976, between the ages of 40 and 51), and millennials (born 1977-1997, between the ages of 19 and 39). Stratified random sampling is a procedure wherein the population is divided into subgroups, or strata, on the basis of the variable, such as age (McMillan & Schumacher, 2010).

Instrumentation

The survey instrument was in the form of a questionnaire, which provided difference statistics, such as percentages of various responses across intergenerational age groups (i.e., baby boomers, Generation Xers, and millennials) to determine if a statistically significant difference existed between the extent to which employees favored CBT or instructor-based training (IBT) types over the other. The survey questions were adapted from the NVCC online learning survey and a survey instrument used in a similar research study adapted by Hawkins (2011) comparing student perceptions of online

(CBT) and traditional (IBT) courses. The survey helped to determine the extent to which employees favored one type of training over another based on recent training experiences and perceptions of types of training among intergenerational age groups.

The questionnaire was distributed and collected via SurveyMonkey (https://www.surveymonkey.com/), a commercial survey online host provided by and commonly used by all SSC Pacific personnel. Difference statistics were compiled by SurveyMonkey for each question and exported to the Microsoft Excel MegaStat software add-in for data analysis.

C2 Department employees were chosen through a stratified random sampling method using the SSC Pacific C2 Department personnel database numbering scheme with the permission of the SSC Pacific commanding officer. Once the personnel were selected, an invitation e-mail with survey instructions was sent to the 160 randomly selected civilian government employees from the SSC Pacific C2 Department.

The survey instrument was divided into three sections. Section 1, Employee Demographics, was used to better understand the age demographic of employees receiving training and to better develop instructional types that are relevant to the participant audience. Sections 2 and 3, Learning Effectiveness and Learning Preferences, respectively, referred to employees' experience with and impressions of CBT-type learning as compared to learning in a classroom or IBT environment. The questionnaire consisted of 20 questions with response options on a 5-point Likert scale, where 0 represented *disagree*, 1 represented *somewhat disagree*, 2 represented *no opinion*, 3 represented *somewhat agree*, and 4 represented *agree*. Likert-type surveys are used

extensively in questionnaires because they allow for fairly accurate assessments of beliefs or opinions (McMillan & Schumacher, 2010). The survey is included in Appendix A.

Validity and Reliability

Validity

Validity is the degree to which an instrument truly measures what it purports to measure (Roberts, 2010). Hawkins (2011) found that the survey titled "Is Online Learning Right for Me?" had been reviewed in professional journals and determined to have "face validity for individual traits and skills believed to contribute to potential success in an Internet-based course" (Hall, 2009, p. 339). Face validity is subjective and concerns the superficial appearance, or face value, of a measurement procedure (Gall, Gall, & Borg, 2007; Gravetter & Forzano, 2012). The 10-question survey was reported to have low predictive validity. Hall (2009) argued that this survey "appears to lack internal consistency. Only one factor, Technology Comfort, had a Chronbach alpha within the generally accepted range of 0.7 to 0.9" (p. 344). As cited by Hawkins (2011), Hall concluded that the lack of internal reliability and predictive validity should be a consideration for institutions considering the use of this survey for counseling and dispensing advice. However, the rising use of the Internet for instructional delivery, coupled with the desire to improve student retention, continues to generate a need for a viable prediction instrument for advising students considering distance education courses.

This researcher chose to use the survey "Is Online Learning Right for Me?" adapted for this study, primarily because it is an instrument used by many educational institutions for students to self-assess their readiness to learn through distance education courses. According to Hawkins (2011), the survey has also been used by Michigan

Community College, DeKalb Technical College, Park University, New Jersey City University, Norwich University, and other community and technical colleges around the United States to enable potential online learners to self-assess their readiness for online learning. This researcher did not use the survey results for counseling or dispensing advice but rather focused on the average response of a total group of respondents rather than on the responses of individuals. According to Gall et al. (2007), "A lower level of item reliability is acceptable when the data are to be analyzed and reported at the group level than at the level of individual respondents" (p. 229).

The researcher coordinated with a group of Space and Naval Warfare (SPAWAR) organizational development (OD) training specialists and technical experts with the intent to review the instrument to determine face validity. The researcher asked the individuals to review the instrument and to respond with recommendations for adding or deleting items with justification. The validity data were recorded in a log for future recall and archive.

Reliability

Reliability is the degree to which an instrument consistently measures something from one time to another (Roberts, 2010). Based on research on reliability by Hawkins (2011) on the use of existing instrumentation, the researcher adapted and used the survey "Is Online Learning Right for Me?" developed by NVCC; this survey instrument has also been used by many educational institutions for students to self-assess their readiness to learn through distance education courses (Hawkins, 2011). Another survey instrument that the researcher considered for this study was from a study by Gottwald (2005) and was also used in the Hawkins (2011) study. Gottwald (2005) reported that the instrument

reliability was determined using the Cronbach split-half analysis. The alpha coefficient for the instrument was .94, indicating the instrument had good internal consistency as a measure of reliability (Gottwald, 2005). The researcher was confident that the adapted NVCC instrument would provide for a reliable survey instrument for this study. The researcher was unable to obtain required permission to use and adapt the Gottwald instruments; however, items considered during field testing were understandable instructions, clear wording, adequate answers, sufficient detail, regional differences, difficult sections, irrelevant questions, length, and convenience (Roberts, 2010). The reliability data, required permission letters, and field-test data were recorded in a log and cataloged for future recall and archive.

Institutional Review Board Compliance

The main purpose of an institutional review board (IRB), according to Roberts (2010), is to ensure the protection of those participating in a research study, particularly as it pertains to ethical issues such as informed consent, protection from harm, and confidentiality. The researcher designed an approval letter to conduct the surveys with the SSC Pacific employees for the SSC Pacific commanding officer to read and sign granting the researcher permission to conduct the research. SSC Pacific is a government organization with an organizational IRB. The researcher was notified by the SSC Pacific IRB that the research was not U.S. Navy/Department of Defense (DoD) sponsored, and the researcher's role in the research was that of a graduate student principal investigator; therefore, it was determined that the SSC Pacific IRB would not review the research.

The SSC Pacific commanding officer authorized the recruitment of subjects for this study. The protection of human subjects was ensured as per requirements of the Brandman University Institutional Review Board (BUIRB).

The survey questionnaire comprised 20 closed-ended questions regarding SSC Pacific employees' training experiences and perceptions of types of training among intergenerational age groups. The researcher designed an informed consent form for participants to read and sign. They received a copy of the consent form for their records, and the researcher kept a copy for the study. The consent form is included as an appendix to the study (Appendix B). The researcher asked participants to read and sign the consent form, and this indicated that the participants understood the research (McMillan & Schumacher, 2010). The signing of the informed consent form provided protection to both the participants and the researcher. The researcher's copies of the signed consent forms were stored in a secure location.

Data Collection

The researcher received approval from the BUIRB to conduct the study. Once the study was approved by the BUIRB, the researcher secured the participation of study participants by coordinating approval with the SSC Pacific commanding officer via the C2 Department chain of command. Upon SSC Pacific approval, the random selection of government employees was initiated by the SSC Pacific C2 Department for field testing and then administration of the survey. The date for administering the survey was carefully considered; in government organizations, there is really no good time to administer surveys, but the researcher avoided major federal holidays and selected a 4-week period between April and May 2017.

The survey was administered electronically; the participants received an e-mail invitation to participate in the research study with the SurveyMonkey link included. The purpose of the survey was explained as was the reason for participant selection due to recent participation in both CBT courses and instructor-based courses offered by the DoD, U.S. Department of the Navy, and SSC Pacific. The participants were notified that the study would inquire about their opinions of CBT and IBT courses most recently completed, perceptions of online learning in general, experiences with their computer-based learning environment, and assessment of their own learning style. The participants knew that the results of this research would enable SSC Pacific to develop education and training products to better serve its employees.

Once participants accessed the SurveyMonkey link, they saw the contents of Appendix A, which included the purpose of the study, a statement that participation was voluntary, a confidentiality statement, ethical considerations, directions for nonparticipation, and elements of informed consent should the recipients decide to participate. Follow-up e-mails were sent to participants every 2 weeks, with the exception of the final 2 weeks, during which the researcher sent out weekly follow-up e-mails.

The survey was designed to measure the effectiveness of two types of training methods and to determine favorability of one type of training over another, using a 5-point Likert scale, among intergenerational groups (i.e., baby boomers, Generation Xers, and millennials). Immediately following the closing of the survey, the researcher compiled the results of the survey for all groups and prepared for data analysis.

Data Analysis

Data collected from the effectiveness and learning preferences sections of the survey were compiled in tabular form in the SurveyMonkey analysis report. The resulting data were derived from the calculated totals from the 5-point scale for each survey question for each intergenerational group. The calculated totals for each group helped to determine differences in the rate of training effectiveness between types of training and if statistically significant differences existed between CBT and IBT types of instruction that would result in favoring one type of training over another. The survey scores were entered into the latest version of the Microsoft Excel MegaStat software add-in for data analysis. An example of the survey questions and corresponding 5-point Likert scale is show in Figure 6.

Effectiveness question: Learning in an instructor-led classroom is more effective than web-based or computer-based training.
0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree
Preferences question: I prefer learning online or through computer-based training rather than a residence classroom environment.
0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Figure 6. Example of survey question and Likert scale.

The researcher determined that the single-factor analysis of variance (ANOVA) statistical test would be used to compare the differences between three independent variables identified as intergenerational groups' survey scores and their significance. This increased the likelihood of finding a significant difference between group means (McMillan & Schumacher, 2010). In addition, a post hoc analysis using a *t* test was conducted to compare two groups at a time.

The difference question posed by the researcher was, "To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?" The researcher used Microsoft Excel with the MegaStat software add-in to analyze the survey score data set. In this study, the single-factor ANOVA was used to assess the significance of age on the learners' acceptance of the type of training delivery. The researcher calculated the *F* statistic, degrees of freedom in the numerator and denominator, and probability to determine whether to accept or reject the null hypotheses.

Limitations

Roberts (2010) wrote, "All studies have some limitations, and it is important that you state them openly and honestly" (p. 162). This study was limited to participants in one government organization, and perceptions may not necessarily apply to employees in other government organizations. There was also a small sample size relative to the target population, which influenced the statistical error. The limits of the survey questionnaire did not account for participant emotions, and results were not used for counseling or dispensing advice. Another limitation was that survey results were based on voluntary participation; therefore, the response rate was undetermined and accounted for error.

Summary

The study employed a descriptive, causal-comparative design to answer the research questions. The purpose of this quantitative study was to determine the degree of difference of effectiveness of and preferences for various CBT types as perceived by baby boomer, Generation X, and millennial generational SSC Pacific employees based in San Diego, California, as measured by the NVCC Extended Learning Institute Survey.

The researcher used a survey to collect demographic data and to describe and determine the degree of difference and effectiveness of various CBT types as perceived by generational groups. Four primary research questions focused and guided the dissertation research related to the preferred CBT types by baby boomer, Generation X, and millennial generational SSC Pacific employees.

The target population for this study was approximately 4,000 civilian government employees at SSC Pacific in San Diego, California, resulting in a sample of 160 randomly selected employees for the survey. The survey questions were adapted from the NVCC online learning survey comparing student perceptions of online (CBT) and traditional (IBT) courses. The survey determined the extent to which the employees favored one type of training over another based on recent training experiences as well as perceptions of types of training among intergenerational age groups.

CHAPTER IV: RESEARCH, DATA COLLECTION, AND FINDINGS

Overview

Chapter IV contains a description of the findings, conclusions, and recommendations of the study and includes the purpose statement, research questions, summary of methodology, population and sample, major findings, conclusions, implications for action, recommendations for further research, and concluding remarks and reflections.

Purpose Statement

The purpose of this quantitative study was to determine the degree of effectiveness and preferences as it related to various computer-based training (CBT) and instructor-based training types as perceived by baby boomer, Generation X, and millennial generational Space and Naval Warfare Systems Center Pacific (SSC Pacific) employees based in San Diego, California, as measured by the Northern Virginia Community College (NVCC) Extended Learning Institute Survey.

Research Questions

Four primary research questions focused and guided the dissertation research related to the preferred CBT types by baby boomer, Generation X, and millennial generational SSC Pacific employees:

1. To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
2. To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?

3. To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
4. To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?

Research Methods and Data Collection Procedures

Immediately following Brandman University Institutional Review Board (BUIRB) approval, the researcher obtained permission to recruit SSC Pacific employees as subjects for research via official letter correspondence from the commanding officer (Appendix C). Over 800 government employees from the SSC Pacific Command and Control (C2) Department received a presurvey e-mail invitation with survey instructions and a bill of rights. Three days later, the researcher activated the survey and e-mailed invitations containing the survey link with instructions. Each participant was required to electronically agree to the informed consent embedded in the survey before being allowed to proceed to survey questions. The survey remained available to participants for 10 days.

Population

The target population for this study was approximately 4,000 civilian government employees at SSC Pacific in San Diego, California. The sampling frame was approximately 800 civilian government employees from the SSC Pacific 5.0 engineering competency, specifically the C2 Department. This specific population was selected due to the highly technical nature of work, diversity in its demographics, and mix of technical and administrative occupations, which were all representative of the target population.

Sample

The sample size was 160 randomly selected employees from the SSC Pacific C2 Department, which was 20% of the sampling frame ($N = 800$). According to McMillan and Schumacher (2010), "A major consideration regarding sample size in quantitative studies is how the number of subjects is used in determining statistical significance" (p. 141). The researcher chose 20% of the sampling frame consistent with sample size consideration, rules of thumb (McMillan & Schumacher, 2010), specific demographics, and other related studies. The sample consisted of computer scientists, information technology (IT) specialists, computer engineers, mathematicians, logisticians, contract specialists, financial analysts, and program managers.

The sample was randomly selected using stratified random sampling of employees, thus reducing sampling errors by using multiple strata, such as intergenerational age groups, to select employees identified as baby boomers (born 1946-1964, between the ages of 52 and 70), Generation Xers (born 1965-1976, between the ages of 40 and 51), and millennials (born 1977-1997, between the ages of 19 and 39). Stratified random sampling is a procedure wherein the population is divided into subgroups, or strata, on the basis of the variable, such as age (McMillan & Schumacher, 2010). A total of 114 employees, or 71% of the sample size, participated in the survey. No participants declined to participate, but 13 employees did not totally complete the survey. The analysis for this chapter reports only on those results from employees who consented to participate and totally completed the survey by meeting the required criteria. Figure 7 shows the distribution of participants.

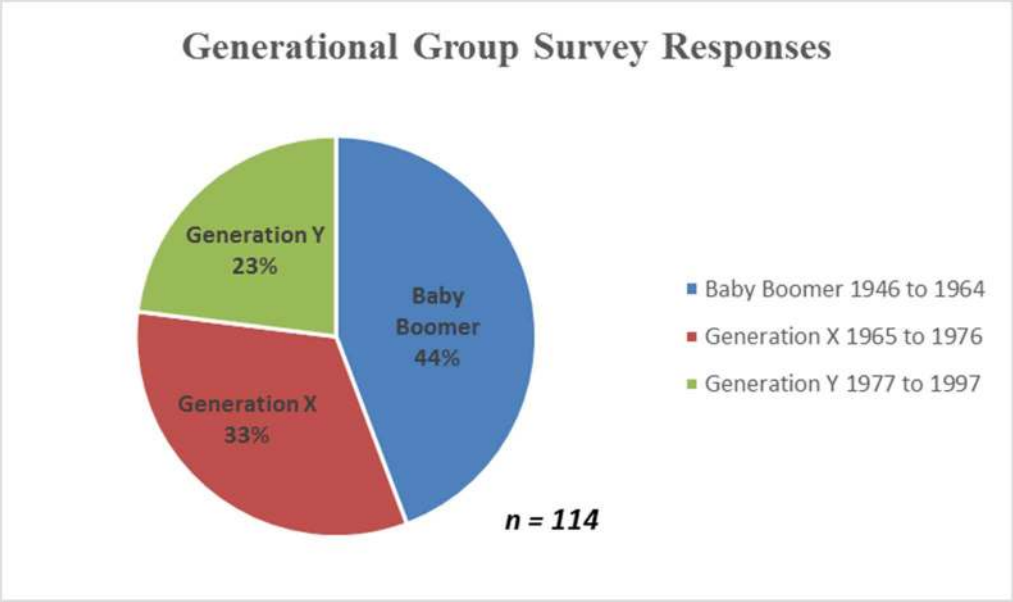

Figure 7. Generational group survey participation.

Demographic Data

The study participants for this research initially included four generational groups; however, no responses were received from employees from Generation Z (born 1997 to present). The researcher attributes the absence of survey participation from this generation to new professional tasking and assignments in other departments. Data on demographics and occupations were collected when survey participants selected the generational group that most closely matched their birth year and primary occupation from lists built into the online survey instrument. The occupation field allowed for a write-in response if the participants' occupation was not listed. Table 5 provides an overview of the sample population by generation.

Table 5

Sample Population by Generation

Generation	Birth	*n*
Baby boomers	1946 to 1964	50
Generation X	1965 to 1976	37
Generation Y	1977 to 1997	27
Generation Z	1997 to present	0
Total	All birth years	114

The demographic questions also asked participants to select their occupation from a list built into the online survey instrument. The occupation field allowed for a write-in response if the participants' occupation was not listed. Noted was that the relatively high level of "other" occupation responses were mostly occupations that could be included in the primary listed occupations and did not significantly impact research outcomes. Table 6 provides an overview of sample occupational fields.

Table 6

Sample Population by Occupation

Occupation	*n*
Engineer (hardware/software)	34
Scientist	18
IT specialist	37
Logistician (supply)	1
Contract specialist	1
Financial specialist	5
Other	18
Total	114

Presentation and Analysis of Data

Quantitative data were collected through an online survey. The survey instrument was in the form of a questionnaire used to provide difference statistics, such as

percentages of various responses across generational age groups (i.e., baby boomers, Generation Xers, and millennials) to determine the extent to which employees favored one type of training over another based on recent training experiences as well as perceptions of types of training. The instrument was divided into three sections. Section 1, Employee Demographics, was used to better understand the age demographic of employees receiving training and to better develop instructional types that are relevant to the participant audience. Sections 2 and 3, Learning Effectiveness and Learning Preferences, respectively, referred to employees' experience with and impressions of CBT-type learning as compared to learning in a classroom or instructor-based training (IBT) environment. The researcher included comment boxes immediately following the effectiveness and preference sections to allow participants to add granularity to responses; the additional data helped to enhance research outcomes.

The questionnaire consisted of 20 questions with response options on a 5-point Likert scale, where 0 represented *disagree*, 1 represented *somewhat disagree*, 2 represented *no opinion*, 3 represented *somewhat agree*, and 4 represented *agree*. Likert-type surveys are used extensively in questionnaires because they allow for fairly accurate assessments of beliefs or opinions. The researcher chose to include a neutral response (i.e., *no opinion*) because it is generally better to include the middle category to encourage respondent choice (McMillan & Schumacher, 2010). Results were compiled and analyzed to determine significant differences between group means that allowed for analysis by the researcher.

Research Question 1

Research Question 1 asked, "To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?" Participants of the survey who identified with the baby boomer generational group responded to the training perception survey that included 20 questions pertaining to their training effectiveness and preferences (Appendix A). This section describes the responses that materialized from the baby boomer generational participants to the survey relevant to training effectiveness and preferences in SSC Pacific.

Mean scores for the 20 questions were calculated and are arranged in order by descending mean in Tables 7 and 8. The tables also present the standard deviation for each of the 20 questions. The standard deviation shows the variation from the mean. When a standard deviation shows zero, all participants responded the same. A smaller standard deviation indicates that the participants had less variation in their answers, and larger standard deviations indicate that the ratings were spread among the responses. Tables 7 and 8 reflect the descriptive statistics for the baby boomers. Descriptive statistics are defined as a set of numbers that describe or characterize the data and represent the most fundamental way to summarize data for interpreting results of quantitative research (McMillan & Schumacher, 2010).

The researcher found that the data revealed differences in responses to specific questions in the effectiveness section that were significant. Responses related to Item E3 revealed that 54% of baby boomers tended to agree that CBT enhanced the effectiveness of their learning while the remaining 46% either had no opinion or disagreed with the

Table 7

Descriptive Statistics for Baby Boomers: Effectiveness

Effectiveness item	*M*	*SD*
E7. Instructor-based classroom training is more effective, because I can interact with the instructor and students.	3.2	1.03
E2. Learning is more effective with an instructor in a classroom environment.	3.1	1.15
E5. Learning in an instructor-led classroom is more effective than web-based or computer-based training.	3.0	1.07
E4. Instructor-based training enhances my learning rather than computer-based training.	2.9	1.11
E3. Computer-based or web-based training enhances my effectiveness to learn.	2.4	1.11
E10. Online instructor-led training makes learning more effective.	2.4	1.08
E1. Learning is more effective in an online environment with an instructor.	2.1	1.18
E9. Online learning is an effective way for me to retain important information and facts.	2.1	1.28
E8. Online learning is an effective way to motivate me to learn.	2.0	1.40
E6. Web-based training is more effective than instructor-based classroom training.	1.6	1.14

Note. $n = 50$.

statement. Based on responses to Item E6, 58% of baby boomers tended to disagree that web-based training was more effective than instructor-based classroom training; alternatively, the remaining 42% either had no opinion or agreed with the statement. Finally, Item E10 asked baby boomers if online instructor-led training made their learning more effective. Nearly divided on this question, 48% of baby boomers somewhat agreed or agreed while 52% either had no opinion or disagreed with the statement. Table 8 shows the descriptive statistics for baby boomer responses to the training preference questions.

Table 8

Descriptive Statistics for Baby Boomers: Preferences

Preference item	*M*	*SD*
P9. My experience/level of comfort with using computers in general is strong.	3.5	0.86
P4. I prefer having more online courses available to use as initial training or refresher training in basic occupational processes and procedures.	3.1	0.90
P8. I would prefer taking an online course for personal satisfaction and enjoyment.	2.5	1.09
P1. I prefer taking courses through the computer.	2.2	1.14
P6. I would prefer taking a self-paced computer-delivered course where I do not have contact with other students or an instructor through the computer.	2.1	1.25
P5. I would prefer taking a scheduled, web-based online course where I interact with other students and an instructor through the computer.	2.0	1.19
P7. I would prefer taking an online course where I have to complete graded assignments and post them to the instructor through the computer.	2.0	1.16
P3. I prefer traveling to a resident classroom-based course out of town than take an online course from my office or home.	1.5	1.34
P2. I prefer learning online or through computer-based training rather than a residence classroom environment.	1.8	1.25
P10. I think learning through the computer is a frustrating process.	1.4	1.34

Note. $n = 50$.

The researcher found that the data revealed differences in responses to specific questions in the training preferences section that were significant. Responses related to Item P9, "My experience/level of comfort with using computers in general is strong," revealed an overwhelmingly response of 90% agreement with this statement among baby boomer respondents while the remaining 10% either had no opinion or disagreed with the statement. The second question that revealed significant differences was Item P8, "I would prefer taking an online course for personal satisfaction and enjoyment." Fifty-four

percent of baby boomer respondents tended to agree with this statement while the remaining 46% either had no opinion or disagreed with the statement.

Research Question 2

Research Question 2 asked, "To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?" Participants of the survey who identified with the Generation X generational group responded to the training perception survey that included 20 questions pertaining to their training effectiveness and preferences. This section describes the responses that materialized from the Generation X participants to the survey relevant to training effectiveness and preferences in SSC Pacific.

Mean scores for the 20 questions were calculated and are arranged in order by descending mean in Tables 9 and 10. The tables also present the standard deviation for each of the 20 questions. The standard deviation shows the variation from the mean. When a standard deviation shows zero, all participants responded the same. A smaller standard deviation indicates that the participants had less variation in their answers, and larger standard deviations indicate that the ratings were spread among the responses. Tables 9 and 10 reflect the descriptive statistics for the Generation Xers.

The researcher found that the data revealed differences in responses to specific questions in the effectiveness section that were significant. Item E10 had the highest rate of significance in the data revealed when Generation Xers responded to the statement, "Online instructor-led training makes learning more effective." Over 62% of Generation Xers tended to agree with the statement as opposed to over 37% who either had no

Table 9

Descriptive Statistics for Generation X: Effectiveness

Effectiveness item	*M*	*SD*
E7. Instructor-based classroom training is more effective, because I can interact with the instructor and students.	3.5	0.84
E5. Learning in an instructor-led classroom is more effective than web-based or computer-based training.	3.4	1.03
E2. Learning is more effective with an instructor in a classroom environment.	3.4	0.95
E4. Instructor-based training enhances my learning rather than computer-based training.	3.0	1.17
E10. Online instructor-led training makes learning more effective.	2.7	1.15
E3. Computer-based or web-based training enhances my effectiveness to learn.	2.6	1.06
E9. Online learning is an effective way for me to retain important information and facts.	2.3	1.12
E1. Learning is more effective in an online environment with an instructor.	2.0	1.30
E8. Online learning is an effective way to motivate me to learn.	1.9	1.22
E6. Web-based training is more effective than instructor-based classroom training.	1.1	0.86

Note. $n = 37$.

opinion or disagreed. Secondly, in response to Item E3, "Computer-based or web-based training enhances my effectiveness to learn," over 67% of Generation Xers agreed with the statement while 33% had no opinion or somewhat disagreed. Lastly, Item E6 asked Generation Xers if web-based training was more effective than instructor-based classroom training. Over 81% of this generational group tended to disagree with the statement, and over 8% had no opinion. Only 10.81% somewhat agreed with the statement. Table 10 shows the descriptive statistics for Generation Xer responses to the training preference questions.

Table 10

Descriptive Statistics for Generation X: Preferences

Preference item	*M*	*SD*
P9. My experience/level of comfort with using computers in general is strong.	3.8	0.53
P4. I prefer having more online courses available to use as initial training or refresher training in basic occupational processes and procedures.	3.2	0.93
P8. I would prefer taking an online course for personal satisfaction and enjoyment.	2.4	1.26
P5. I would prefer taking a scheduled, web-based online course where I interact with other students and an instructor through the computer.	2.3	1.05
P7. I would prefer taking an online course where I have to complete graded assignments and post them to the instructor through the computer.	2.1	1.27
P3. I prefer traveling to a resident classroom-based course out of town than take an online course from my office or home.	1.9	1.56
P7. I would prefer taking an online course where I have to complete graded assignments and post them to the instructor through the computer.	1.8	1.21
P6. I would prefer taking a self-paced computer-delivered course where I do not have contact with other students or an instructor through the computer.	1.8	1.21
P2. I prefer learning online or through computer-based training rather than a residence classroom environment.	1.6	1.34
P10. I think learning through the computer is a frustrating process.	1.2	1.21

Note. $n = 37$.

The researcher found that the data revealed differences in responses to specific questions in the training preferences section that were significant. Item P9 had the highest significance as revealed in Generation Xer responses. The statement was, "My experience/level of comfort with using computers in general is strong." Generation Xers overwhelmingly responded with agreement (over 94%); only 5.41% had no opinion on the statement. The second significant question, Item P8, asked Generation Xers to

respond to the statement, "I would prefer taking an online course for personal satisfaction and enjoyment." This generational group's response rate revealed that over 45% tended to agree while only 27% tended to disagree, and only slightly over 27% had no opinion on the statement.

Research Question 3

Research Question 3 asked, "To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?" Participants of the survey who identified with the millennial generational group responded to the training perception survey that included 20 questions pertaining to their training effectiveness and preferences. This section describes the responses that materialized from the millennial generational participants to the survey relevant to training effectiveness and preferences in SSC Pacific.

Mean scores for the 20 questions were calculated and are arranged in order by descending mean in Tables 11 and 12. The tables also present the standard deviation for each of the 20 questions. The standard deviation shows the variation from the mean. When a standard deviation shows zero, all participants responded the same. A smaller standard deviation indicates that the participants had less variation in their answers, and larger standard deviations indicate that the ratings were spread among the responses. Tables 11 and 12 reflect the descriptive statistics for the millennials.

The researcher found that the data revealed differences in responses to specific questions in the effectiveness section that were significant. For Item E10, millennials responded to the statement, "Online instructor-led training makes learning more effective." Forty-four percent of millennials had no opinion, over 33% tended to disagree

Table 11

Descriptive Statistics for Millennials: Effectiveness

Effectiveness item	*M*	*SD*
E7. Instructor-based classroom training is more effective, because I can interact with the instructor and students.	3.6	0.64
E4. Instructor-based training enhances my learning rather than computer-based training.	3.4	0.75
E2. Learning is more effective with an instructor in a classroom environment.	3.4	0.64
E5. Learning in an instructor-led classroom is more effective than web-based or computer-based training.	3.3	0.82
E10. Online instructor-led training makes learning more effective.	1.9	1.07
E3. Computer-based or web-based training enhances my effectiveness to learn.	1.7	1.14
E9. Online learning is an effective way for me to retain important information and facts.	1.7	1.20
E8. Online learning is an effective way to motivate me to learn.	1.6	1.31
E1. Learning is more effective in an online environment with an instructor.	1.4	1.22
E6. Web-based training is more effective than instructor-based classroom training.	1.0	0.90

Note. $n = 27$.

with the statement, and only slightly over 22% somewhat agreed or agreed with the statement. Secondly, Item E3 was, "Computer-based or web-based training enhances my effectiveness to learn." Over 55% of millennials tended to disagree with the statement while slightly over 29% tended to agree; slightly over 14% had no opinion. Thirdly, Item E6 asked millennials to rate their agreement with the statement, "Web-based training is more effective than instructor-based classroom training." An overwhelming majority (over 74%) of millennials disagreed with this statement while only slightly over 7% agreed and over 18% had no opinion about the statement. Table 12 shows the descriptive statistics for millennial responses to the training preference questions.

Table 12

Descriptive Statistics for Millennials: Preferences

Preference item	*M*	*SD*
P9. My experience/level of comfort with using computers in general is strong.	4.0	0.19
P4. I prefer having more online courses available to use as initial training or refresher training in basic occupational processes and procedures.	3.2	1.01
P3. I prefer traveling to a resident classroom-based course out of town than take an online course from my office or home.	2.1	1.48
P5. I would prefer taking a scheduled, web-based online course where I interact with other students and an instructor through the computer.	1.8	1.33
P1. I prefer taking courses through the computer.	1.7	1.29
P7. I would prefer taking an online course where I have to complete graded assignments and post them to the instructor through the computer.	1.7	1.10
P8. I would prefer taking an online course for personal satisfaction and enjoyment.	1.7	0.98
P2. I prefer learning online or through computer-based training rather than a residence classroom environment.	1.4	1.31
P6. I would prefer taking a self-paced computer-delivered course where I do not have contact with other students or an instructor through the computer.	1.4	1.22
P10. I think learning through the computer is a frustrating process.	1.3	1.23

Note. $n = 27$.

The researcher found that the data revealed differences in responses to specific questions in the training preferences section that were significant. Item P9 was the most significant and asked millennials to rate their agreement with the statement, "My experience/level of comfort with using computers in general is strong." Over 96% of millennials agreed, and 3.7% somewhat agreed with this statement. No millennials disagreed or had no opinion. In response to Item P8, "I would prefer taking an online course for personal satisfaction and enjoyment," millennials tended to disagree (over

40%) while only 25.93% somewhat agreed. Over 33% of millennial respondents had no opinion about the statement.

Research Question 4

Research Question 4 asked, "To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?" The researcher used an analysis of variance (ANOVA) to determine if there were significant differences in responses between the three generational groups. The test did reveal statistically significant differences between generations in responses to specific questions within the Learning Effectiveness and Learning Preferences sections of the survey. The questionnaire consisted of 20 questions with response options on a 5-point Likert scale, where 0 represented *disagree*, 1 represented *somewhat disagree*, 2 represented *no opinion*, 3 represented *somewhat agree*, and 4 represented *agree*. Table 13 compares the mean scores of SSC Pacific baby boomer, Generation X, and millennial employees for all 10 training effectiveness and 10 training preference questions.

In the Learning Effectiveness section, three questions revealed significant differences. Based on responses to Item E3, baby boomers and Generation Xers tended to agree more ($F = 5.91$, $p < .01$) that computer-based or web-based training enhanced the effectiveness of their learning. The same statement was found to be rated significantly lower by millennials ($M = 1.7$, $SD = 1.14$), reflecting a significant difference when compared to the scores of baby boomers ($M = 2.4$, $SD = 1.11$) and Generation Xers ($M = 2.6$, $SD = 1.06$). Secondly, Item E6 asked if web-based training was more effective

Table 13

Effectiveness and Preference Differences Between Generational Groups

	Baby boomer (n = 50)		Generation X (n = 37)		Millennial (n = 27)				
Survey item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*df*	*p*
Effectiveness									
E1	2.1	1.18	2.0	1.30	1.4	1.22	2.77	113	.0669
E2	3.1	1.15	3.4	0.95	3.4	0.64	1.21	113	.3022
E3	2.4	1.11	2.6	1.06	1.7	1.14	5.91	113	.0036
E4	2.9	1.11	3.0	1.17	3.4	0.75	2.08	113	.1298
E5	3.0	1.07	3.4	1.03	3.3	0.82	1.18	113	.3116
E6	1.6	1.14	1.1	0.86	1.0	0.90	4.04	113	.0202
E7	3.2	1.03	3.5	0.84	3.6	0.64	2.06	113	.1324
E8	2.0	1.40	1.9	1.22	1.6	1.31	1.01	113	.3690
E9	2.1	1.28	2.3	1.12	1.7	1.20	1.51	113	.2257
E10	2.4	1.08	2.7	1.15	1.9	1.07	3.87	113	.0237
Preferences									
P1	2.2	1.14	1.8	1.21	1.7	1.29	1.63	113	.2003
P2	1.8	1.25	1.6	1.34	1.4	1.31	0.75	113	.4752
P3	1.5	1.34	1.9	1.56	2.1	1.48	1.61	113	.2037
P4	3.1	0.90	3.2	0.93	3.2	1.01	0.11	113	.9000
P5	2.0	1.19	2.3	1.05	1.8	1.33	1.43	113	.2429
P6	2.1	1.25	1.8	1.21	1.4	1.22	2.86	113	.0612
P7	2.0	1.16	2.1	1.27	1.7	1.10	0.92	113	.4024
P8	2.5	1.09	2.4	1.26	1.7	0.98	4.45	113	.0138
P9	3.5	0.86	3.8	0.53	4.0	0.19	3.92	113	.0227
P10	1.4	1.34	1.2	1.21	1.3	1.23	0.37	113	.6919

than instructor-based classroom training ($F = 4.04$, $p < .03$). The responses by generational groups resulted in a higher mean score for baby boomers ($M = 1.6$, $SD = 1.14$), reflecting a significant difference when compared to the scores of Generation Xers ($M = 1.1$, $SD = 0.86$) and millennials ($M = 1.0$, $SD = 0.90$), who generally did not feel that web-based training was more effective than instructor-based classroom training. Thirdly, in response to Item E10, "Online instructor-led training makes learning more effective" ($F = 3.87$, $p < .03$), baby boomers and Generation Xers ($M = 2.4$, $SD = 1.08$ and $M = 2.7$, $SD = 1.15$, respectively) tended to agree to a significantly higher degree that

instructor-led training made learning more effective as compared to millennials ($M = 1.9$, $SD = 1.07$). The data reflected a significant difference between generational groups.

In the Learning Preferences section, two questions revealed significant differences. Item P8 asked if respondents would prefer taking an online course for personal satisfaction and enjoyment ($F = 4.45$, $p < .02$). The responses by generational groups resulted in differences where baby boomers and Generation Xers ($M = 2.5$, $SD = 1.09$ and $M = 2.4$, $SD = 1.26$, respectively) tended to prefer taking online courses for personal satisfaction and enjoyment as compared to millennials, who rated the statement significantly lower ($M = 1.7$, $SD = 0.98$). Item P9 asked respondents to rate their agreement with the statement that their experience/level of comfort with using computers in general was strong ($F = 3.92$, $p < .03$). Overwhelmingly, baby boomers ($M = 3.5$, $SD = 0.86$), Generation Xers ($M = 3.8$, $SD = 0.53$), and millennials ($M = 4.0$, $SD = 0.19$) all rated this statement significantly higher than the other statements, indicating that all generational employees agreed that their comfort level in using computers was generally strong.

Summary

Chapter IV reviewed the purpose of the study, research questions, the data collection methods, and analysis of the data. The data presented for each of the four research questions were analyzed and reported in narrative and table format. Chapter V presents a summary of major findings, unexpected findings, conclusions, implications for action, and recommendations for further research.

CHAPTER V: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this quantitative study was to determine the degree of difference of effectiveness of and preferences for various computer-based training (CBT) types as perceived by baby boomer, Generation X, and millennial generational Space and Naval Warfare Systems Center Pacific (SSC Pacific) employees based in San Diego, California, as measured by the Northern Virginia Community College (NVCC) Extended Learning Institute Survey. The study was guided by four primary research questions related to the preferred CBT types by baby boomer, Generation X, and millennial generational SSC Pacific employees:

1. To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
2. To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
3. To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?
4. To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?

One hundred fourteen government employees participated in the study. This sample population was selected due to the diverse group of generations and their roles in government research, development, test, and evaluation (RDT&E) directly impacted by the rapid increase in technology. The participants (a) were at least 18 years of age,

(b) were government employees, (c) were located in the greater San Diego geographical area, and (d) had received training through CBT and instructor-based training (IBT) methods.

In this final chapter, a summary of the major findings of the study is reviewed as related to the literature. Implications for practice in adult education in government institutions are discussed, and suggestions for future research are provided. This chapter concludes with reflections on the research process.

Major Findings

This section is a summary of the major findings of this study. Each subsection begins with the corresponding research question and then provides a summary of the results by generational groups supported by the literature review.

Major Finding 1

To what degree do baby boomer generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?

The data collected from baby boomers revealed the importance of their job effectiveness since the introduction of computers in the workplace. The findings indicated that the baby boomer employees placed their highest value on training effectiveness related to learning in an instructor-based setting, whether in a classroom or computer-based environment. Perceptions of the effectiveness of instructor-based classrooms that allow for interaction with instructors or students ($M = 3.2$), the perceptions of learning effectiveness with an instructor in a classroom environment ($M = 3.1$), and the perceptions of learning in an instructor-led classroom over web-based

training or CBT (M = 3.0) led the researcher to assess that IBT is an important element to baby boomer learning in the workplace.

The data collected from baby boomers also revealed the importance of their job preferences since the introduction of computers in the workplace. The findings indicated that the baby boomer employees also placed their highest value on training preferences related to their knowledge in the practical use of computers, availability of online courses, and completion of online courses for personal enjoyment. The baby boomers indicated that their experience and level of comfort with using computers in general was strong (M = 3.5), the importance of having more online courses available for initial training or refresher training (M = 3.1), and their preference for taking an online course for personal satisfaction and enjoyment (M = 2.5), all of which are indicative of baby boomers' reliance on technology to maintain work-life balance.

The above results had similar findings based on research from Meister and Willyerd (2010) noting that computers have directly impacted baby boomers' jobs since the introduction of the computer into the workplace. However, according to Ashleigh Jensen (as cited in Smith, 2016), baby boomers have embraced technology more than previous generations and were one of the first generations to begin relying on it to make office work more efficient. Known as independent, individuals in this generation are not digital natives, which Haugen and Musser (2013) defined as individuals born after 1980. Baby boomers can be classified as digital immigrants, who are less familiar with the digital environment and learned how to use e-mail and Internet late in life out of necessity in the growing technological environment. Some individuals in this generation, however, are also known as digital settlers, who helped shape the digital age but still rely

heavily on the analog world (Haugen & Musser, 2013). The research suggests that baby boomers continue to adapt and embrace workplace technological changes based on attitudes toward their learning effectiveness and preferences.

Major Finding 2

To what degree do Generation X generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?

The data collected from Generation Xers revealed the importance of their job effectiveness since starting their careers in a period of social and economic change. The findings indicated that the Generation Xers placed their highest value on training effectiveness related to learning in an instructor-based setting, whether in a classroom or computer-based environment. Perceptions of the effectiveness of instructor-based classrooms that allow for interaction with instructors or students (M = 3.5), the perceptions of learning in an instructor-led classroom over web-based or CBT (M = 3.4), the perceptions of learning effectiveness with an instructor in a classroom environment (M = 3.4), and the perceptions that instructor-led training enhances learning more than CBT (M = 3.0) led the researcher to assess that IBT is an important element to Generation Xer learning in the workplace.

The data collected from Generation Xers also revealed the importance of their job preferences since starting their careers in a period of social and economic change. The findings indicated that the Generation X employees also placed their highest value on training preferences related to their knowledge in the practical use of computers, availability of online courses, and completion of online courses for personal enjoyment. Generation Xers indicated that their experience and level of comfort with using

computers in general was strong (M = 3.8), the importance of having more online courses available for initial training or refresher training (M = 3.2), and their preference for taking an online course for personal satisfaction and enjoyment (M = 2.4), all of which are indicative of Generation Xers' reliance on technology to exercise their self-sufficiency and maintain expectations of work-life balance.

The above results had similar findings based on research from Meister and Willyerd (2010) and Smith (2016) that revealed that Generation Xers typically had baby boomer parents who both worked, and they are therefore known as "latchkey" children (Meister & Willyerd, 2010, p. 49). Due to self-sufficiency in their youth, they are now known for thinking like entrepreneurs, thriving in situations where they can be independent thinkers, and expecting work-life balance. Because Generation Xers started their careers in a period of social and economic change and have witnessed the effect of the stock market crash on their families, their ability to succeed technologically and create a work-life balance is important for Generation Xers (Meister & Willyerd, 2010). The research suggests that Generation Xers continue to embrace and reinvent workplace technological changes based on attitudes toward their learning effectiveness and preferences.

Major Finding 3

To what degree do millennial generational SSC Pacific employees perceive the effectiveness of various types of CBT systems?

The data collected from millennials revealed the importance of their job effectiveness based on their innate knowledge of the Internet of things (IoT) in addition to being among the best educated generations. The findings indicated that the millennials

placed their highest value on training effectiveness related to learning in an instructor-based setting, whether in a classroom or computer-based environment. Perceptions of the effectiveness of instructor-based classrooms that allow for interaction with instructors or students ($M = 3.6$), the perceptions that instructor-led training enhances learning more than CBT ($M = 3.4$), the perceptions of learning effectiveness with an instructor in a classroom environment ($M = 3.4$), and the perceptions of learning in an instructor-led classroom over web-based training or CBT ($M = 3.3$) led the researcher to assess that IBT is an important element to millennial learning in the workplace.

The data collected from millennials also revealed the importance of their job preferences based on their innate knowledge of the IoT in addition to being among the best educated generations. The findings indicated that the millennial employees also placed their highest value on training preferences related to their knowledge in the practical use of computers, availability of online courses, and traveling out of town to attend classroom-based courses. Millennials indicated that their experience and level of comfort with using computers in general was strong ($M = 4.0$), the importance of having more online courses available for initial training or refresher training ($M = 3.2$), and their preference for traveling out of town to attend a resident classroom-based course over taking an online course from home or office ($M = 2.1$), all of which are indicative of millennials' dependence on technology and communication in a time of rapid globalization, technological advancement, and diversity.

The above results had similar findings based on research from Bass (2008), Blair (2016), and Meister and Willyerd (2010), who reported that millennials have been living on the web for as long as they could write and are the best educated generation to date.

Living in a time of rapid globalization, technological advancement, and diversity, millennials have adapted to "all communication technology" and, according to Marston (2007), "are dependent on it" (p. 1). This generation expects immediate digital response as "they are accustomed to their text messages and . . . daily [use] of social networking and social media" (Marston, 2007, p. 1). The personal social media practices of millennials transcend work practices, which will require organizations to transform how they learn and communicate in a global market; millennials are the generation to seek and demand change. The research suggests that millennials continue to embrace but seek transformation in the workplace to adopt technological changes based on optimistic attitudes toward their learning effectiveness and preferences.

Major Finding 4

To what degree are there differences between baby boomer, Generation X, and millennial generational SSC Pacific employees as it relates to effectiveness of and preferences for CBT types?

Analysis of variance (ANOVA) was used to determine if there were significant differences in responses between the three generational groups. The test did reveal statistically significant differences between generations in responses to specific questions within the Learning Effectiveness and Learning Preferences sections of the survey. The questionnaire consisted of 20 questions with response options on a 5-point Likert scale, where 0 represented *disagree*, 1 represented *somewhat disagree*, 2 represented *no opinion*, 3 represented *somewhat agree*, and 4 represented *agree*. Table 13 (repeated here for ease of reference) compares the mean scores of SSC Pacific baby boomer, Generation

X, and millennial employees for all 10 training effectiveness and 10 training preference questions.

Table 13

Effectiveness and Preference Differences Between Generational Groups

	Baby boomer (n = 50)		Generation X (n = 37)		Millennial (n = 27)				
Survey item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*df*	*p*
Effectiveness									
E1	2.1	1.18	2.0	1.30	1.4	1.22	2.77	113	.0669
E2	3.1	1.15	3.4	0.95	3.4	0.64	1.21	113	.3022
E3	2.4	1.11	2.6	1.06	1.7	1.14	5.91	113	.0036
E4	2.9	1.11	3.0	1.17	3.4	0.75	2.08	113	.1298
E5	3.0	1.07	3.4	1.03	3.3	0.82	1.18	113	.3116
E6	1.6	1.14	1.1	0.86	1.0	0.90	4.04	113	.0202
E7	3.2	1.03	3.5	0.84	3.6	0.64	2.06	113	.1324
E8	2.0	1.40	1.9	1.22	1.6	1.31	1.01	113	.3690
E9	2.1	1.28	2.3	1.12	1.7	1.20	1.51	113	.2257
E10	2.4	1.08	2.7	1.15	1.9	1.07	3.87	113	.0237
Preferences									
P1	2.2	1.14	1.8	1.21	1.7	1.29	1.63	113	.2003
P2	1.8	1.25	1.6	1.34	1.4	1.31	0.75	113	.4752
P3	1.5	1.34	1.9	1.56	2.1	1.48	1.61	113	.2037
P4	3.1	0.90	3.2	0.93	3.2	1.01	0.11	113	.9000
P5	2.0	1.19	2.3	1.05	1.8	1.33	1.43	113	.2429
P6	2.1	1.25	1.8	1.21	1.4	1.22	2.86	113	.0612
P7	2.0	1.16	2.1	1.27	1.7	1.10	0.92	113	.4024
P8	2.5	1.09	2.4	1.26	1.7	0.98	4.45	113	.0138
P9	3.5	0.86	3.8	0.53	4.0	0.19	3.92	113	.0227
P10	1.4	1.34	1.2	1.21	1.3	1.23	0.37	113	.6919

In the Learning Effectiveness section, three questions revealed significant differences. Based on responses to Item E3, baby boomers and Generation Xers tended to agree more ($F = 5.91$, $p < .01$) that computer-based or web-based training enhanced the effectiveness of their learning. The same statement was found to be rated significantly lower by millennials ($M = 1.7$, $SD = 1.14$), reflecting a significant difference when compared to the scores of baby boomers ($M = 2.4$, $SD = 1.11$) and Generation Xers

($M = 2.6$, $SD = 1.06$). Secondly, Item E6 asked if web-based training was more effective than instructor-based classroom training ($F = 4.04$, $p < .03$). The responses by generational groups resulted in a higher mean score for baby boomers ($M = 1.6$, $SD = 1.14$), reflecting a significant difference when compared to the scores of Generation Xers ($M = 1.1$, $SD = 0.86$) and millennials ($M = 1.0$, $SD = 0.90$), who generally did not feel that web-based training was more effective than instructor-based classroom training. Thirdly, in response to Item E10, "Online instructor-led training makes learning more effective" ($F = 3.87$, $p < .03$), baby boomers and Generation Xers ($M = 2.4$, $SD = 1.08$ and $M = 2.7$, $SD = 1.15$, respectively) tended to agree to a significantly higher degree that instructor-led training made learning more effective as compared to millennials ($M = 1.9$, $SD = 1.07$). The data reflected a significant difference between generational groups.

In the Learning Preferences section, two questions revealed significant differences. Item P8 asked if respondents would prefer taking an online course for personal satisfaction and enjoyment ($F = 4.45$, $p < .02$). The responses by generational groups resulted in differences where baby boomers and Generation Xers ($M = 2.5$, $SD = 1.09$ and $M = 2.4$, $SD = 1.26$, respectively) tended to prefer taking online courses for personal satisfaction and enjoyment as compared to millennials, who rated the statement significantly lower ($M = 1.7$, $SD = 0.98$). Item P9 asked respondents to rate their agreement with the statement that their experience/level of comfort with using computers in general was strong ($F = 3.92$, $p < .03$). Overwhelmingly, baby boomers ($M = 3.5$, $SD = 0.86$), Generation Xers ($M = 3.8$, $SD = 0.53$), and millennials ($M = 4.0$, $SD = 0.19$) all rated this statement significantly higher than the other statements, indicating that all

generational employees agreed that their comfort level in using computers was generally strong.

Interpretation of the data presented a significant difference between preferred types of CBT instruction among baby boomer, Generation X, and millennial generational SSC Pacific employees. The training effectiveness data revealed that baby boomers and Generation Xers tended to agree more that online-type training was more effective for their learning, resulting in a higher variation in responses; alternatively, millennials showed a lower variation in responses to the same effectiveness questions. The training preferences data revealed that baby boomers and Generation Xers preferred taking online courses for personal satisfaction and were also comfortable using computers in general. Millennials, however, had a lower variation in responses with regard to taking online classes for personal satisfaction. Millennials also had a higher variance comparable to baby boomers and Generation Xers with responses regarding the experience/level of comfort with using computers.

Unexpected Findings

The results of this study were supported by the findings in previous research that considered training effectiveness and training preferences among generational groups in the workplace. While the data aligned with research findings for each of the generations, one particular finding emerged that was surprising. In response to Item E7, "Instructor-based classroom training is more effective, because I can interact with instructor and students," baby boomers, Generation Xers, and millennials all tended to overwhelmingly agree with the statement. In large organizations, learning gaps typically exist between a younger generation of technology-savvy computer literates and an older generation of

employees struggling to keep pace with the rapid growth of information technology (IT) systems. Hawkins (2011) explained that while many employees are persistent, self-efficacious adult learners, their learning preferences and lack of experience may make CBT a difficult method to develop skills and knowledge, which limits their ability to learn efficiently. However, in RDT&E organizations such as SSC Pacific, generational employees strive to remain competitive and therefore are motivated to keep pace with technological improvements in training systems and learning methods. The goal is to remain productive and cost-conscious members of the federal service. Additionally, responses to Item E7 by baby boomers noted that classroom training with an instructor was more conducive to their learning, Generation Xers added that training effectiveness depends on instructor training delivery and the effectiveness of the training material, and one millennial indicated that IBT is best due to interaction with instructors and other students; however, they felt training in this manner applied to more complex material.

Regarding the training preferences of generational employees, one unexpected finding was the responses from baby boomers and millennials to Item P3, "I prefer traveling to a resident classroom-based course out of town than take an online course from my office or home." It was significant that the responses from two generations were separated by Generation Xers' referring to online learning over IBT. The concerns of the baby boomers and millennials depended on the quality of instruction in the classroom, the quality of the CBT, and the training environment. Alternatively, Generation Xers preferred online learning; however, all generational respondents felt that learning through a computer was frustrating.

The results address training perceptions of generational employees in high-performing, technologically advanced organizations. Jensen (as cited in Smith, 2016) stated that baby boomers tend to embrace technology more than previous generations since they were among the first generations to begin relying on technology in the office to make work more efficient. Generation Xers most resemble millennials in how they use technology; however, the motivation was necessitated by the need for job protection from millennials who were entering the workforce in greater numbers (Meister & Willyerd, 2010). Finally, millennials are the digital natives among the generations, have been living on the web since they could write, and are the best educated generation to date (Bass, 2008; Blair, 2016; Meister & Willyerd, 2010). Consequently, older generations in many organizations continue to struggle with technology at the basic level. The best strategy to identify organizational gaps is to determine the generational makeup of the workforce, understand the training needs, and develop a strategy to overcome weaknesses that impede productivity and proficiency.

Conclusions

Four conclusions were drawn from this study about generational group perceptions of training effectiveness of and preferences for various CBT types. First, all three generations had varying attitudes toward training effectiveness and perceptions of training types; however, research suggests that baby boomers continue to adapt and embrace workplace technological changes based on attitudes toward their learning effectiveness and preferences. According to Jensen (as cited in Smith, 2016) in a report to the Idaho State Legislature's Change in Employee Compensation Committee, baby

boomers tend to embrace technology more than previous generations and were one of the first generations to begin relying on it to make office work more efficient.

Second, Generation Xers continue to embrace and reinvent workplace technological changes based on attitudes toward their learning effectiveness and preferences. The self-efficacy of this generation gave rise to entrepreneurs who thrive in situations where they can be independent thinkers (Marston, 2007). Millennials live in a time of rapid globalization, technological advancement, and diversity (Marston, 2007). They continue to embrace but seek transformation in the workplace to adopt technological changes based on optimistic attitudes toward their learning effectiveness and preferences.

Third, generational employees' attitudes toward learning styles and learning methods, such as CBT, create gaps among groups struggling to keep pace with the rapid growth of IT systems. The learning gaps in organizations between a younger generation of technology-savvy computer literates and an older generation of employees continue; however, research suggests that attitudes and behaviors have shifted in technologically advanced and diverse organizations.

Lastly, the importance of transformational leaders in high-performing, technologically advanced organizations is a necessity in today's globally diverse workplace. Miles (1997) created the *framework for leading corporate transformation*, which was the basis for this study. Elements of Miles's framework include generating energy for change and creating a clear and compelling vision that challenges the status quo, forges a path forward, and aligns the organization to the vision with transformational processes. Organizations with existing infrastructure may be able to weather the

technological changes, but a lack of support of transformational leader principles to guide the way for new or emerging organizations could make the merging of technological and generational challenges even more difficult to overcome (Ribes & Finholt, 2009).

Organizations that fail to recognize generational group differences face difficulties in managing and engaging teams, which affects their ability to keep employees motivated and productive (Birkman, 2016; Ellison, 2014; Hawkins, 2011; Meister & Willyerd, 2010; Prensky, 2001). According to D. L. Anderson (2015), in organizations facing rapid increases in technology, history has shown that these challenges are compounded by a diverse workforce since today's organizations may contain up to four generations of employees. "Individual interventions" to overcome complex generational and cultural challenges "can be . . . influential to [improve] personal growth, development, and change" (D. L. Anderson, 2015, p. 209). Miles (1997) stated that successful corporate transformation processes share a few fundamental attributes: they thrive on energy, they are embedded in a comprehensive implementation process, and they demand a transformational leader.

Implications for Action

Findings from this research revealed that training effectiveness and preferences varied by generation, which creates gaps in learning. Exacerbating this phenomenon is the rapid increase in technology recognized by almost everyone in the world today. There has been an explosion of information and innovation, and everyone wants in on it. This is the "wake-up call" to realize that IT is progressing at an exponential rate. We have all seen the benefits; however, more attention is needed toward the negative impacts on our greatest asset: the warfighter.

Implication 1

The results of this study should be considered in addition to historical, technological, and training data aimed at solutions for keeping pace with the rapid growth of technology in organizations. Leaders have the responsibility to ensure organizations keep pace with training technology by being aware of diverse workforce capabilities, limitations, and preferred learning methods and styles. They should direct organizational development professionals to conduct periodic training needs analysis to assess required technology growth, impacts on innovation, cost considerations, and anticipated interventions that consider increasing complexity, changing workforce demographics, and the changing nature of work (D. L. Anderson, 2015; Hollis, 2014).

Implication 2

In an era of rapid globalization, technological advancement, and diversity, millennials continue to embrace but seek transformation in the workplace to adopt technological changes based on their optimistic attitudes; however, the same can be said, to a lesser degree, of baby boomers and Generation Xers (Marston, 2007). Miles's (1997) framework for leading corporate transformation is a key element of this study. Transformational leadership is a key element for any existing or new organization to support emerging technology development and has been proven in studies to be effective in an IT environment. The transformational leader's role is important in creating an atmosphere of "support" through the organization's "vision," mission, and "strategic goals" (Daly, 2011, pp. 61-62). Organizations must have the support from their leaders through a shared vison to support missions and overall strategic goals. Survival of an organization depends on keeping pace with competitors, realizing implications of staying

competitive, and planning for future growth. Finally, organizations must be cognizant of adult learning behaviors in a diverse workforce consisting of baby boomers, Generation Xers, and millennials as they expand technology (D. Anderson & Anderson, 2010).

Implication 3

If "change is the essence of innovation, growth, and transformation," and "organizations that can change quickly and successfully will win in the dynamic twenty-first century marketplace" (L. A. Anderson & Anderson, 2010, p. 17), then it is apparent that organizations in the 21st century require transformational leaders to forge visions that will not only enable but also embrace constant change if they are to remain competitive. In technologically advanced organizations, change is generally accepted; however, for many others, change is hard. The ability for organizations to implement change strategies demonstrates the importance to seek out or create successful transformational leaders (D. Anderson & Anderson, 2010). Based on this research, having the right leaders in place who display transformational leadership characteristics to support change management efforts to assess course corrections, enable change predictors, address change issues, and create the shared visions the organization expects and deserves is critical to high-performing organizations of the future.

Recommendations for Further Research

The literature and survey data support the importance of establishing workplace practices leading to employee perceptions of training effectiveness and preferences. Subsequent research studies are recommended and could provide additional information to improve an organization's ability to provide just-in-time training to its employees.

1. This study considered the learning effectiveness of generational learners currently receiving CBT and IBT; however, it did not consider Generation 2020, the next generation already entering the workforce. Further research could determine if there are also significant differences between Generation 2020's learning effectiveness compared to that of other generations represented in this study.
2. This study considered the learning preferences of generational learners currently receiving CBT and IBT; however, it did not consider Generation 2020, the next generation already entering the workforce. Further research could determine if there are also significant differences between Generation 2020's learning preferences compared to those of other generations represented in this study.
3. This study only considered a target population of government employees within SSC Pacific. The same study could be expanded to private or nongovernmental organizations aimed at research to determine employees' perceived training effectiveness and preferences that align with an organization's vision and mission.
4. This study discussed the influence of exponential expansion of technology over time and its impact on today's diverse workforce and training implications. Further research could explore the impact of the IoT on employees' motivation to learn in challenging environments.
5. This study discussed the need for leaders with transformational leadership characteristics to lead the way in supporting innovation with generational groups in mind. Further research could explore the impact of four generations through a training needs analysis with focus groups in anticipation of greater flexibility in training.

6. This study discussed the need to address training gaps in organizations facing rapid increases in technology compounded by a diverse workforce. Further intergenerational studies to address the increasing complexity, changing workforce demographics, and the changing nature of work are needed to increase organizational productivity.

Concluding Remarks and Reflections

This study provides insight into the perceptions of training effectiveness and preferences of government employees in a technologically advanced organization. The rapid increase in technology coupled with a more diverse workforce creates barriers to achieving a highly trained technical workforce to effectively respond to increasing work demands. The study will also provide the U.S. Department of the Navy, Naval Education and Training Command, organizational development (OD) professionals, and curriculum development designers with the state of generational group perceptions of CBT effectiveness and the preferred type of CBT instruction. Policymakers, curriculum developers, and computerized training designers will be provided with the empirical data necessary to better understand the learning needs of today's diverse workforce during a training needs analysis. Results could help organizations engage generational employees by developing age-friendly teaching methods, such as slower presentations with increased discussion, longer practice sessions, and interactive computer programs to aid learning.

This study is the result of my self-developed passion to improve and expand workforce, education, and training development in highly technologically advanced organizations. Although many of the adult learning principles in social sciences, training

development, and curriculum development include processes crucial in allowing innovative ideas to overcome gaps in training, implementing the effective principles of transformational leadership is, foremost, the way to achieve success in a rapidly changing environment. Technology continues to exponentially grow, and government organizations must keep pace to maintain the advantage over adversaries and, most importantly, to provide the warfighters with the cutting-edge technologies needed to win and keep them safe.

As a Navy Veteran, federal civil service supervisor, and educator for over 36 years, my passion for education and technology has evolved. I have been privileged to serve alongside some of the greatest service members, civilians, and educators who have guided me to this moment in life and are my motivation. I have experienced the lows and the highs throughout my career; however, I have always learned and lived.

My life's journey does not conclude with this study, but rather this emboldens me to pursue greater accomplishments. I have learned that nothing in life is easy, and this doctoral program and dissertation were no exception. I am further motivated by the words of General (U.S. Army, Ret.) Stanley McChrystal (2015), who stated in his book *Team of Teams*, "Our transformation is reflective of the new generation of mental models we must adopt in order to make sense of the twenty-first century. If we do manage to embrace this change, we can unlock tremendous potential for human progress" (p. 251). I say Yes We Can!

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APPENDICES

APPENDIX A

Survey Instrument

Intergenerational Group Training Perceptions Survey

In an effort to better understand the demographics of our employees for this study and to better develop instructional methods and types that are relevant to our audience, please answer the following question about yourself. Your information and feedback will help us create instructional tools that serve the workforce better. Your response will only be used for statistical purposes and will remain anonymous.

Part 1 - Employee Demographics

1. What is your Age Group?

0 - 1946 to 1964 (Baby Boomers)

1 - 1965 to 1976 (Generation X)

2 - 1977 to 1997 (Generation Y or Millennials)

4 - 1997 to Present (Generation Z or 2020)

Proceed to the next page to select your occupational field.

2. What is your primary occupational field?

0 – Engineer (Hardware or Software)

1 – Scientist

2 – Information Technology Specialist

3 – Logistician (Supply)

4 – Contract Specialist

5 – Financial Analyst

6 – Other _____

Proceed to the next page to commence the learning effectiveness and preference questionnaire.

The following questions refer to your experience and impressions about online, i.e. web-based-based learning as compared to learning in a classroom environment. These questions are adapted from the Northern Virginia Community College online learning survey and will help us to determine the extent to which our employees effectively

Part 2 - Employee Survey

1. Learning Effectiveness

Please rate the level of agreement with the following statements.

Learning is more effective in an online environment with an instructor.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Learning is more effective with an instructor in a classroom environment.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Computer-based or web-based training enhances my effectiveness to learn.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Instructor-based training enhances my learning rather than computer-based training.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Learning in an instructor-led classroom is more effective than web-based or computer-based training.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Web-based training is more effective than instructor-based classroom training.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Instructor-based classroom training is more effective, because I can interact with the instructor and students.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Online learning is an effective way to motivate me to learn.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Online learning is an effective way for me to retain important information and facts.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

Online instructor-led training makes learning more effective.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

2. Learning Preferences

Please select your level of agreement with the following statements.

I prefer taking courses through the computer.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I prefer learning online or through computer-based training rather than a residence classroom environment.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I prefer traveling to a resident classroom-based course out of town than take an online course from my office or home.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I prefer having more online courses available to use as initial training or refresher training in basic occupational processes and procedures.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I would prefer taking a scheduled, web-based online course where I interact with other students and an instructor through the computer.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I would prefer taking a self-paced computer-delivered course where I do not have contact with other students or an instructor through the computer.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I would prefer taking an online course where I have to complete graded assignments and post them to the instructor through the computer.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

I would prefer taking an online course for personal satisfaction and enjoyment.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

My experience/level of comfort with using computers in general is strong.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 – Agree

I think learning through the computer is a frustrating process.

0 - Disagree 1 - Somewhat Disagree 2 - No Opinion 3 - Somewhat Agree 4 - Agree

APPENDIX B

Informed Consent Form

Consent to Participate in Research:

The Development of Organizational Training: Identifying Generational Differences and Perceptions in Computerized Learning Systems in Government Organization

DATE:

BRANDMAN UNIVERSITY

16355 LAGUNA CANYON ROAD

IRVINE, CA 92618

Principal Investigator: Gregory Negron

Background: You are being invited to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear of if you need more information.

Purpose of Study: The purpose of this quantitative study is to determine the degree of difference of effectiveness and preferences for various Computer-Based Training (CBT) types as perceived by Baby Boomer, Generation X, and Millennial generational Space and Naval Warfare Systems Center Pacific employees based in San Diego, CA.

Study Procedures: The instrument will be divided into three sections. Section one, Employee Demographics will be used to better understand the age demographic and occupation of employees receiving training and to better develop instructional types that are relevant to the participant audience. Section two and three consist of a 20 item questionnaire regarding Learning Effectiveness and Learning Preferences respectively and refer to employee experience and impressions about CBT type learning as compared to learning in a classroom or IBT environment. Your expected time commitment for this study is: 15-20 minutes.

Consent:

I understand that:

a) There are minimal risks associated with participating in this research. Participation in surveys is voluntary. The surveys should take approximately 15-20 minutes of time to fill out. All responses will be combined to develop the next round of survey consolidation. The responses are anonymous. The Researcher will protect my confidentiality by keeping the research materials in a password-protected computer that is available only to the researcher and retained for five years. No personally identifiable information (PII), (such as, names, Social Security Numbers [SSNs], e-mail addresses, Internet Protocols [IP] addresses, street addresses, telephone numbers) will be attached to the answers once they have been received from the respondent.

b) The possible benefit of this study to me is that my input may help add to the research regarding the state of generational group perceptions of computer-based training effectiveness and the preferred type of CBT type instruction used to build increase productivity and performance. It will also produce findings that will be useful to Department of the Navy, Naval Education & Training Command, Organizational Development (OD) professionals, and curriculum development designers to better understand the learning needs of today's diverse workforce during a training needs assessment and analysis.

c) Any questions I have concerning my participation in this study will be answered at any time by Gregory Negron. He can be reached by email at: gregory.negron@navy.mil. His school email is: negr2801@mail.brandman.edu or Dr. Carlos Guzman (Dissertation Chair) at cguzman@brandman.edu.

d) My participation in this research study is voluntary. I may decide to not participate in the study and I can withdraw at any time. I can also decide not to answer particular questions during the process if I so choose. I understand that I may refuse to participate or may withdraw from this study at any time without any negative consequences. Also, the Researcher may stop the study at any time.

e) No information that identifies me will be released without my separate consent and that all identifiable information will be protected to the limits allowed by law. If the study design or the use of the data is to be changed, I will be so informed and my consent re-obtained. I understand that if I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Executive Vice Chancellor of Academic Affairs, Brandman University, at 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

ACKNOWLEDGEMENT: I acknowledge that I have received a copy of this form and the "Research Participant's Bill of Rights."

I have read the above and understand it and hereby consent to the procedure(s) set forth.

_____ _____

Printed Name of Participant Email Address

_____ _____

Signature of Participant Date

_____

APPENDIX C

Permission Letter to Recruit Participants

DEPARTMENT OF THE NAVY
SPACE AND NAVAL WARFARE SYSTEMS CENTER PACIFIC
53560 HULL STREET
SAN DIEGO, CA 92152-5001

3883
Ser 59000/1701
APR 1-7 2017

From: Commanding Officer, Space and Naval Warfare Systems Center Pacific
To: Gregory P. Negron, M.A.
Via: Willard R. Bonwit, Command and Control Department (Code 53000)

Subj: PERMISSION TO RECRUIT SSC PACIFIC EMPLOYEES AS SUBJECTS FOR RESEARCH SURVEY

1. I, Captain Gisele M. Bonitz, as Commanding Officer of Space and Naval Warfare Systems Center Pacific (SSC Pacific), give permission to Mr. Gregory Negron, M.A., Principal Investigator of the Command and Control (C2) Department to recruit volunteers from the SSC Pacific C2 Department for the research study entitled "The Development of Organizational Training: Identifying Generational Differences and Perceptions in Computerized Learning Systems in Government Organizations." Although recruitment may take place in SSC Pacific work spaces, all recruitment must take place during non-work time (i.e. before or after work hours or during an employee's lunch break.)

2. The surveys must follow the guidelines that are in the enclosed research protocol which has been approved by the Brandman University Institutional Review Board (BUIRB). Any deviation from the approved consent form, research study, and or research questions must be approved by Commanding Officer of Space and Naval Warfare Systems Center Pacific.

3. I further understand that participating in this research study is completely voluntary and those who consent to participate may withdraw their participation from the study at any time.

G. M. BONITZ

APPENDIX D

Synthesis Matrix

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Abbott, W. J. (1890). *The naval history of the United States* [Kindle version]. Retrieved from Amazon.com	X							
Anderson, D. L. (2015). *Organization development: The process of leading organizational change*. Thousand Oaks, CA: SAGE.								X
Anderson, D., & Anderson, L. A. (2010). *Beyond change management: How to achieve breakthrough results through conscious change leadership* (2nd ed.). San Francisco, CA: Pfeiffer.	X		X			X		
Anderson, L. A., & Anderson, D. (2010). *The change leader's roadmap: How to navigate your organization's transformation* (2nd ed.). San Francisco, CA: Pfeiffer.			X	X				
Bass, B. M. (with Bass, R.). (2008). *The Bass handbook of leadership: Theory, research, & managerial applications* (4th ed.). New York, NY: Free Press.			X		X			
Bennis, W. (2009). *On becoming a leader* (Rev. ed.). New York, NY: Basic Books.			X	X				

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Billington, D. D. (1996). Seven characteristics of highly effective adult learning. Retrieved from http://archive .education.jhu.edu/PD/newhorizons /lifelonglearning/workplace/articles /characteristics/index.html						X		
Birkman. (2016). *How generational differences impact organizations & teams* [Adobe Digital Editions version]. Retrieved from https://birkman.com/wp-content/uploads/2016/05/Generational-Differences-PDF.pdf					X			
Blair, P. (2016, September 3). Baby boomers vs. millennials. *The San Diego Union-Tribune*, p. 15.					X			
Boslaugh, D. L. (1999). *When computers went to sea: The digitization of the United States Navy*. Los Alamitos, CA: IEEE Computer Society Press.	X							
Bray, T. (2006). *The training design model*. London, England: Kogan Page Limited.							X	
Brown, P. C., Roediger, H. L., III, & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. Cambridge, MA: The Belknap of Harvard University Press.							X	X
Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York, NY: W. W. Norton & Company.	X	X						

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Chermack, T. J. (2011). *Scenario planning in organizations: How to create, use, and assess scenarios*. San Francisco, CA: Berrett-Koehler.		X						
Daly, E. W. (2011). *The effect of leadership in the delivery of information technology systems* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3531378)			X					
De Geus, A. (1988). Planning as learning. *Harvard Business Review*, *66*(2), 70-74.		X						
DePorter, B. (Ed.). (2000). *Discovering your personal learning style*. Oceanside, CA: Learning Forum.							X	
Dialogue. (n.d.). In *Merriam-Webster dictionary*. Retrieved from http://www.merriam-webster.com /dictionary/dialogue		X						
Elkins, D., & Pinder, D. (2015). *E-learning fundamentals: A practical guide*. Arlington, VA: ATD Press.							X	
Ellison, N. (2014). *Bridging the generation gap in the 148th fighter wing maintenance squadron* (Master's thesis). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 1573325)	X				X			
Enterprise Networking Solutions, Inc. (n.d.). Infrastructure solutions. Retrieved from http://www.ens-inc.com/services/infrastructure/				X				

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Ertmer, P. A., & Newby, T. J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science, 24*, 1-24. Retrieved from https://www.brown.edu/about /administration/sheridan-center/sites /brown.edu.about.administration .sheridan-center/files/uploads /ErtmerNewby1996_0.pdf								**X**
Foroohar, R. (2016, January 20). The 1 thing on everybody's mind at Davos 2016. *Time*. Retrieved from http://time .com/4186599/davos-2016-technology-jobs/				**X**				
Friedrich, R., Peterson, M., Coster, A., & Blum, S. (2010). *The rise of Generation C: Implications for the world of 2020*. Retrieved from Strategy& website: https://www .strategyand.pwc.com/media/file /Strategyand_Rise-of-Generation-C.pdf.pdf					**X**			
Haugen, D., & Musser, S. (2013). *The millennial generation: Opposing viewpoints*. Farmington Hills, MI: Greenhaven Press.					**X**			
Hawkins, J. B. (2011). *Bridging the knowledge gap: The effectiveness of compulsory computer-based training in federal employees' professional education* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3489818)						**X**		**X**

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Hermanson, K. (1996). Enhancing the effectiveness of adult learning programs. Retrieved from http://archive .education.jhu.edu/PD/newhorizons /lifelonglearning/workplace/articles /adult-learning-programs/index.html						X		
Hollis, E. T. (2014). *Leadership styles: A phenomenological study of transformational, transactional, and situational leadership styles employed by CIOs at military combatant commands* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3620687)		X	X					
Knight, M. H. (2016). *Generational learning style preferences based on computer-based healthcare training* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 10108947)						X	X	
Kogan, D., Khemani, D., Moazed, T., Leufgen, J., Laird, E., Derr, M., & Keefe, K. (2013). *Evaluation of the aging worker initiative: Final report*. Retrieved from U.S. Department of Labor, Employment and Training Administration website: https://wdr .doleta.gov/research/FullText_Documen ts/ETAOP_2013_19_Final_Report.pdf				X				

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Lee, W. W., & Owens, D. L. (2004). *Multimedia-based instructional design: Computer-based training, web-based training, distance broadcast training, performance-based solutions* (2nd ed.). San Francisco, CA: Pfeiffer.								**X**
Macdonald, J. (2006). *Blended learning and online tutoring: A good practice guide*. Burlington, VT: Gower.						**X**		
Marston, C. (2007). *Motivating "the what's in it for me?" workforce: Managing across the generational divide and increase profits*. Hoboken, NJ: J. Wiley & Sons.					**X**			
Meister, J. C., & Willyerd, K. (2010). *The 2020 workplace: How innovative companies attract, develop, and keep tomorrow's employees today*. New York, NY: HarperCollins.	**X**				**X**			
Miles, R. H. (1997). *Leading corporate transformation: A blueprint for business renewal*. San Francisco, CA: Jossey-Bass.		**X**	**X**					
Morris, I. (2010). *Why the west rules—for now: The patterns of history, and what they reveal about the future*. New York, NY: Farrar, Straus, and Giroux.	**X**	**X**						
Novelli, B. (2006). *50+: Igniting a revolution to reinvent America*. New York, NY: St. Martin's Press.				**X**				

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
Prensky, M. (2001). Digital native, digital immigrant. *On the Horizon*, *9*(5), 45-51. Retrieved from https://www .marcprensky.com/writing/Prensky%20- %20Digital%20Natives,%20Digital%20 Immigrants%20-%20Part1.pdf					**X**			
Ribes, D., & Finholt, T. A. (2009). The long now of technology infrastructure: Articulating tensions in development. *Journal of the Association for Information Systems*, *10*(5), 375-398.		**X**		**X**				
Schmidt, E., & Cohen, J. (2013). *The new digital age: Reshaping the future of people, nations and business*. New York, NY: Alfred A. Knopf.	**X**	**X**	**X**					
Schwartz, P. (1991). *The art of the long view*. New York, NY: Doubleday.		**X**						
Senge, P. M. (2006). *The fifth discipline: The art & practice of the learning organization*. New York, NY: Doubleday.		**X**			**X**			
Smith, B. A. (2016, January 26). Class teaches the generations to communicate at work. *Idaho Business Review*. Retrieved from http://idahobusinessreview.com/2016/01 /26/class-teaches-how-different- generations-can-communicate-at-work/					**X**			
Stockton, W. (1981, June 28). The technology race. *New York Times*, pp. 1-6. Retrieved from www.nytimes.com				**X**				
Stolovitch, H. D., & Keeps, E. J. (2011). *Telling ain't training* (2nd ed.). East Peoria, IL: ASTD Press.							**X**	

Reference \ Topic	Naval History & Technology	New Technology Challenges in Learning Organizations	Leader Roles in Supporting New Technology	Technological Advances Forcing Organizational Change	Generational Learning Groups	Learning Style Preferences	Learning Theories	The Technology Gap
U.S. Department of Labor, Employment and Training Administration. (2016). High growth industry profile: Information technology. Retrieved from http://www.doleta.gov/BRG/IndProf/IT_profile.cfm				**X**				
Zemke, R., Raines, C., & Filipczak, B. (2000). *Generations at work: Managing the clash of veterans, boomers, Xers, and nexters in your workplace*. New York, NY: AMACOM.					**X**			
Zetter, K. (2014, November 3). An unprecedented look at Stuxnet, the world's first digital weapon. *WIRED*. Retrieved from https://www.wired.com/2014/11/countdown-to-zero-day-stuxnet/		**X**						

APPENDIX E

Brandman IRB Approval

BRANDMAN University Chapman University System

BRANDMAN UNIVERSITY INSTITUTIONAL REVIEW BOARD

IRB Application Action – Approval

Date: 4/21/2017

Name of Investigator/Researcher: Gregory P. Negron

Faculty or Student ID Number: B00321884

Title of Research Project:

The Development of Organizational Training: Identifying Generational Differences and Perceptions in Computerized Learning Systems in Government Organizations

Project Type: [✓] New [ ] Continuation [ ] Resubmission

Category that applies to your research:

- [✓] Doctoral Dissertation EdD
- [ ] DNP Clinical Project
- [ ] Masters' Thesis
- [ ] Course Project
- [ ] Faculty Professional/Academic Research
- [ ] Other:

Funded: [✓] No [ ] Yes

(Funding Agency; Type of Funding; Grant Number)

Project Duration (cannot exceed 1 year): 1 year

Principal Investigator's Address: 10390 Westchester Ave, San Diego, CA 92126

Email Address: negr2801@mail.brandman.edu Telephone Number: (619) 335-0977

Faculty Advisor/Sponsor/Chair Name: Dr. Carlos Guzman

Email Address: cguzman@brandman.edu Telephone Number: (949) 903-2058

Category of Review:

[ ] Exempt Review [✓] Expedited Review [ ] Standard Review

☑	I have completed the NIH Certification and included a copy with this proposal
☐	NIH Certificate currently on file in the office of the IRB Chair or Department Office

Signature of Principal Investigator: Gregory Negron Digitally signed by Gregory Negron Date: 2017.04.21 14:20:32 -07'00' Date: 4/21/17

Signature of Faculty Advisor/ Sponsor/Dissertation Chair: Carlos Guzman Digitally signed by Carlos Guzman Date: 2017.04.21 13:11:11 -07'00' Date: 4/21/17

BRANDMAN UNIVERSITY INSTITUTIONAL REVIEW BOARD
IRB APPLICATION ACTION – APPROVAL
COMPLETED BY BUIRB

IRB ACTION/APPROVAL

Name of Investigator/Researcher: Gregory P. Negron

☐ Returned without review. Insufficient detail to adequately assess risks, protections and benefits.

☐ Approved/Certified as Exempt form IRB Review.

☑ Approved as submitted.

☐ Approved, contingent on minor revisions (see attached)

☐ Requires significant modifications of the protocol before approval. Research must resubmit with modifications (see attached)

☐ Researcher must contact IRB member and discuss revisions to research proposal and protocol.

Level of Risk: ☐ No Risk ☑ Minimal Risk ☐ More than Minimal Risk

IRB Comments:

IRB Reviewer: Michael Moodian Digitally signed by Michael Moodian DN: cn=Michael Moodian, o=Brandman University, ou, email=moodian@brandman.edu, c=US Date: 2017.04.28 11:48:35 -07'00'

Telephone: _____ Email: _____

BUIRB Chair: Doug DeVore Digitally signed by Doug DeVore DN: cn=Doug DeVore, o=Brandman University, ou, email=ddevore@brandman.edu, c=US Date: 2017.04.28 11:49:49 -07'00' Date: 04-28-17

REVISED IRB Application ☐ **Approved** ☐ **Returned**

Name: _____

Telephone: _____ **Email:** _____ **Date:** _____

BUIRB Chair: _____