Baby Boomer Perceptions and Experiences of Instructional Technology:

A Descriptive Phenomenological Study

Brianne J. Mangione

Dissertation Submitted to the Doctoral Program

of the American College of Education

in partial fulfillment of the requirements for the degree of

Doctor of Education in Curriculum and Instruction

June 2021

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Brianne J. Mangione

Approved by:

Dissertation Chair: Richard Herring, Ph.D.

Committee Member: Sarah Everts, Ph.D.

Abstract

Previous research on the implementation of instructional technologies has been conducted at the elementary, secondary, and college levels. Scholars have categorized college-age students as traditional or non-traditional, with the differentiation occurring at age 25. Little research has been done on specific populations of college students, particularly baby boomer community college students. As colleges serve a wide demographic of students, understanding the baby boomer generation's experiences with and perceptions of instructional technology is important. The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. Both the cognitive theory of multimedia learning and technology acceptance model were used to guide the study. The sample size consisted of 18 baby boomer community college students enrolled at the chosen community college and who had no relationship with other individuals involved in the research. Semistructured interviews, which were video and audio recorded using Zoom software, were used to gather information from the participants. Interviews were transcribed, and a copy of the transcript was sent to each associated participant as part of a member-checking process. Data results indicated many adult students who are older have positive perceptions of instructional technology but desire a balance between technological teaching methods and traditional teaching methods. Such findings may provide information to college professionals on how to better engage an older demographic of students and promote future research on the topic.

Keywords: baby boomers, community college, instructional technology, phenomenological, qualitative

Dedication

This dissertation is dedicated to my mom, my dad, and my husband. To my mom, thank you for being my first teacher and first educational supporter; you've instilled the importance of education in me. To my dad, thank you for teaching me the value of working hard, staying disciplined, and always striving to do better. To my husband, thank you for believing in me; I wouldn't have made it nearly as far as I have if it wasn't for your constant support, encouragement, and love.

Acknowledgments

I would like to thank my friends and family, old and new, for all the kind words and well wishes throughout my doctoral journey. They have all helped to inspire me and cheer me on. I have also greatly appreciated the guidance and direction from my chair, Dr. Herring, as well as from my committee member, Dr. Sally. I will forever be grateful for their patience, kindness, and expertise.

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Chapter 1: Introduction

Community colleges serve a variety of students from diverse backgrounds. College students differ not only in race and ethnicity but also in age and socioeconomic status (Margarit & Kennedy, 2019). The American Association of Community Colleges (2014) stated the number of students who were older than traditional-age students was expected to increase over time.

Research on instructional technology and college students has led to an increase in the implementation of instructional technology (Elaldı, 2018). Narrowing research on the topic may benefit specific age groups and populations in higher education. The background and statement of the problem provide information related to the importance of research on the issue. A rationale for research is included in the purpose of the study and possible benefits are included in the significance of the study. Guides for the research include the research questions and the theoretical framework. Definitions of terms and phrases used throughout the research are provided. The assumptions, scope and delimitations, and limitations provide a description of the research, identify boundaries of the research, and describe pertinent limitations related to the study.

Background of the Study/Problem

Multiple generations of students, including those who belong to the following designations—baby boomers, Generation X, millennials, and Generation Z—attend community colleges. Kasworm (2018) argued adults who are older are either attending or returning to higher education. Reasons adults who are older might be participating in college courses include a desire to complete a degree, internal motivation to overcome a fear of failure, and a desire to set an example for younger populations (Helterbran, 2017). While older groups have little experience with technology in school settings, younger students are more familiar with

instructional technologies (Czaja, 2019). Instructional technologies currently used in the classroom include smart boards, online learning management systems (LMSs), and electronic slideshow presentations (Florenthal, 2018).

The background of the problem is individuals from different generations vary in learning styles. Adults who are older prefer hands-on experiences and activities for learning, whereas younger adults prefer technological tools and methods of instruction (Urick, 2017). As individuals who are part of Generation Z comprise traditional-age college students, technological approaches to teaching have led instructors to implement instructional technologies in the classroom (Elaldı, 2018). Czaja (2019) found adults who are older have positive perceptions about trying technologies but often display low self-confidence using technologies. As baby boomers typically fall into the category of digital immigrants, who are adults born before the surge of technology, scholars have found adults who are older prefer traditional methods of communicating with others and learning new information (Colbert et al., 2016). For this study, baby boomers were defined as individuals born between 1946 and 1964 (Moody, 2017).

Statement of the Problem

The problem was baby boomers struggle with adapting to instructional technologies. Czaja (2019) found, though adults aged 55 or older typically used technology to a lesser extent than younger adults, adults who are older tended to be perceptive of technologies and needed proper training and instruction. Studies of instructional technologies at the higher education level have generalized college students without differentiation of age categories, and a gap in research was identified for community college baby boomer students (Cummins et al., 2018). A lack of research on the use of instructional technology to engage baby boomers at the higher education level existed.

Cummins et al. (2018) noted prior research on college students was mostly focused on students younger than 25 years of age, and a gap in research exists for students older than age 25. As colleges serve students of a variety of ages, Kasworm (2018) further argued age categories in prior research were inconsistent and often covered a large range of students rather than narrowing the categories. Specificity in research subjects is important when studying a phenomenon, as individuals from one age group may perceive and experience the world differently than another age group. As a gap existed in research on the matter, studying baby boomer community college students' perceptions of instructional technology and the associated effects on classroom engagement led to a reduction in the research gap.

Purpose of the Study

The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. As research on instructional technology at the college level did not differentiate age groups, a gap existed pertaining to the baby boomer generation. The findings contributed to the understanding of the perceptions of baby boomer students regarding instructional technology and classroom engagement.

Research was conducted at a community college in northern Illinois, which will be referred to as Wilson College to protect the identity of participants. Following a phenomenological qualitative approach, an interview was the means of data collection (Merriam & Tisdell, 2016). The interview was conducted virtually. Member checking was performed by emailing a copy of the transcript from the interview to each respective participant for review. Results may be shared with local community college leaders and administration as well as faculty and instructional designers to contribute to the knowledge base and reduce the gap in

research on baby boomer college students and instructional technology.

Significance of the Study

Studying the perceptions and experiences of baby boomers may provide instructional designers and instructors with information to appropriately engage students of varying demographics, specifically adults who are older in the baby boomer generation. As a gap in research existed regarding the baby boomer generation and instructional technology at the college level, results may lead to a positive social change by providing faculty with information on best practices for increasing classroom engagement for a diverse group of learners (Cummins et al., 2018). The present research may also promote future research on the matter by professionals working in higher education institutions.

Information from the phenomenological research on the perceptions and experiences of baby boomers with instructional technology may also be shared with college leaders and administration. Leaders and administrators in higher education may then emphasize the importance of providing quality education to a retiring population (Helterbran, 2017). An outcome might include changes in community college policy to provide accessible and appropriate content for all student learners.

Research Questions

The research questions served as the focus of the phenomenological qualitative research study. As phenomenological studies are conducted to uncover an understanding of phenomena, an interview was used to answer the research questions (Webb & Welsh, 2019). The research questions, derived from the problem statement and purpose of the study, were as follows:

Research Question 1: What are the experiences and perceptions of baby boomer community college students regarding the use of instructional technologies?

Research Question 2: How does the use of instructional technology affect classroom engagement, according to baby boomer experiences and perceptions?

Theoretical Framework

The cognitive theory of multimedia learning (CTML) and technology acceptance model (TAM) were used to create the theoretical framework, which served as a guide for the phenomenological research. Developed by Richard Mayer in 2001, the CTML focuses on the implementation of both audio and visual tools for instruction (Sezgin & Coskun, 2016). Consisting of three principles, the CTML is centered on the idea the video channel and audio channel separately have a limited capacity and using both simultaneously maximizes an individual's capacity to learn and process information (Bhatti et al., 2017). The TAM, developed by Fred Davis as an adaptation to the theory of reasoned action, is focused on students' perceptions of technology (Buabeng-Andoh, 2018). Asiyah et al. (2018) found individuals had an increased motivation to learn in digital settings when perception of usefulness and ease of use of technology were high. Elements of the framework were explored during the interview process and were closely aligned with the research questions regarding individuals' perceptions and experiences.

Definitions of Terms

Significant terminology used throughout the research process are defined. Definitions are included to aid in understanding common terms and phrases used throughout the research process. The aim of defining significant terminology is to reduce confusion and improve clarity of content.

Andragogy. Andragogy is a theory focused on adult learners and adult education (Karabacak, 2018).

Baby Boomers. Baby boomers were born between 1946 and 1964 (Moody, 2017).

Cognitive Theory of Multimedia Learning (CTML). The CTML is a theory focused on the use of visual and auditory tools for instruction, developed by Richard Mayer in 2001 (Sezgin & Coskun, 2016).

Digital Immigrants. Digital immigrants were born before the surge of technology (Howlett & Waemusa, 2018).

Digital Literacy. Digital literacy is the ability to read, understand, and deliver information through technology (Kaeophanuek & Na-Songkhla, 2019).

Digital Natives. Digital natives are experienced and competent with technology (Judd, 2018).

Generation X. Generation X were born between 1964 and 1980 (Shadle, 2016).

Generation Z. Generation Z were born between 1995 and 2012 (Chicioreanu & Amza, 2018).

Instructional Technology. Instructional technology encompasses technologies used in education to thoughtfully aid in the teaching and learning process (Sullivan et al., 2018).

Millennials. Millennials were born between 1981 and 1994 (Shadle, 2016).

Multimedia Learning. Multimedia learning involves learning with materials that incorporate both visual and auditory aspects (Liew & Tan, 2016).

Pedagogy. Pedagogy is a theory focused on children as learners or students who learn from a teacher-centered approach (Adebisi & Oyeleke, 2018).

Technology. Technology encompasses digital devices or programs used for the sharing of information (Dees et al., 2017).

Technology Acceptance Model (TAM). The TAM is a theory focused on an individual's

perception of technology, developed by Fred Davis in 1985 (Buabeng-Andoh, 2018).

Assumptions

Study assumptions, the truth of which could not be demonstrated, are clarified and the necessity and unavoidability of the assumptions are described. The first assumption is the participants answered interview questions with honesty and openness. Phenomenological research focuses on how participants perceive the world and experiences rather than what is objective (Merriam & Tisdell, 2016). Another assumption is the subjects chose to participate voluntarily and without external incentives. Study assumptions were necessary because subjects volunteered to participate and understood the benefits and risks of the research when signing the consent form.

Scope and Delimitations

The scope of the study was limited to baby boomer community college students at Wilson College in northern Illinois. An interview was used to allow participants to express their perceptions of and experiences with instructional technology. Research was conducted on participants who had been enrolled at the institution during either the 2018–2019 or 2019–2020 school year. Phenomenological qualitative research was used, allowing participants to share lived experiences from a subjective standpoint rather than an objective point of view (Merriam & Tisdell, 2016). The potential effect of scope and delimitations of the study is participants from one community college in northern Illinois were studied, whereas other baby boomer community college students were not included in the research. Research results are not transferable to other contexts for baby boomer community college students.

Limitations

Limitations include the responses from participants, which were subjective in nature. As *credibility* refers to how closely results of research match reality, participants were encouraged to respond to questions in an honest and open manner (Creswell & Poth, 2018). Merriam and Tisdell (2016) described *dependability* as how consistent research results are with collected data. To avoid issues with dependability, member checking was performed with participants. A limitation to member checking is participants might have perceived the phenomenon differently during member checking than during the initial interview.

Transferability is concerned with how well research may apply in other contexts (Amankwaa, 2016). As phenomenology is subjective and the sample size was small, results are not transferable in multiple contexts. *Confirmability* refers to accurate results shaped by subjects and not by researcher bias (Amankwaa, 2016). Before the research took place, a bracketing strategy was used to remove previous biases and beliefs about the phenomenon studied. As the semistructured interviews required dialogue between the interviewer and the interviewee, efforts were made to avoid interviewer error or influence on the subjects.

Chapter Summary

An introduction and overview were included to provide an understanding of the background and statement of the problem of a lack of research on engaging baby boomers in higher education using instructional technology. As a gap existed regarding baby boomers' perceptions of instructional technology, an outcome of the study was a reduction of the gap in research. Increasing the amount of research on the matter may promote further research in related areas and may lead to a social change within higher education (Cummins et al., 2018).

Two research questions were identified to serve as guides for the study and were

qualitative in nature to discover the lived experiences and perceptions of participants (Webb &

Welsh, 2019). The research questions focused on experiences of baby boomers with instructional

technology, baby boomers' perceptions of instructional technology, and how baby boomers

perceived instructional technology to affect classroom engagement. The CTML and TAM were

introduced as guides for the research. Terms were identified and defined to provide clarification

and ease of reading throughout the research.

Two assumptions were described and clarified regarding participant honesty and

willingness to participate. The scope and delimitations included the research site and the

subjective nature of the participant responses due to the phenomenological design of the study

(Merriam & Tisdell, 2016). Limitations included the possibility of differences among

participants' original responses to the interview questions and member checking performed at a

later time. The chapter introduced the study, and the following chapter includes a review of

relevant literature.

Chapter 2: Literature Review

Colleges serve students from a diverse set of backgrounds, including those of diverse age, race, ethnicity, sexual orientation, religion, political stance, and socioeconomic status. In 2014, the American Association of Community Colleges (as cited in Zeit, 2014) stated a vast majority of community college students are over 22 years of age, and the number of students in their mid-20s is expected to increase. While literature regarding baby boomers in the workforce exists, limited research has been conducted on baby boomers in higher education courses.

The problem was baby boomers struggle with adapting to instructional technologies. The background of the problem was individuals from different generations vary in learning styles. Urick (2017) stated adults who are older, specified in his study as being born between 1934 and 1965, preferred hands-on approaches, whereas younger adults, those born between 1976 and 1987, preferred the use of technology. The extent of the problem was, multiple generations attend community college, including baby boomers, Generation X, millennials, and Generation Z, though most researchers separate students as either traditional (under 25 years of age) and non-traditional (25 years of age and older) adult learners (Brinthaupt & Eady, 2014). While discrepancies exist regarding cutoff dates defining generations, Shadle (2016) defined baby boomers as those born the decade after the conclusion of World War II, Generation X as those born between 1963 and 1980, and millennials as those born between 1981 and 1994. Chicioreanu and Amza (2018) defined those who were born between 1995 and 2012 as Generation Z or iGen, and noted Generation Z was the first generation to have grown up surrounded by smartphones.

A gap existed in the literature regarding the use of instructional technologies to engage students from the baby boomer generation, which includes anyone born between 1946 and 1964 (Moody, 2017). Previous research was conducted primarily on baby boomers in the workforce

and baby boomers' perceptions and characteristics in comparison to those of other generations (Rickes, 2016). Research on instructional technologies focused mainly on elementary-level students or on the perspectives of teachers utilizing instructional technologies (Liu et al., 2017; Masullo, 2017). Regarding higher education, little research has been conducted on the baby boomer generation's perceptions and experiences of instructional technologies at the community college level. The present research addressed the problem and decreased the gap in research.

The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. The research was conducted to bring awareness to higher education instructors and instructional designers of the perceptions and experiences of older community college students regarding the use of instructional technology. If research were not conducted, student engagement in the classroom may not be as high as desired by community college instructors.

Studying baby boomers' perceptions of and experiences with instructional technology may contribute to the knowledge base by allowing community college instructors and instructional designers to understand which types of technologies are useful for engaging baby boomer college students. Results will be shared with instructional designers and community college instructors to aid in the creation of workshops and trainings for community colleges in northern Illinois. By presenting the experiences of students with instructional technologies, instructors may be informed on teaching and learning strategies to implement in the classroom. As a result of the study, those informed may be well equipped with the knowledge to create classroom designs that allow for proper and appropriate use of instructional technologies that engage a variety of students (Saulnier, 2015).

Included in Chapter 2 are a description of strategies used to search for literature and the theoretical framework that guided the research. A detailed review of recent and relevant literature related to adults who are older in higher education, andragogy versus pedagogy, adults who are older and technology, digital immigrants and digital natives, multimedia learning, instructional technology, teacher perceptions of instructional technology, and student perceptions of instructional technology is also included. The following main sections are found in the chapter: literature search strategy, theoretical framework, research literature review, and chapter summary.

Literature Search Strategy

The literature search strategy section includes articles that support the chosen theoretical framework and literature review topics. A list of the search engines and libraries used for searching relevant literature is provided. Also included is a list of keywords and themes used for researching literature. The keywords and themes were searched individually and in combination to produce different results, some of which were narrowed and focused, others of which were broad.

The American College of Education's MyAthens access to the EBSCO Discovery Service database was used to search many of the keywords and themes for the literature review, as well as for other sections of the study. The EBSCO Discovery Service was chosen as the primary search engine for the study as EBSCO provides access to various peer-reviewed, full-text journal articles. EBSCO Discovery Service also provided access to ERIC, ProQuest, and the Directory of Open Access Journals when EBSCO did not directly have access to peer-reviewed, full-text journal articles. Other search engines used for research include Google Scholar and ResearchGate, though EBSCO Discovery Service was primarily used to ensure the articles and

sources were credible and trustworthy.

Keywords and themes were searched using the search engines in order to gather information on various topics surrounding the study to support the theoretical framework and literature review. The following keywords and themes were searched to support the theoretical framework: *cognitive theory of multimedia learning*, *multimedia learning*, and *technology acceptance model*. The following keywords and themes were used to support the literature review and were searched individually or in combination to narrow the results: *traditional students*, *non-traditional students*, *baby boomer generation*, *community colleges*, *adults who are older*, *adult learning theory*, *instructional technology*, *multimedia learning*, *classroom*, *technology*, *enrollment*, *engagement*, *activities*, *qualitative*, *phenomenology*, *online education*, *perceptions*, *motivation*, *digital immigrants*, *digital natives*, *digital literacy*, *digital divide*, *gamification*, *social media*, *Facebook*, and *Twitter*.

Theoretical Framework

The theoretical framework, based on a theory and a model, served as the guide for the study. The theory and model used were the CTML and the TAM. The focus of CTML is on using both visual and audio tools for teaching and learning (Sezgin & Coskun, 2016). An individual's perception of the usefulness and ease of use of technology are components of the TAM (Buabeng-Andoh, 2018). Both the theory and the model guided the review of research literature, as well as the study's research design.

Cognitive Theory of Multimedia Learning

The theory used for the theoretical framework was the CTML, developed by Richard Mayer in 2001 (Sezgin & Coskun, 2016). The development of the CTML was inspired by three previous theories: the working memory model (Baddeley, 2003), the cognitive load theory

(Sweller et. al, 1998), and the dual coding theory (Paivio, 1991). The CTML consists of three

learning principles: (a) dual channel, (b) limited capacity, and (c) active processing (Geok Tin et

al., 2018). According to the first principle (dual channel), two channels (audio and visual) are

used for processing information. The idea a limitation exists for each channel is the second

learning principle (limited capacity). Each channel may process only a specific amount of

information at a given time. The idea learning is an active process that requires the integration of

the information received and processed by both channels is the focus of the third learning

principle, which is active processing (Bhatti et al., 2017). Figure 1 is a display of the integration

of the visual channel and the audio channel according to the cognitive theory of multimedia

learning.

Figure 1

Integration of Dual Channels in the Cognitive Theory of Multimedia Learning
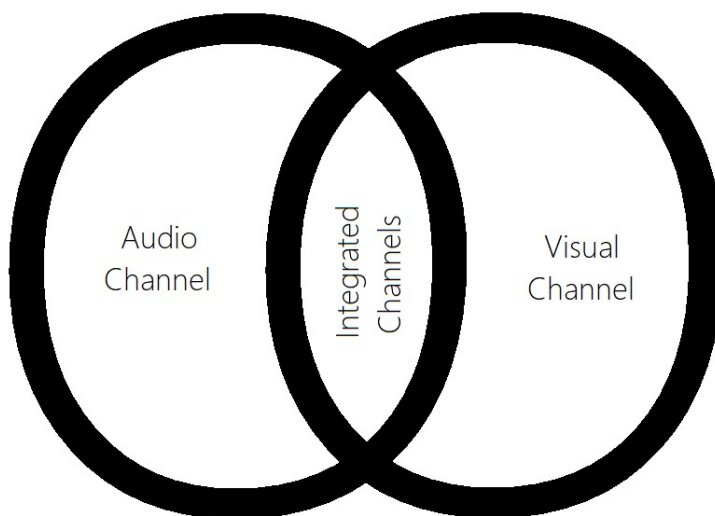
To utilize both the audio and visual channels for learning via the CTML, multimedia instruction for teaching and learning requires the use of both words and pictures (Dousay, 2016). Rudolph (2017) provided a list of graphic examples, including maps, photos, videos, graphs, and animations, and stated a combination of graphics with words (either spoken or through print/text) produces a multimedia means of instruction for teaching and learning. Bhatti et al. (2017) argued multimedia learning may also include instructional technologies and technology-centered education. The CTML guided the study for understanding instructional technology as a multimedia tool for teaching and learning.

Technology Acceptance Model

The model used for the theoretical framework was the TAM. Davis developed the TAM in 1985 as an adaptation of the theory of reasoned action, developed by Fishbein and Ajzen in 1975 (Buabeng-Andoh, 2018; Lin et al., 2018; Mallya & Lakshminarayanan, 2017; Weerasinghe, 2017). The TAM consists of multiple components, including perceived usefulness (PU), perceived ease of use (PEOU), attitude towards the technology (ATT), behavioral intention (BI), and actual use (AU; Binyamin et al., 2019; Mallya & Lakshminarayanan, 2017). Though the TAM consists of five components, research has been on PU and PEOU and how the other three components (ATT, BI, and AU) affect PU and PEOU (Mallya & Lakshminarayanan, 2017). An individual's intention to use a particular technology, according to the TAM, is affected by PU and PEOU (Siegel et al., 2017). Figure 2 is a display of the factors that affect actual use of technology, according to the technology acceptance model.

Binyamin et al. (2019) found the following factors affected perceived ease of use of technology: (a) content quality, (b) system navigation, (c) ease of access, (d) system interactivity, (e) instructional assessment, and (f) system learnability. Mallya and Lakshminarayanan (2017)

argued behavioral intention was closely associated with students' perceived usefulness of

technology in academic settings. Asiyah et al. (2018) found high levels of PU and PEOU greatly

increased motivation of students to participate and be engaged in e-learning settings. The TAM

guided the study for understanding how individuals' perceptions of both the usefulness of

technology and the ease of use of technology affected engagement in academic settings.

spacing

Figure 2

Components of Technology Acceptance Model Affecting Actual Use
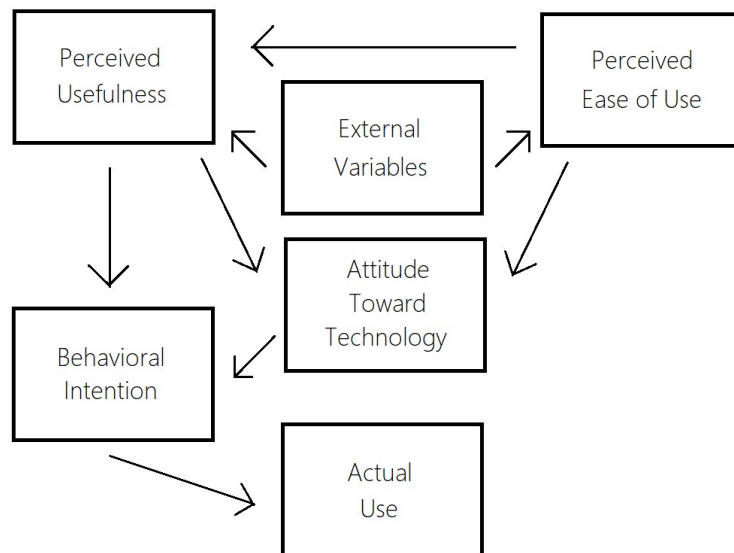
Research Literature Review

A review of literature was conducted on a variety of topics related to adults who are older

in higher education, adults who are older and technology, digital immigrants and digital natives,

multimedia learning, instructional technology, teacher perceptions of instructional technology,

and student perceptions of instructional technology. A gap in the literature was identified

regarding adults who are older in higher education (Cummins et al., 2018). Research on baby

boomers' experiences with and perceptions of technology may benefit universities by providing

information on how to properly embrace retiring baby boomers and provide high-quality

education (Helterbran, 2017).

Adults Who are Older in Higher Education

Kasworm (2018) studied the history of adult participation in higher education and found

adults participated as students in higher education institutions during Colonial America times as

colleges were accessible to those who were qualified. The decrease of adult students during the

Civil War and post-Civil War eras was due to lack of time and funds to support adult learners in

higher education (Kasworm, 2018). When the Serviceman's Readjustment Act, also known as

the GI Bill, was introduced after World War II, the number of adult students in higher education

increased dramatically, forcing higher education institutions to meet the needs of both younger

and older students (Kasworm, 2018). Kasworm argued the increase in veteran adult students was

temporary, and enrollment of adult veterans eventually decreased, which led to colleges reverting

to serving a younger student population and therefore excluding adult students. Since the 1980s,

the focus of higher education has shifted, and adult students are again quite prevalent in higher

education (Kasworm, 2018). While research regarding adult students is not lacking, Kasworm

argued little and unclear distinction has been made among adult students of various ages.

Much research has been conducted on college students of two age categories: those under

25 years of age, classified as traditional students, and those 25 years of age and older, classified

as non-traditional students (Alshebou, 2019). Regarding mature students, researchers have

typically studied individuals in the age range of 20–30 (Imlach et al., 2017). Helterbran (2017)

conducted research to understand why adults who are older, such as baby boomers, participate in

higher education courses and identified three main reasons: unfinished business, "cutting the

mustard" (p. 15), and a sense of legacy.

According to the unfinished business theme, adults who are older did not have the opportunity to attend college at a younger age due to family needs or pressures of work, feeling a long-time desire to go to or return to college (Helterbran, 2017). Helterbran (2017) found the "cutting the mustard" theme emerged from older students who felt attending college to earn a degree was necessary in order to meet expectations of others or to overcome fear of failure. Helterbran also found other adults who are older felt leaving a legacy for younger students was important by setting an example of lifelong learning and achievement.

Cummins et al. (2018) studied possible reasons why adults attend college at an older age and found adults who are older believed credentials and degrees to be important for obtaining and maintaining careers in the workforce. Cummins et al. also suggested adults who are older might be motivated to participate in higher education as proof of character, work ethic, and motivation to employers. Adults who are older and seeking to maintain employment displayed positive character qualities and traits in order to keep employment status (Cummins et al., 2018). Helterbran (2017) found another reason for attending college as an adult who was older was the incentive to keep the mind engaged in challenging activities. Imlach et al. (2017) argued adults who are older can be academically successful by participating in ongoing activities that are cognitively stimulating.

Andragogy Versus Pedagogy

In the early 1970s, Malcom Knowles developed the theory of andragogy, typically associated with adult learners and adult education (Galustyan et al., 2019; Karabacak, 2018; Portugal, 2015). *Pedagogy* differs from *andragogy* children as learners, or students who learn mainly from a teacher-centered approach, are the focus of pedagogy (Adebisi & Oyeleke, 2018). Dole et al. (2016) discussed the importance of changing teaching and learning practices from a

teacher-centered approach to a learner-centered approach, a method more closely associated with adult learners.

Portugal (2015) found adult learners preferred learning opportunities that allowed adults to apply knowledge to real-world situations. Dole et al. (2016) suggested learner-centered approaches to teaching allow students to make connections and applications to life outside the classroom. By bringing personal experiences into the classroom, students can be more fully engaged in class and intrinsically motivated academically (Karabacak, 2018). In a learner-centered approach, the instructor becomes more of a facilitator who guides students in the learning process than a traditional teacher who disseminates all the information to the students (Adebisi & Oyeleke, 2018; Portugal, 2015).

Kasworm (2018) argued pedagogy and andragogy focus more on instructional principles than on the age of the learner. Andragogy can be applied to young learners and adult learners alike (Kasworm, 2018). Instead of being mutually exclusive, principles of both pedagogy and andragogy can be applied in the classroom in a blend of teacher-directed and self-directed learning (Adebisi & Oyeleke, 2018). Andragogy is typically viewed as an adult learning theory because the main components are more commonly associated with adults than with children (Sharifi et al., 2017).

Karabacak (2018) discussed Knowle's six main components of andragogy: (a) need to know, (b) self-concept, (c) role of the experience, (d) readiness to learn, (e) orientation to learning, and (f) motivation. Each of the main components sets andragogy apart from pedagogy because each component is typically more characteristic of adults and aids in the goal of adult education, which is self-actualization (Adebisi & Oyeleke, 2018; Sharifi et al., 2017). Knowle's six components of andragogy may be applied to face-to-face classes as well as online classes

(Adebisi & Oyeleke, 2018).

The first three components of andragogy focus on the learner, whereas the last three components focus on the learning (Karabacak, 2018). According to Karabacak (2018), the first component of andragogy, need to know, is focused on the importance of adults knowing the reason for learning prior to the commencement of the learning process. The second component, self-concept, requires individuals to move from a dependent approach to learning to a self-directed approach in which the adult takes responsibility for behaviors and decisions (Adebisi & Oyeleke, 2018; Karabacak, 2018). Role of the experience, the third component of andragogy, is focused on the use of adults' prior experiences to aid in the learning process (Adebisi & Oyeleke, 2018).

Karabacak (2018) identified the fourth component of andragogy, readiness to learn, as increasing as a learner understands the importance of learning specific skills to appropriately handle real-world issues. Orientation to learning, the fifth component of andragogy, is focused on the adult's shift from subject-centered learning to problem-centered learning to immediately address real-life challenges instead of waiting for prior content knowledge to become applicable (Adebisi & Oyeleke, 2018; Karabacak, 2018). According to Adebisi and Oyeleke (2018), the last component of andragogy, motivation, increases as an individual matures and responds to both internal and external motivators, such as better jobs, job satisfaction, higher salaries, and self-respect.

Adults Who are Older and Technology

The Center for Research and Education on Aging and Technology Enhancement (CREATE) was developed to explore adults who are older who had interactions with various technologies (Czaja, 2019). Czaja (2019) wrote CREATE focuses on adults who are older who

interacted and used technologies, allowing those within the organization to examine issues regarding training, technology design, technology uptake, attitudes toward technology, and usability. Czaja also mentioned one of CREATE's goals was to educate adults who are older on the benefits of using technology as well as to ensure technology was useful and usable by the population of adults who are older.

Román-García et al. (2016) found fewer individuals aged 55 or older tended to use technologies in comparison to the rest of the population. Some adults who are older also have limited access to technologies. Though adults who are older seem to be perceptive of technologies and view the use of technologies to be beneficial, many adults who are older exhibit low levels of self-efficacy and confidence with using technologies (Czaja, 2019). Technologies may be useful for adults who are older in providing knowledge, recreational, and communication opportunities, as well as applications for safety and support. Czaja (2019) argued the digital divide will continue to prevail if adults who are older are not considered an important user group of digital technologies.

Digital Immigrants and Digital Natives

Coined by Prensky in 2001, individuals are classified as either *digital immigrants* or *digital natives* (Ehiobuche & Justus, 2016; Rosli et al., 2016). Colbert et al. (2016) stated digital immigrants include adults who have accepted, adopted, and are comfortable with technology. Though individuals who were born during the surge of technology are considered digital natives, while those born before the surge of technology are considered digital immigrants, Howlett and Waemusa (2018) argued the terms should be defined not by birth year but by amount of experience with technology. For example, Judd (2018) identified digital natives as those who are not only experienced with using technology but also competent.

The differences between digital natives and digital immigrants have been identified as the *digital divide* and has been studied in terms of both workforce and academic settings (Howlett & Waemusa, 2018; Román-García et al., 2016). Whereas digital immigrants typically have traditional ways of communicating with others and learning, digital natives are comfortable using technologies for communication, entertainment, and learning (Colbert et al., 2016). Salazar-Márquez (2017) compared digital immigrants learning how to use technology to individuals learning a new language. Though digital immigrants have the capability to adapt to technology, old traditions are still valued and sometimes even preferred (Salazar-Márquez, 2017). Román-García et al. (2016) found many adults and elders fell into the digital immigrant category and used fewer technologies than younger populations, supporting the need for digital literacy.

Digital literacy, according to Kaeophanuek and Na-Songkhla (2019), requires an individual to read, understand, and deliver information via common technological systems used in education. Soysal et al. (2019) found adults who achieved higher levels of education exhibited higher levels of technological skills than adults with lower levels of education. Salazar-Márquez (2017) postulated once digital immigrants achieved digital literacy through mastery of technologies, their academic achievement scores were similar to those accomplished by digital natives. Khromov and Kameneva (2016) suggested digital literacy can be broken down into subcategories of literacies that focus on communicating with others via words, images, and multimedia products.

Texting literacy requires individuals to understand texting language, such as abbreviations and acronyms, as well as knowing when to appropriately use the abbreviations and acronyms (Khromov & Kameneva, 2016). In educational settings in which social media and

online platforms are used, texting literacy may be beneficial. Gaming literacy necessitates individuals to understand how to navigate games and online worlds. When instructors utilize gamification as a form of teaching and learning, gaming literacy may benefit learners (Khromov & Kameneva, 2016). Visual, media, and multimedia literacy requires an individual to understand how multimedia can be used to either supplement or replace text communication. As the presence of technology increases in education, visual, media, and multimedia literacy is important. Kaeophanuek and Na-Songkhla (2019) argued cognitive skills play an important role in developing digital literacy. By educating students on how to use critical thinking skills to learn and use technologies, teachers can assist students in achieving digital literacy (Salazar-Márquez, 2017).

Multimedia Learning

Multimedia learning involves the use of materials that utilize both visual and verbal aspects for teaching and learning (Bhutto et al., 2018; Liew & Tan, 2016). Benefits of multimedia include an increase in the understanding of course content as well as an increased interest in course content (Fayanto et al., 2019). Regarding oral production skills for reading and speaking, Muslem and Abbas (2017) found multimedia-immersive learning enhanced student performance and consequently increased students' reading and speaking skills. Multimedia learning can enhance the learning process for English-language learners (Shadiev et al., 2018). Students who participate in classes that utilize technology can benefit from multimedia learning to enhance application of technological skills (Rusli & Negara, 2017).

One concept stemming from multimedia learning is the *redundancy effect*. According to Andresen et al. (2019), the redundancy effect occurs when both channels (visual and audio) present the same information without presenting new information. In such cases of poorly

designed multimedia learning, the result of the redundancy is reduced learning. Andresen et al. postulated the redundancy of information led to students wasting processing capacity on repeated content, leaving less room for new information, even though Knoop-van Campen et al. (2018) found multimedia to be effective for those with dyslexia.

Liew and Tan (2016) found students who were happy were likely to be motivated to interact with multimedia learning, while students who exhibited negative moods and attitudes were likely to have poor experiences with multimedia learning. Multimedia learning involves the use of educational tools that utilize audio and visual representation of information and include combinations of the following: (a) videos, (b) 3D animations, (c) music, charts, images, mobile devices, (d) the Internet, (e) spoken words, and (f) sounds (Acuña & López-Aymes, 2016; Bhutto et al., 2018; Kanellopoulou et al., 2019; Shadiev et al., 2018). Often, multimedia learning tools also fall into the category of instructional technology as multimedia tools require the use of both audio and visual channels.

Instructional Technology

Instructional technologies, according to Sullivan et al. (2018), are technologies used purposely and thoughtfully to aid the teaching and learning process. Ipek and Ziatdinov (2017) stated one of the purposes of instructional technology is to aid in students' learning and to enhance pedagogy. Technology in education should be implemented as a supplement to teaching, and teachers must be able to use technologies effectively and efficiently in order to successfully integrate technology into an educational setting (Elaldı, 2018). Common forms of instructional technologies used in the classroom include smart boards, electronic slideshow presentations, LMSs, social media, and gamification and polling (Florenthal, 2018; Kırbaş, 2018; Ozkanal & Uygucgil, 2016; Pektaş & Kepceoğlu, 2019; Uzun & Kilis, 2019; Valova & Marinov, 2019).

Smart Boards

Smart boards were first used in education in the late 1990s and early 2000s (Gürbüztürk, 2018). According to Kırbaş (2018), smart boards were viewed as a combination of traditional blackboards and modern computer technology. Günaydin and Karamete (2016) argued modern technologies should be used in education not only to meet the needs of a younger generation but also to blend modern technologies with traditional methods of instruction. Though smart boards are not necessarily a new technology, smart boards are a newer form of technology used in education with which older individuals may not be familiar or experienced. Smart boards are increasingly used as an educational technology due to the multiple learning features offered (Gürbüztürk, 2018; Kırbaş, 2018).

Günaydin and Karamete (2016) reported teachers who hesitated to use smart boards in the classroom felt incompetent and desired proper training. Bıçak (2019) echoed such findings by arguing teachers needed support and training prior to implementing smart boards in the classroom. Despite the hesitancy of some teachers to use smart boards for teaching and learning, Kırbaş (2018) argued smart boards have the following benefits: (a) ability for multimedia learning, (b) easily visible and readable screens, (c) interactive features, (d) increased student engagement, and (e) fostering of creativity. Smart boards are also beneficial for promoting positive teacher–student interaction, interest, and enjoyment of learning (Gürbüztürk, 2018).

Gürbüztürk (2018) argued smart boards contribute to two dimensions of the teaching and learning process: instructional excellence and learning process. Smart boards contribute to instructional excellence via the use of three major senses, including seeing, hearing, and touching. Smart boards allow for instructors to display a variety of visual features, to include sound effects, and to allow for interactivity with the touch screen (Gürbüztürk, 2018). The

second dimension, learning process, focuses on the student as a learner. Student motivation and student participation can be increased with the use of smart boards for teaching and learning. Bıçak (2019) also found the implementation of smart boards may help not only to decrease disciplinary issues and challenges but also to aid instructors with improving classroom management.

Electronic Slideshow Presentations

Another form of instructional technology used by instructors in classrooms is electronic slideshow presentations. Uzun and Kilis (2019) wrote about the progression of teaching strategies in education, stating chalkboards, flip charts, and overhead transparencies were older techniques, and electronic slideshow presentations took priority for many instructors. Two of the most common types of electronic slideshow presentation tools are Microsoft PowerPoint and Prezi (Ferreira et al., 2018). Electronic slideshow presentation tools allow teachers to implement multimedia in the classroom. For example, many electronic slideshow presentation tools incorporate a combination of written text, animations, images, sounds, and videos (Uzun & Kilis, 2019).

Uzun and Kilis (2019) discussed the advantages and disadvantages of using PowerPoint as an instructional technology. Some advantages of using PowerPoint in the classroom include ease of use, integrating dual channels (audio and visual) for learning, and organization. Disadvantages pointed out by Uzun and Kilis include the risk of either oversimplification or overcomplication of course content, following a teacher-centered instead of student-centered approach, and possible risk of diversion from intended lesson content. Ferreira et al. (2018) suggested teachers should become familiar with electronic slideshow presentation tools before implementation in the classroom in order to enhance the learning environment and increase

student engagement.

Moulton et al. (2017) conducted a study comparing PowerPoint and Prezi as electronic slideshow presentation tools and found participants believed Prezi to be more effective, engaging, and organized than PowerPoint. Prezi is considered not only an electronic slideshow presentation tool but also a zoomable user interface. Allowing for presenters to use Zooming and panning animations, Prezi offers features in a larger capacity than PowerPoint. The use of animations reduces the risk of audience members excessively reading slides, a disadvantage mentioned by Ferreira et al. (2018). Though Prezi was preferred over PowerPoint regarding visual appeal and audience engagement, participants described PowerPoint as organized, professional, and easy to use (Moulton et al., 2017).

Learning Management Systems

Learning management systems are used for collaboration between teachers and students as well as managing courses and distributing course content (Valova & Marinov, 2019). Valova and Marinov (2019) described LMSs to have the following functions: (a) content management system, (b) interaction management system, (c) system for managing and evaluating students, (d) enough disk space, and (e) social space. LMSs are used by educational institutions to enhance communication between teachers and students. Students who are registered for the course can access and interact with the LMS (Valova & Marinov, 2017, 2019).

Other functions and features of LMSs include the ability to administer online assessments, manage delivery of learning content, track student activities, receive feedback and responses, and communication among users via discussion boards (Al-Azawei, 2019). Many LMSs allow for teachers to post announcements and keep students updated as well as to share materials and documents (Al-Azawei, 2019). LMSs typically include grading systems that allow

teachers to input student grades. Asynchronous or synchronous teaching are features included in most LMSs (Valova & Marinov, 2017, 2019).

Bove and Conklin (2019) conducted a study using the TAM to assess how comfortable faculty were with using Blackboard as an LMS. The study was focused on faculty perceptions of ease of use and usefulness of the Blackboard LMS in higher education. Both ease of use and usefulness perceptions were associated with how comfortable the faculty were with using technology (Bove & Conklin, 2019). Blackboard training and support were provided when Blackboard was first introduced as a LMS for the institution; however, ongoing training and Blackboard support were not provided in following orientations. Bove and Conklin reported challenges to faculty comfort using Blackboard as a LMS were due to the lack of training. Suggestions provided by Bove and Conklin included ongoing professional development, incentives for online course development, and allowing adequate time for training and developing.

Social Media

As social media continues to increase in the age of technology, social media has been integrated into the world of education (Ozkanal & Uygucgil, 2016). The social media–educational institution relationship exists not only from a marketing standpoint but also from a communications perspective. Ozkanal and Uygucgil (2016) described social media as a way for students to interact with educational institutions. Educational institutions may keep students, parents, and the community up to date on current events at the institution, as well as provide a means for individuals to communicate questions or concerns (Eger et al., 2019).

Educational institutions active on social media tend to have better relationships with social media users (such as prospective students and individuals from the community) than

institutions that are not active on social media. Eger et al. (2019) also argued networking with faculty from institutions allowed students to acquire information about possible career opportunities or programs of study. Though multiple social media platforms have been integrated into education, three of the most common platforms are Facebook, Twitter, and Instagram.

  Facebook. Facebook integration into education allows teachers to implement creative and innovative ways of teaching and learning in the classroom (Al-Azawei, 2019; Shefketi & Hamiti, 2019). As a digital tool used for communication and entertainment, Facebook increases student motivation to learn and be engaged with course content. Teachers have used Facebook to teach asynchronously outside of class as the platform can be accessed independent of a time and location (Shefketi & Hamiti, 2019). As the social media platform has developed over the years, Facebook offers a variety of tools and functions that can be used by teachers and students to aid the teaching and learning process.

  Facebook functions that are utilized in educational settings include the places tool, advertising (in terms of announcements), events/calendar, sharing and exchanging files, voting polls, communication (messenger), and Facebook groups (Dhyab & Varol, 2018). Other features include the ability to share photos, videos, and links and to live chat via video calling (Ersöz & Nihat Şad, 2018; Singh, 2018). With the development of various interactive features, Facebook serves as a digital tool for teachers and students to communicate and interact. The implementation of online and social media platforms for learning has benefits and potential consequences.

  Benefits of using Facebook as a tool for teaching and learning include increased collaboration among students, increased motivation to participate and engage in course content, and the ability to improve self-confidence among students (Ersöz & Nihat Şad, 2018; Singh,

2018). The ability to sign up for Facebook for free is also a benefit to using Facebook as an educational tool, and the ability to "like" and comment on individuals' posts leads to immediate feedback from students and teachers (Dhyab & Varol, 2018). Facebook also allows for students to engage in peer assessment.

Possible consequences of using Facebook as a tool for teaching and learning include the potential for poor safety and privacy management among users who are unfamiliar with how to use the platform. Lower satisfaction of using Facebook as an instructional technology may also occur if students have insufficient experience or knowledge with using the social media tool (Al-Azawei, 2019). Regarding peer assessment, the names of students who comment on other students' work will be shown on posts. Peer reviewing on Facebook does not allow for anonymity and may lead to students providing positive, subjective comments rather than objective feedback to each other (Ersöz & Nihat Şad, 2018; Singh, 2018).

Twitter. Twitter has also been incorporated into education by teachers and educational institutions. Specifically, higher education institutions have incorporated Twitter as an instructional technology (Jeong & Jalali, 2019). Similar to the Facebook social media platform, Twitter allows for connecting, posing questions, and exchanging resources and ideas (Lemon, 2019). From a marketing standpoint, Twitter allows for organizations, such as educational institutions, to increase the number of views a post or link has, using hashtags (Maggio et al., 2019).

Benefits of incorporating Twitter as an instructional technology include increased student engagement, motivation, communication, and learning, which lead to a creative and innovative learning environment (Malik et al., 2019). Malik et al. (2019) argued Twitter allowed for collaboration and communication among learners both inside and outside of the classroom.

Anthony and Jewell (2017) found students had positive perceptions about implementing Twitter as an educational tool and as a means for students to build connections with each other. Students who are shy and quiet more actively participate in online social media platforms for learning (Malik et al., 2019).

Educators have also used Twitter to model professional online behavior to students. Deaves et al. (2019) found, in addition to using Twitter as an educational tool to enhance academic knowledge, Twitter was used to teach students soft skills, such as professionalism and online safety. Though Twitter can be used in education to help students learn or enhance digital literacy, students who do not have experience using the social media platform might find the implementation to be frustrating and, in turn, be hesitant to use Twitter for educational purposes (Deaves et al., 2019). Singh (2018) warned users should be familiar with the platform in order to avoid privacy issues and discover unauthentic information online. Lemon (2019) suggested teachers should have knowledge of and experience with Twitter before utilizing the tool as an instructional technology inside or outside the classroom.

Instagram. Instagram is another social media platform on which users post photos and may "like" and comment on other users' posts. Hashtags are also a feature on Instagram. Pilař et al. (2019) conducted a study to understand which hashtags were used in addition to #gamification and found education and business were the main large areas connected with the #gamification hashtag. Examples of hashtags that fell into the education category are #teacher, #school, #university, #education, #science, #student, #artist, #teaching, #video, and #students.

Aloraini (2018) found Instagram was used as an educational tool for helping individuals learn the English language. Because Instagram does not have a character limit, Aloraini found individuals were able to comment on other students' posts without reaching a character limit.

Aloraini also postulated, by using audio and videos, students were able to communicate with each other through the practice of speaking and learning a new language. Instagram allowed students to practice proper grammar, vocabulary, and pronunciation. Aloraini also suggested Instagram may be a supplemental tool that helps teachers who are limited on time by allowing language learners to practice outside the classroom.

Gamification and Polling

The implementation of games in the classroom has been increasingly popular as educational teaching strategies lean toward multimedia tools (Pektaş & Kepceoğlu, 2019). Using games for learning activities in education is known as *gamification* (Sánchez-Rivas et al., 2019). The aim of gamification in education is to increase student motivation and allow for instant feedback and rewards (Almeida & Simoes, 2019; Bal, 2019; Bechkoff, 2019; Hursen & Bas, 2019).

Pektaş and Kepceoğlu (2019) described the following benefits of gamification: provision of a safe learning experience in which students are free to make mistakes without strong consequences, the allowance of cooperation and collaboration among students, and a focus on problem solving and critical thinking. Bechkoff (2019) found students perceived gamification as fun and engaging but warned gamification methods differ from each other. Teachers who implement gamification in the classroom should take care to choose methods that suit the subject matter or teaching style (Bechkoff, 2019).

Examples of gamification methods and tools include Kahoot!, FlipQuiz, Plickers, Twine, Storium, and ClassDojo (Bal, 2019; Bechkoff, 2019; Hursen & Bas, 2019; Pektaş & Kepceoğlu, 2019). Bechkoff (2019) found certain gamification methods were time consuming, such as choose-your-own-adventure activities, but also noted assessment results increased and

assessment times decreased when using the choose-your-own-adventure format. Healthier teacher–student communication and increased participation inside and outside of class were reported by Hursen and Bas (2019) with the implementation of gamification.

A qualitative case study was conducted by Pektaş and Kepceoğlu in 2019 to understand student perceptions of the benefits and limitations of gamification applications (apps). Using open-ended questionnaires and clinical interviews, Pektaş and Kepceoğlu found both benefits and limitations of using gamification apps such as Kahoot!, Plickers, and FlipQuiz. Positive outcomes of the study included increased student motivation, increased student participation, and assessment time efficiency. Such outcomes were congruent with Almeida and Simoes's (2019) finding that gamification allowed for quick feedback and creative problem solving. Participants who repeatedly chose wrong answers reported feelings of low self-confidence and low levels of motivation. Pektaş and Kepceoğlu also stated difficulties in classroom control as well as the time commitment to set up and prepare the game might be possible negative outcomes of gamification. Overall, participants had a generally positive attitude toward the implementation of gamification in the classroom (Pektaş & Kepceoğlu, 2019).

Another type of instructional technology used in the classroom is polling via student response systems. Student response systems are used to enhance the learning environment by increasing participation, discussion, and engagement among students (Florenthal, 2018). In higher education, student response systems are effective for engaging students who participate in large lecture hall classes (Wong, 2016). Common examples of polling technologies used in education include Poll Everywhere and Socrative (Florenthal, 2018; Wong, 2016). While Poll Everywhere and Socrative allow for the use of mobile devices for responses, older polling systems and technologies require the use of clickers (Wong, 2016).

Florenthal (2018) stated students who forgot to bring clickers or who lost clickers toward the beginning of the semester became frustrated and had high levels of stress. Using mobile devices for polling is much more preferred but benefits and limitations of using mobile devices exist. For example, mobile devices require the use of wireless Internet or service data for students to respond to the polling website. Low battery, poor Internet connection, and other technological errors are potential limitations that exist to using online polling (Florenthal, 2018).

Wong (2016) suggested online polling technologies allowed for teachers to identify students who were struggling, while allowing the students to maintain anonymity from each other. Data from the polling sessions were viewed by the instructor only so students saw general statistics. By allowing for anonymity in responses, students felt more comfortable participating and had reduced levels of anxiety (Florenthal, 2018; Wong, 2016). Another advantage of online polling is real-time feedback. Students and teachers alike can view poll responses immediately in the classroom via means of an informal assessment of learning (Florenthal, 2018).

Using surveys and questionnaires, Wong (2016) found students had five outcomes to using polling software in the classroom: (a) satisfaction with hardware and website for the student response system, (b) positive perception of the student response system, (c) minimal time and effort to learn how to use the student response system, (d) willingness to use the polling technology in the future, and (e) satisfaction in answering questions using the student response system. Students also reported being more attentive during class and finding the course interesting and engaging due to the polling technologies (Wong, 2016). Florenthal (2018) found usefulness and ease of use to be benefits of using polling systems, such as Socrative.

Teacher Perceptions of Instructional Technology

Teacher perceptions regarding the use of instructional technology in educational settings differ among instructors but are generally positive (Dinc, 2019). Perceptions of instructional technology may be affected by teachers' previous knowledge of and experience with the technologies involved as well as current attitudes toward implementing technologies in the classroom (Dees et al., 2017; Dinc, 2019; Khlaif, 2018). In a study concerning Montessori teachers, Jones (2017) found the teachers exhibited positive attitudes toward technology. Teachers also believed technologies in the classroom to be useful as supplemental tools for learning.

Scalise (2016) stated teachers should understand when to integrate instructional technology to enhance the teaching and learning process and to improve learning outcomes and goals. Including either too much or too little technology in the classroom can result in poor technology integration. To avoid poor technology integration, Scalise suggested tactful lesson planning that includes scaffolded hands-on activities modeled by the instructor so students may understand how to effectively use instructional technology for learning.

Regarding benefits of integrating instructional technology, Dinc (2019) identified an increased understanding of course content and increased student engagement. Dinc also identified potential limitations of instructional technology, including teacher concerns about access to technologies, lack of time for integration, lack of confidence, and inadequate training prior to integration. Tatli et al. (2019) argued teachers with negative attitudes toward instructional technology might have such perceptions due to valuing older, traditional teaching strategies.

One suggestion for reducing barriers and limitations of technology integration in

educational settings is proper professional development for teachers (Dees et al., 2017; Dinc, 2019). Dees et al. (2017) stated professional development workshops may help to reduce the risk of technologies as distractions in the classroom. Professional development opportunities may also increase teachers' familiarity with digital devices used in the classroom (Dees et al., 2017). Dinc (2019) suggested taking teachers' perceptions of instructional technology into account prior to developing professional development trainings in order to tailor the workshops to the needs of the instructors.

Khlaif (2018) conducted a descriptive case study to explore the perceptions of teachers regarding factors affecting the adoption and acceptance of technology in elementary and secondary education. After collecting weekly lesson plans from the participants and conducting interviews, Khlaif identified mixed perceptions among the participants regarding tablets. Factors that contributed to positive teacher attitudes included accessibility and multimedia features. Negative attitudes were affected by lack of teacher experience using the tablets. Other factors contributing to negative attitudes included lack of resources as well as technological challenges related to hardware and software (Khlaif, 2018).

Student Perceptions of Instructional Technology

Students typically perceive instructional technologies in the classroom to be fun and engaging (Florenthal, 2018). Student response systems, such as online polling, allow students who are generally quiet in class to participate with minimal anxiety. Students perceive student response systems as easy to use, useful, and time efficient (Wong, 2016). Learning management systems are useful for keeping students up to date with grades and class materials (Bove & Conklin, 2019; Sivo et al., 2018). Gamification allows for creative thinking, cooperation, and motivation for learning (Hursen & Bas, 2019).

Staples et al. (2018) explored students' opinions of instructional technology by administering surveys with Likert-scale questions. In measuring the responses of the students, Staples et al. categorized importance of devices as either *important*, *unimportant*, or *neutral*. Laptops, library desktops, and smart phones were viewed as important by students, whereas personal desktops and e-readers were viewed as unimportant. Students viewed iPads as neutral, even though two major sections of the survey focused on iPads (Staples et al., 2018).

Androniceanu and Burlacu (2017) researched students' opinions about changes that will take place in the educational system in the near future, such as flipped learning, gamification, and the implementation of social media. Regarding opinions of new educational technologies, students rated gamification highest. Factors related to resistance to change varied, and no linear trends were identified (Androniceanu & Burlacu, 2017). Similar to the findings of Bechkoff (2019), utilizing educational technologies in the classroom was suggested by Androniceanu and Burlacu to increase both student engagement and student motivation in the classroom.

Gap in Literature

Prior research has been conducted on the CTML, the TAM, digital immigrants and digital natives, the integration of instructional technologies in the classroom, teacher perceptions of instructional technologies, and student perceptions of instructional technologies. As most research for higher education has focused on either traditional-aged students younger than 25 or nontraditional-age students older than 25, little is known about subgroups within the non-traditional age category (Cummins et al., 2018). Kasworm (2018) argued age categories for adult learners have been inconsistent in research, which makes the definition and characteristics of various adult learners unclear.

A gap in literature existed regarding baby boomer college students' experiences with and

perceptions of instructional technology in education. Helterbran (2017) stated the importance of leadership in universities to embrace and provide high-quality education to the retiring baby boomer population. The present study was conducted to reduce the gap in literature and to provide instructional designers as well as community college faculty with information to properly engage baby boomer community college students. Reducing the gap in literature may also encourage instructional designers, faculty, and scholars to continue research on related topics.

Chapter Summary

The chapter provided an overview of relevant literature related to adults who are older in higher education, andragogy versus pedagogy, adults who are older and technology, digital immigrants and digital natives, multimedia learning, instructional technology, teacher perceptions of instructional technology, and student perceptions of instructional technology. The literature search strategy section provided an explanation of the search engines and libraries used to search the literature. Also included was a list of keywords used to search resources.

The theoretical framework section provided an explanation of the CTML, which focuses on using dual channels for learning (Sezgin & Coskun, 2016). Also provided was an explanation of the TAM, which focuses on individuals' perceptions of usefulness and perceptions of ease of use of technology (Binyamin et al., 2019; Mallya & Lakshminarayanan, 2017). Both the CTML and the TAM served as guides for the review of literature and provided a framework for the study.

The research literature review section provided an extensive and detailed review of relevant literature. A section regarding a gap in the literature was also provided to explain the necessity of the research. While Chapter 2 was an overview of previous research literature

related to the study, Chapter 3 is an outline of the methodology and design for the research.

Chapter 3: Methodology

College populations consist of students of varying demographics, including race and ethnicity, age, gender, and socioeconomic status. The number of nontraditional students, age 25 and older, attending college part-time or full-time is increasing (Woods & Frogge, 2017). Some of the individuals who make up the nontraditional student population include baby boomers, individuals born between 1946 and 1964 (Millsap, 2018).

The problem was baby boomers struggle with adapting to instructional technologies. The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. Using a descriptive phenomenological design, the first research question focused on discovering baby boomers' past experiences and current perceptions of instructional technologies. The second research question was aimed at understanding how classroom engagement is affected by perceptions. The following research questions guided the study:

Research Question 1: What are the experiences and perceptions of baby boomer community college students regarding the use of instructional technologies?

Research Question 2: How does the use of instructional technology affect classroom engagement, according to baby boomer perceptions?

The goal of the phenomenological qualitative study was to allow for an understanding of a specific phenomenon (Qutoshi, 2018). An interview was used as the instrument in the research study (Webb & Welsh, 2019). The chapter includes the following sections, research design and rationale, role of the researcher, research procedures, data analysis, reliability and validity, ethical procedures, and chapter summary.

Research Design and Rationale

The qualitative study of baby boomers' experiences with and perceptions of instructional technologies in higher education followed a phenomenological qualitative approach. Merriam and Tisdell (2016) described qualitative research as an understanding of experiences. Qualitative research is focused on answering the question of how rather than the question of what (Yates & Leggett, 2016). Data for qualitative research are typically in the form of words rather than numbers (Merriam & Tisdell, 2016). Qualitative research focuses more on describing experiences than explaining causality.

Though various types of qualitative research exist, the study was phenomenological to allow for the discovery of lived experiences and perceptions about a specific phenomenon (Webb & Welsh, 2019). Aspects of phenomenology originated during the times of Plato and Socrates, but Edmund Husserl was the philosopher to establish phenomenology as a research design in the early 20th century (Qutoshi, 2018). The interpretation of experiences is subjective to the participants and not objective (Merriam & Tisdell, 2016). The design was appropriate for answering the research questions because the goal of the study was to discover the lived experiences and perceptions of baby boomers regarding instructional technology at community colleges. The anticipated benefit of the design was potential insight for curriculum and instruction designers structuring courses at the community college level and sharing ideas for best practices (Sharif & Cho, 2015).

Role of the Researcher

Wilson College in northern Illinois, a community college in which I was employed part-time as an instructor in the kinesiology and health education department and full-time as an academic advisor, was the site for the study. I took on the role of observer to allow for the use of

an interview as the data collection instrument. Interviews allowed for complete observation with no active participation from me as a participant.

Prior relationships, personal or professional, between any parties involved were not permitted. Omitting individuals with prior relationships to any party from the study reduced the chance of bias during the interviewing process. Before the research took place, a bracketing strategy was used to remove previous biases and beliefs about the phenomenon studied (Merriam & Tisdell, 2016). Bracketing requires an individual to set aside previous biases, assumptions, or experiences in order to truly be able to explore the lived experiences of others (Qutoshi, 2018). Incentives were not used during the recruiting process, to ensure participants were truly willing to participate.

Research Procedures

Baby boomer community college students were the target population for the phenomenological qualitative study. Nonprobability sampling is used often in qualitative research (Merriam & Tisdell, 2016) and was used in the present study. The phenomenon was explored using a semistructured interview, a data collection instrument commonly used in qualitative research (Yates & Leggett, 2016). The data collection instruments aligned with the research questions regarding experiences with and perceptions of instructional technology, as well as how perceptions of instructional technology affect classroom engagement.

Population and Sample Selection

A total of 444 baby boomer students had been enrolled at Wilson College within two years of the study and served as the potential participants. The sample population included 18 participants recruited via nonprobability purposeful sampling. Purposeful sampling is also known as *criterion-based sampling* and requires participants to meet specific requirements to

qualify for the study (Merriam & Tisdell, 2016). To recruit participants for the sample

population, students received an email with the qualifications and description of the study.

Snowball sampling, described by Marcus et al. (2017) as a method of recruiting participants

indirectly through individuals who are not conducting the study, was considered but not included

to further recruit participants. To qualify for participation in the study, participants were born

between 1946 and 1964, enrolled in a community college course at Wilson College during either

the 2018–2019 or 2019–2020 school year, and had neither a professional nor personal

relationship with the researcher. Not meeting one of the criteria resulted in exclusion from the

study.

Administrators of Wilson College were contacted in order to obtain permission to

conduct the qualitative study at the main campus (see Appendix A). A letter of support was

received from Wilson College indicating research was supported at the location (see Appendix

B). No research was to commence until approval was obtained by the Institutional Review Board

from the research institution (IRB; Clark, 2019). Per Wilson College, expedited from the location

site's IRB was also necessary prior to conducting research and was obtained after completing

initial IRB approval from the research institution (see Appendix C). After permission was

granted, emails were sent to potential participants containing information regarding the purpose

of the study, a letter of recruitment (see Appendix D), the criteria for qualification, methods of

data collection, the consent form to sign if interested in participating (see Appendix E), and an

email address to contact for participation. All individuals who qualified for the study and were

interested in participating were instructed to respond to the email. The procedures of the study,

potential risks and benefits, and a statement of confidentiality were included in the consent form,

which provided clear and detailed content to the potential participants to ensure no confusion

regarding the research procedures (Clark, 2019).

Instrumentation

Data were collected via a semistructured interview. To understand experiences and

perceptions through observed phenomena, participants shared subjectively rather than

objectively (Webb & Welsh, 2019). Semistructured interviews allow for questions to be used

flexibly and are highly suggested for phenomenological qualitative studies (Merriam & Tisdell,

2016). The interview was focused on collecting data regarding experiences with and perceptions

of instructional technology. Core questions reviewed by subject matter experts (SMEs) guided

the interview (see Appendix F) but also allowed for undetermined follow-up questions,

following a semistructured approach that lasted approximately 15–60 minutes. With permission

from participants, each interview was video and audio recorded using Zoom software for

transcription during data analysis.

The interview for the study was developed to align with the research questions. Questions

were developed following Patton's (2015) six types of questions. The first few questions of the

interview focused on demographics, while the rest of the interview questions focused on

experiences, feelings, and opinions. Close-ended questions, leading questions, and multiple-

choice questions were avoided, aligning with the suggestions from Merriam and Tisdell (2016).

For credibility of data gathered, participants were also asked to verify the accuracy of the written

analysis of data collected, through member checking (Merriam & Tisdell, 2016). Video and

audio recordings, as well as the interview transcript, will be kept on a password-protected laptop

and destroyed 3 years after the study is concluded.

To ensure validity of the data collection, five SMEs were contacted to review the

interview questions. Three of the SMEs were instructional design specialists at a community

college. one was a faculty member of a community college who has achieved an EdD in curriculum leadership, and one was a faculty member of a community college who has achieved an EdD in curriculum and instruction. An email was sent to each of the SMEs to garner insight as to validity and clarity of the research instruments (see Appendix G).

Data Collection

Prior to data collection, journaling was implemented to reduce the risk of researcher bias. Data were collected using a qualitative research instrument. The research instrument was semistructured interview questions that followed Patton's (2015) suggestions for qualitative questions. The semistructured interview was conducted virtually and took approximately 15–60 minutes to complete. Prior to the interview, participants were asked permission to video and audio record the interview using Zoom software. By video and audio recording the interview, the accuracy of transcription was increased during data preparation and analysis (Moser & Korstjens, 2018).

Each participant received a copy of the respective transcript via email to check for accuracy through member checking. Member checking required participants to check over written analyses or transcripts to determine whether the information was accurate or true (Merriam & Tisdell, 2016). The video and audio recordings from the interview were kept on a password-protected laptop to ensure privacy of individuals. Three years after the study, both the video and audio recordings will be destroyed. Participants will receive the final document after the study has been completed, along with a thank you for participation in the study. No other follow-up procedures were required for the study.

Data Preparation

To prepare collected data for analysis, transcripts were made of the video and audio recorded semistructured interview. Transcribing the interview allowed for analysis of themes and patterns among interview responses. After the interview was transcribed, the transcripts were imported into a web application program for coding and analysis. The coding and analysis program intended for use was Dedoose, but manual coding through styles described by Saldaña (2016) was used instead.

Data Analysis

After the semistructured interview was video and audio recorded using Zoom software, the recordings were transcribed and prepared in a Word document. The transcript of the semistructured interview was analyzed through coding. Coding is the process of attributing a word or short phrase to a portion of language and may be used for the purpose of pattern detection in later analysis (Saldaña, 2016). Williams and Moser (2019) stated, though each phase of coding must be conducted, coding software can be used to help ease the data analysis process. The original intent was to use Dedoose software to code the data, but manual coding was used instead due to budgetary constraints. Journaling was used during the initial reading of the data.

Reliability and Validity

Credibility, or internal validity, deals with how closely the research findings match reality (Creswell & Poth, 2018; Merriam & Tisdell, 2016). Merriam and Tisdell (2016) suggested dependability in qualitative research deals with whether the research results are consistent with the collected data. Guba and Lincoln (1981) suggested member checking to establish credibility and dependability. To ensure credibility and dependability, member checking was performed after the interview was conducted (Saldaña, 2016). Each participant received a copy of the

respective transcript to ensure accuracy of the transcribed content. In doing so, participants were able to check if the transcript was true and the data interpreted accurately (Merriam & Tisdell, 2016). Member checking allowed for dependability by allowing participants to confirm the transcript was consistent with the original data collected.

Transferability deals with how well the research results can apply in other contexts (Amankwaa, 2016). To ensure transferability, the written data included thick, rich descriptions of the data collected through the inclusion of participant quotes and detailed findings (Creswell & Poth, 2018). Thick, rich descriptions of data allow future researchers to decide how the research findings can be applied to other contexts (Amankwaa, 2016). Confirmability deals with how the research results are shaped by the participants and not by researcher bias (Amankwaa, 2016). An audit trail in the form of a journal was implemented to ensure confirmability (Creswell & Poth, 2018; Merriam & Tisdell, 2016).

Ethical Procedures

Prior to research, participants were given details on the research procedures and potential risks and benefits, to omit the risk of deception in research (Merriam & Tisdell, 2016). Participants signed a consent form (see Appendix D) before any research commenced. Clark (2019) stated informed consent allows participants to understand the procedures of the research before the study begins. Individuals who did not sign the consent form were excluded from the study. No research began until the IRB approved the study. All IRB policies and guidelines were followed to ensure ethical procedures were practiced.

Participant names were changed on the written report in alignment with the protection of the subjects' right to privacy (Merriam & Tisdell, 2016). Participants were also told the video and audio recordings as well as the interview transcripts would be kept on a password-protected

laptop and destroyed 3 years after the study concluded. To avoid ethical issues related to research in one's workplace, participants were excluded from the study if personal or professional relationships between parties existed. By excluding such individuals, no power differentials occurred. The procedure of bracketing was also conducted to remove researcher biases and assumptions prior to commencement of the study (Qutoshi, 2018).

Chapter Summary

The is an overview of the phenomenological qualitative study chosen to research the lived experiences of baby boomers with instructional technology at the community college level. A detailed explanation of phenomenological qualitative research was provided. The role of the researcher section explained how bias was kept to a minimum.

An explanation of how subjects were recruited, the instrument used for data collection, and how the data were prepared for analysis were included in the research procedures section. The data analysis section described the software that was used for examining and coding the data. A description of measures taken to ensure credibility within the research was provided in the reliability and validity section, and the ethical procedures section addressed human rights and IRB protocol.

Chapter 3 was an outline of the methodology for the research, which was qualitative in nature. The research method was descriptive phenomenology and focused on experiences and perceptions of participants. Also included in the chapter was an explanation of the protocol for the study. Chapter 4 includes details of the results of the research conducted.

Chapter 4: Research Findings and Data Analysis Results

A phenomenological design was implemented and individuals from the baby boomer generation who attended Wilson College were interviewed. Multiple generations attend college, particularly community college, including individuals who belong in the Generation Z, millennial, Generation X, and baby boomer generations. Due to advances in technology and changes in the education system over time, individuals from different generations vary in learning styles. The problem was baby boomers struggle with adapting to instructional technologies. The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. The following research questions guided the study:

Research Question 1: What are the experiences and perceptions of baby boomer community college students regarding the use of instructional technologies?

Research Question 2: How does the use of instructional technology affect classroom engagement, according to baby boomer perceptions?

Two major sections detail the collection and analysis process of the research conducted. In the data collection section, a description of how the data were gathered, the number of participants involved, deviations from the research methodology, and unusual circumstances are included. The data analysis and results section include an analysis of the data, visual depictions of the results, and a description of how the results relate to the research questions.

Data Collection

After obtaining IRB approval, permission was obtained from the location site. The director of institutional research, who was also the chair of the IRB at Wilson College, provided a list of potential participants who met the criteria for the study. To qualify for the research,

individuals were required to (a) have been born between 1946 and 1964, (b) have been enrolled

in a community college course at the institution during either the 2018–2019 or 2019–2020

school year, and (c) not have a professional or personal relationship with any parties involved in

the study.

A recruitment letter was sent to 444 potential participants. Of the 444 potential

participants, 36 responded to the email. Of the 36 responders, 18 participants were interviewed

for the phenomenological study. Five individuals expressed interest after the research had been

conducted. One individual expressed interest but did not meet the criteria. Six individuals

expressed interest but either did not complete the consent form or did not complete the interview

process. Six individuals declined to participate.

Six of the participants were male, while 12 were female. The oldest participant was born

in 1947, while the youngest participant was born in 1964. Figure 3 depicts the age demographics

of the individuals who participated in the interviews. While participant ages were spread out, 10

of the participants were born during the last 5 years of the baby boomer generation.

The recruitment letter was emailed to potential participants on June 8, 2020, and

interviews were conducted through July 3, 2020. After a participant expressed interest in the

study by responding to the recruitment email, a consent form was sent to the participant. The

consent form, which was reviewed by the committee chair, was saved as a Word document and

uploaded into Adobe Sign. Using the Adobe Sign platform, the consent form was modified so

the participant could electronically sign the form in all appropriate areas.

Once the consent form was signed, a Zoom interview was scheduled at a time convenient

to the participant. One participant requested a phone call rather than a Zoom meeting due to

privacy concerns but was still compliant with being audio recorded via the Voice Recorder

recording application. The purpose of using video recording in addition to audio recording was to provide clarity should the audio be unclear, rather than being used for interpretation of gestures or posture. Inclusion of the interview was determined as necessary to the research to support the findings from analysis. The interviews were designed to take 45–60 minutes but took anywhere from 15 to 60 minutes. The discrepancy in time was due to a variety of factors, including technology errors and concise responses from participants.

spacing

Figure 3

Participants' Age Demographics
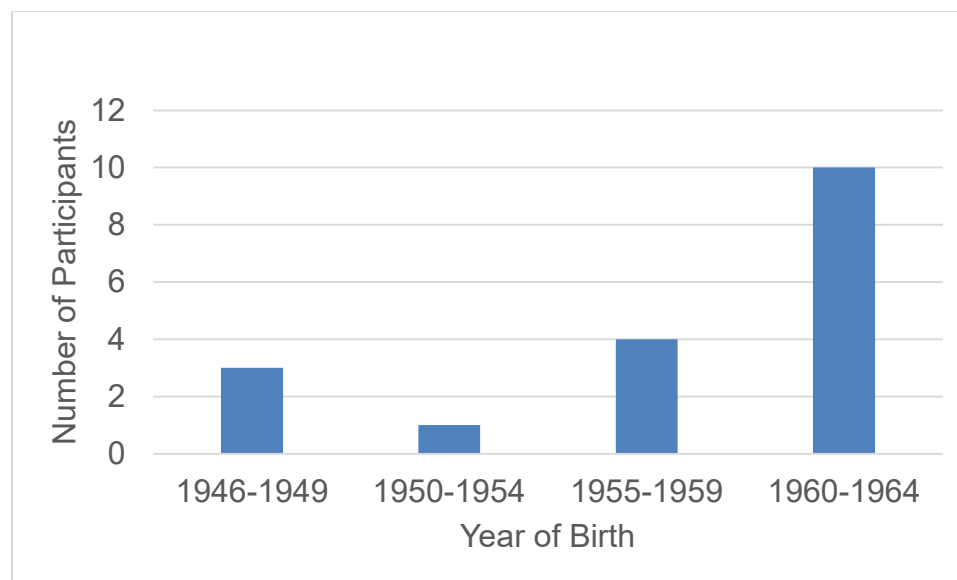
The original plan was to conduct interviews either face-to-face or virtually, whichever was most convenient for the participant. Due to external circumstances of a global pandemic and concerns for health and safety of all individuals involved, interviews were conducted virtually. Each Zoom interview was recorded using the recording feature within the Zoom app. A backup recording was made using a recording app called Voice Recorder on a smart phone. For the

interview conducted over the phone, the Voice Recorder recording app on a smart phone was used.

Data Analysis and Results

All recordings of the interviews were uploaded to a transcription service called Trint. The software transcribed the interviews and allowed for editing for specific names and mistaken words or phrases. After the transcripts were complete, a copy was sent to the associated participant for member checking. Of the 18 participants who were interviewed, 11 participated in a member check. Only one of the participants who performed a member check indicated small clarifications within the transcript; the other 10 participants confirmed accuracy of the transcripts.

The original plan for coding was to use an app called Dedoose, but due to budgetary concerns, coding was done manually. After reviewing various methods of coding described by Saldaña (2016), structural coding was chosen as the most appropriate method for organizing and analyzing the data. Each transcript was printed as a hard copy and reviewed multiple times for codes and themes, with annotations added throughout the process. After transcripts were examined multiple times, particular patterns and themes became apparent. A total of seven themes emerged from the coding and theming process. Figure 4 displays the emergent themes and associated research questions.

Figure 4

Emergent Themes with Associated Research Questions
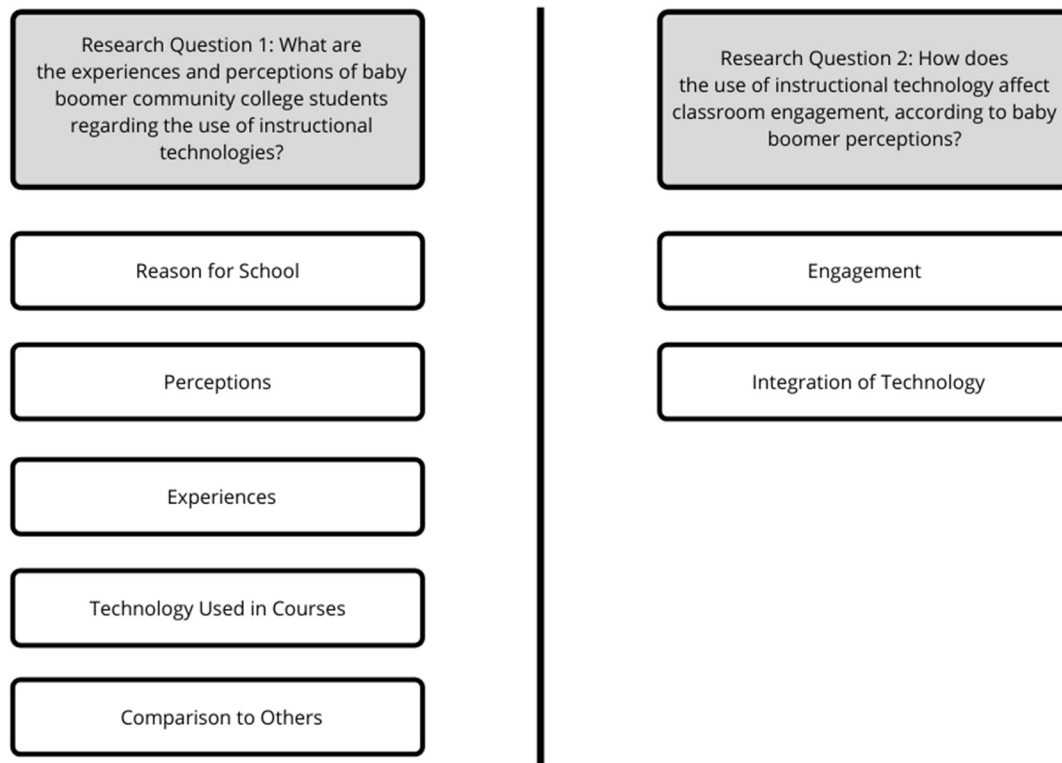
Research Question 1

The focus of Research Question 1 was to identify the lived experiences and perceptions of baby boomer community college students regarding instructional technology. Themes that emerged from the data were reason for school, perceptions, experiences, technology used in courses, and comparison to others. Table 1 is an illustration of the associated themes for Research Question 1 along with identified codes. Each of the themes is described in more detail in the following subsections.

Table 1

Themes and Codes Associated with Research Question 1

Theme	Code	Subcodes
Reason for school	Career	Career change
		Prerequisites
		Finish schooling
	Personal	Time
		Ability
		Interest
		Recreation
		Cost
		Challenge
		Skill development
Perceptions	Positive perceptions	Great
		Inevitable
		Needed
		Fun
		Comfort level
		Desire to learn
		Willingness
	Negative perceptions	Privacy
		Dependence
		Advancement
		Human interaction
		Confusion
		Problems
	Mixed perceptions	Appropriateness
		Reliability
Experiences	Personal experiences	Home exposure
		Daily integration
		Personal use
	Educational experiences	Academic exposure
		Prior incidents
		Mastery
		User-friendliness

Table 1 Cont.

Theme	Code	Subcodes
Technology used in courses	Devices	Apple computer
		Chromebook
		iPad
		Phone
		Projector
		X-ray machine
	Programs	Microsoft Word
		Microsoft PowerPoint
		Microsoft Excel
		Photoshop
		Internet
		Kahoot!
		Quizlet
		Podcast
		Digital book
		Access code
		Google Docs
		Adobe
		Videos
		Webex
		Zoom
		Skype
		FaceTime
	Learning management systems	Quizzes
		Tests
		Assignments
		Discussion board
Comparison to others	Comparison to other baby boomers	Similar
		Behind
		Ahead
		Fear
		Resistance
		Difficulties
		Acceptance
	Comparison to younger students	Adaptation
		Use
		Openness
		Ease
		Knowledge

Reason for School

The first theme that emerged from the data was related to participants' reasons for attending community college. Six participants noted the reason for attending the institution was to make a career change, while four participants mentioned having an interest in attending community college. Many of the participants also mentioned finishing school and refreshing skills as reasons for attending the community college. Regarding career change, Participant 12 stated, "I wanted to do something a little bit, yeah, more rewarding."

Perceptions

The second theme that emerged from the data related to the first research question was perceptions of instructional technology. Participants exhibited positive, negative, and mixed perceptions of instructional technology. Those who had positive perceptions of instructional technology used descriptors such as "great" and "fun." Six participants indicated being comfortable with using technology. Regarding instructional technology, Participant 17 said, "I think it really can be beneficial and so helpful. . .. I think it makes it possible for so many more people to learn in ways that are comfortable for them." Three participants described a willingness and desire to learn how to use technology.

Regarding negative perceptions of instructional technology, many participants noted problems with technology, including audio and visual features not working with some programs and the technology "freezing" at times. Others expressed concern about technology replacing human interaction and too much dependence on technology in the classroom. Two participants noted technology does not meet all students' needs.

Regarding mixed perceptions of technology, two participants noted technology, when

working properly, can be good. Participant 11 spoke about the benefits and costs of technology, stating, "I think it takes away a lot of jobs, for one thing, and in a way, it's environmentally friendly because there's not a lot of gas spent going to and back to class." Participant 11's statement reflected what other participants had mentioned regarding too much of a reliance on technology. Participant 6 stated, "I see value in it. I see it being able to enhance what you're learning. But I still go back to: It should be the classroom, and the technology enhances it, as opposed to it all being technology."

Experiences

Descriptive phenomenology, developed by Husserl, is focused mainly on the lived experiences of participants (Creswell & Poth, 2018). Moustakas (1994) continued Husserl's work by emphasizing descriptions of participant experiences rather than interpretation. The theme of experiences emerged with two codes: personal and educational experiences. Both personal and educational experiences were related to the lived experiences of the participants.

The code of personal experiences was related to participants' prior use or knowledge of technology. Six participants referenced social media as a reason for having knowledge of or experience with using technology for personal use. Many participants noted high exposure to technology due to necessary use at work, prior use in classes, or growing up with technology.

The code of educational experiences was related to situations or incidents that occurred in a school setting. Two participants referenced current enrollment in online classes, stating difficulty early in the semester learning how to use the programs, devices, and platforms. Eight participants reported having bad experiences with technology in school settings. Two of these participants stated online tests and quizzes did not allow for manual grading and were too specific on correct responses for open-ended questions. Participant 17 indicated an issue with an

instructional technology not allowing for manual grading, stating, "There were two answers actually that were correct, and it wouldn't let me pick both of them. . .. I think it can be a frustration for, you know, someone who really wants to learn."

One participant spoke about technology, mentioning experiences when work was not saved properly. Participant 9 stated:

There was one time I was doing the CET [Clinical Evaluation Tool] and it took me hours, say, like, 10 hours, and then it was lost, and I had to redo the whole thing. And then, I guess, there's some kind of bar, you can save here, like a hard drive, something. But I didn't have that. So anyway, I had to redo the whole thing because it was lost.

Regarding an experience in which technology was not user-friendly, Participant 18 stated:

The student portal isn't always the most user-friendly, and sometimes I feel like I have to hunt and peck a little bit to find, you know, when an assignment is due or what the assignment is. So that can be a little frustrating.

Technology Used in Courses

When asked about types of technology used in courses, participants responded with a variety of answers. Three codes appeared from the theme of technology used in courses: devices, programs, and LMSs. Participants discussed technology used not just in recent courses but also courses taken years ago. Regarding devices, three participants mentioned using Apple computers, Apple II, or Chromebooks in previous or current courses. Other devices mentioned included iPads, smartphones, and projectors. Participant 12 discussed using x-ray machines to practice skills for a health-care program.

For programs used in courses, 12 participants reported using PowerPoint for learning and studying purposes. Seven participants mentioned using videos to review course content and

study for exams. Other programs mentioned by participants included Zoom, Webex, Skype, and FaceTime for video conferencing with instructors. Regarding gamification programs, three participants mentioned using Kahoot! and two mentioned using Quizlet during class or outside class for studying. Six participants reported using YouTube for reviewing materials learned in class. Google Docs was listed as a program used in courses, along with Microsoft Word, Photoshop, Adobe, ATI, Salesforce, eMAR, online access codes, and digital books. Participant 18 reminisced about digital books: "I liked it. It was a lot more searchable and things like that. It was a lot easier to go back and find the things I was looking for."

The primary LMS used at the institution was Blackboard, and all participants referenced using the system for a variety of purposes. Seven participants mentioned taking quizzes and tests on Blackboard. Two participants mentioned turning in assignments on Blackboard. Two participants discussed using the discussion board feature of the LMS for casual and academic use. Participant 5 discussed Blackboard's features, saying, "It's getting your syllabus. It's doing your homework. It's doing, it's connecting with your instructor and classmates. It's keeping on a timeline. It's doing the tests."

Comparison to Others

The theme of comparison to others was broken down into two codes. The first code was comparison to other baby boomers either attending community college or in general, while the second code was comparison to the younger generation either attending community college or in general. All participants referenced both generations regarding technology in education.

When conducting a comparison to other baby boomers, three participants mentioned being at the "tail end" of the generation and not identifying as being part of the generation. Participant 10 indicated having a parent who also belonged in the baby boomer generation, and

when conducting a comparison to other baby boomers, stated, "I don't necessarily know that it has a whole heck of a lot to do with our age demographic as just the willingness to learn something and the willingness to accept advancement in our lives." Four participants mentioned technology came easier compared to others within the generation. Three participants stated feeling similar about their experience with and knowledge of technology in comparison to other baby boomers. One participant identified as being less comfortable with technology than other baby boomers. When considering others within the baby boomer generation, many participants stated other baby boomers have a fear of technology or a resistance to change.

When conducting a comparison to younger generations, seven participants stated those belonging to younger generations are ahead of baby boomers regarding technology. Participant 5 stated, "I'm in the dust" when reflecting on the younger generations' use and comfort with technology. One reason 10 participants gave for the discrepancy of comfort between baby boomers and younger generations was younger generations grew up using technology. Two participants mentioned younger generations consistently use smart phones, while two others mentioned technology is easy for young adults. Five participants stated younger individuals are open to or comfortable with using technology.

Research Question 2

The focus of Research Question 2 was to identify how instructional technology affects classroom engagement, according to baby boomer perceptions. Themes that emerged from the data were engagement and integration of technology. Table 2 is an illustration of the associated themes for Research Question 2, along with identified codes. Each of the themes is described in more detail in the following subsections.

Table 2

Themes and Codes Associated with Research Question 2

Theme	Code	Subcode
Engagement	Positive engagement	Questions
		Opinions
		Discussion board
		Lectures
	Negative engagement	Interaction
		Human instruction
		Responses
		Notes
	Mixed engagement	Personality
		People
		Preference
Integration of technology	Need for education	Teachers
		Students
		Time
		Curriculum
	Supplemental use	Teaching methods
		Material
		Content
		Reliance

Engagement

Participants exhibited positive, negative, and mixed perceptions of how instructional technology affected classroom engagement. Six participants reported positive classroom engagement from instructional technology, referencing live lectures and participation in discussion boards. Participant 16 stated, "The positive part about that is engaging with your other students in reference to having a subject matter, giving your opinion, and then you can give your opinion about the students, what they wrote."

Twelve participants had negative perceptions of how instructional technology affected classroom engagement. Participant 1 stated, "If I had to give it a score, I'd give it a C minus." Five participants expressed a need for interaction among students. When discussing live lectures, some participants mentioned students may ask questions, but no other interaction is evident in class. Participant 14 noted the issue of discussion boards not allowing for real-time responses among students, resulting in less engagement than a live discussion.

Four participants indicated a mixture of engagement with instructional technology and online courses. When discussing participation and engagement, Participant 17 mentioned, "It depends on people's personalities." Participant 8 stated, "You can't just say yea or nay on that because there's the human element with it. You know, technology doesn't exist without humans, and unfortunately, we bring several factors into that equation."

Integration of Technology

The theme of integration of technology presented two codes: a need for education and supplemental use. Four participants discussed a need for education on how to use technology. Some participants stated a need for instructors to be educated on how to properly implement technology. Others indicated a need for instructors to teach the students how to use the technology for learning.

Regarding supplemental use, four participants indicated instructional technology should supplement teaching and not be the primary method of instruction. Participant 10 mentioned, "I think there needs to be technology, but I think there needs to be technology with limits." Participant 18 similarly stated, "I think the prevalence of technology in the classroom has maybe created an overdependence on technology. I think the younger generation just kind of, like, if the

technology is not working, they're stuck." The suggestions of some participants reflected a need for balance between instructional technology and traditional instruction.

Reliability and Validity

Credibility refers to how closely research results match reality (Merriam & Tisdell, 2016). One common method to ensure credibility is to perform a member check. After each interview was transcribed, a copy of the transcript was emailed to the associated participant for member checking. Of 18 participants, 11 responded to confirm accuracy or inaccuracy of the transcript. Ten of the participants indicated the interpretation was accurate, while one participant suggested minor revisions for spelling and inaudible portions.

Dependability deals with whether research findings would yield the same results should the research be replicated. Merriam and Tisdell (2016) noted one way to ensure dependability is to perform an audit trail. An audit trail serves as explanation of how data were collected, organized, and analyzed.

Transferability refers to how the results of research may be applied to other contexts (Merriam & Tisdell, 2016). Generalizations may be difficult due to small sample size within a specific target population. To increase transferability, thick, rich descriptions were included through participant quotes and detailed findings, allowing for application of findings to other contexts.

To ensure trustworthiness, bracketing was performed prior to conducting research. Bracketing involves setting aside prior assumptions and views to reduce bias in data collection and analysis (Creswell & Poth, 2018). Journaling was implemented throughout the data collection and analysis process to ensure confirmability and objectivity, reducing the risk of bias.

Chapter Summary

Two research questions guided the phenomenological study that explored the experiences and perceptions of baby boomer community college students regarding instructional technologies and how classroom engagement is affected, according to such perceptions. Semistructured interviews were used as the data collection method and were conducted virtually. A total of 18 participants signed consent forms and participated in the interviews. After the interviews were conducted, each participant received a transcript of the respective interview to confirm accuracy. Of the 18 participants, 11 participated in the member-checking process.

Seven primary themes emerged from the data: reason for school, perceptions, experiences, technology used in courses, comparison to others, engagement, and integration of technology. The first five themes were associated with the first research question, which was focused on participant experiences and perceptions of instructional technology. Research Question 2, which dealt with how instructional technology impacts classroom engagement, according to perceptions, was associated with the latter two themes. Discussions and conclusions are provided next, along with limitations, recommendations, and implications for leadership.

Chapter 5: Discussion and Conclusion

Community colleges educate students from various demographics, including race, ethnicity, age, gender, and socioeconomic status. Previous research on college students focused on specific races, socioeconomic categories, or age groups. When exploring various assets of age groups, researchers typically categorized participants as traditional students or nontraditional students. Nontraditional students are age 25 and older, and the number of nontraditional students attending college is increasing (Woods & Frogge, 2017). Baby boomers fare in the nontraditional student category, but the age range of 25 and older does not warrant generalization of baby boomers as multiple generations are encompassed. The baby boomer generation consists of those born between 1946 and 1964, which allows for a smaller range for research than exploring community college students of all ages (Millsap, 2018).

The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. Both the CTML and the TAM were used to guide the study. Two research questions were developed from the framework:

Research Question 1: What are the experiences and perceptions of baby boomer community college students regarding the use of instructional technologies?

Research Question 2: How does the use of instructional technology affect classroom engagement, according to baby boomer perceptions?

After data were collected and analyzed, seven themes emerged and were identified in Chapter 4. Five of the seven themes related to the first research question about experiences and perceptions of baby boomer community college students. Two of the seven themes related to the second research question about how instructional technology affects classroom engagement,

according to the perceptions of baby boomers. The findings and interpretations, limitations, recommendations, and implications for leadership are described in the following sections.

Findings, Interpretations, Conclusions

After reviewing literature and identifying a research gap related to the lack of research on the use of instructional technology to engage baby boomers at the higher education level, the theoretical framework was used to guide the research. The CTML was developed by Mayer in 2001 and focused on using both audio and visual channels for instruction (Sezgin & Coskun, 2016). Using both audio and visual channels for learning at the same time can maximize a person's capacity to learn, process, and retain information (Bhatti et al., 2017). Many instructional technologies make use of both audio and visual channels. Research Question 1 focused on baby boomer community college students' experiences with and perceptions of instructional technology.

Davis developed the TAM in 1989 as an adaptation to the theory of reasoned action (Buabeng-Andoh, 2018). Major components of the TAM include perception of usefulness and ease of use of technology. According to the model, if perception of usefulness and ease of use of technology are high, individuals have an increased motivation to learn in digital environments (Asiyah et al., 2018). Research Question 2 focused on how instructional technology affects classroom engagement, according to baby boomer perceptions.

Using semistructured interviews to collect data, a total of 18 participants described their perceptions of and experiences with instructional technology. Many of the participants' comments related back to the research questions and theoretical framework. A detailed description of the findings and interpretations is provided as follows, including an explanation of how Themes 1 through 5 relate to Research Question 1 and how Themes 6 and 7 relate to

Research Question 2.

Research Question 1

Research Question 1 focused mainly on baby boomer community college students' lived experiences with and perceptions of instructional technologies. The semistructured interview questions (see Appendix E) were related to Research Question 1. Five corresponding themes that emerged from the data include reason for school, perceptions, experiences, technology used in courses, and comparison to others.

Theme 1: Reason for School

Participants indicated the reason for attending community college during either the 2018–2019 or 2019–2020 school year to be related to making a career change or finishing a degree. Helterbran (2017) identified three main reasons why adults who are older return to or attend college and indicated some adults who are older attend school to finish or complete a degree. Some of the participants did not have the opportunity to finish school due to pressures of work or family needs. The data aligned with Helterbran's findings about adults who are older feeling a need to finish school. Cummins et al. (2018) found some adults who are older attended school due to a belief the credentials and degrees were important for obtaining and maintaining jobs. The data collected and analyzed aligned with the findings of Cummins et al. as some of the participants indicated a career change as a reason for attending community college.

Theme 2: Perceptions

The data analyzed resulted in three codes for the theme of perceptions: positive perceptions, negative perceptions, and mixed perceptions. Of the positive perceptions, some participants indicated instructional technology was beneficial in providing ways for a larger scope of people to learn than through curriculum that does not include instructional technology.

The data aligned with Czaja's (2019) findings, which indicated adults who are older viewed technologies to be beneficial. Other participants indicated instructional technology was "great" and "fun." Florenthal (2018) found students perceived instructional technologies in the classroom to be fun and engaging.

Regarding negative and mixed perceptions of instructional technology, participants discussed issues such as technology "freezing" at times or only perceiving technology as positive when functioning properly. Prior literature about adults who are older who had mixed and negative perceptions of instructional technology was not found. The digital divide between digital natives and digital immigrants was researched as part of the literature review. Digital immigrants include those who did not grow up during the surge of technology or those who accepted and adopted technology, whereas digital natives grew up during the surge of technology (Howlett & Waemusa, 2018). Many adults who are older can be categorized as digital immigrants (Román-García et al., 2016).

Theme 3: Experiences

The theme of experiences was broken down into two codes: personal experiences and educational experiences. Personal experiences related to participants' prior use or knowledge of technology, whereas educational experiences related to specific incidents in which participants encountered technology in a school setting. Howlett and Waemusa (2018) argued, while digital immigrants and digital natives are often categorized by age, individuals should be categorized based on prior experience using technology. Some participants had experience and prior use of technology for work, prior classes, or personal use growing up, aligning with Judd's (2018) argument digital natives include individuals who are competent using technology.

Regarding educational experiences, many participants indicated difficulty learning how

to use instructional technology or having issues with automated grading systems. The poor educational experiences align with the TAM. For individuals who had trouble navigating technology, the perception of usefulness and ease of use of technology was low, which led to a low acceptance of technology.

Theme 4: Technology Used in Courses

For the theme of technology used in courses, three codes emerged from the data: devices, programs, and LMSs. Devices included electronics that allowed participants to complete coursework, communicate with others, or learn, such as Chromebooks, smartphones, or projectors. Literature from the review in Chapter 2 indicated smart boards and electronic slideshow presentations as devices used as instructional technology. Though smart boards were not described in the participants' interviews, electronic slideshow presentations, such as PowerPoint, were mentioned when projectors were discussed.

Participants cited PowerPoint, video conferencing software, and gamification apps as programs. Video conferencing software such as Zoom, Webex, and Skype was used for communication between students and instructors but was not found during the literature review. Gamification programs such as Kahoot! were mentioned by participants as a means of engagement in the course and a way to review material learned. Participants also indicated having positive attitudes toward gamification programs, aligning with the findings of Pektaş and Kepceoğlu (2019).

Learning management systems were discussed by participants, particularly Blackboard, the main platform used by the study site. Participants discussed features of Blackboard, including discussion boards, learning materials, turning in assignments, and communication. Such features were also described by Valova and Marinov (2019) and Al-Azawei (2019). Participants indicated

ease of use when using Blackboard, aligning with the findings of Bove and Conklin (2019).

Theme 5: Comparison to Others

The theme of comparison to others was broken down into two codes: comparison to other baby boomers and comparison to younger individuals. Participants indicated a mixture of responses regarding comparison to other baby boomers. Some participants felt more competent than others did within the same generation at using instructional technologies, due to prior exposure to technology or being on the younger side of the generation, which supported the findings of Salazar-Márquez (2017) about adaptability. Research participants who felt more competent at using technology than other baby boomers supported the concept of digital literacy. Digital literacy, according to Kaeophanuek and Na-Songkhla (2019), relates to an individual's ability to read, understand, and deliver information via electronic systems.

When conducting a comparison to younger individuals, baby boomer community college students reported feeling slower and more hesitant to learn new technologies. Many stated younger individuals had grown up surrounded with technologies and were better suited to use technologies in education. Participants stated preferring face-to-face classes over online classes, emphasizing a more traditional approach to teaching and learning as the preferred method. Urick (2017) stated a similar argument regarding adults who are older and a preference for hands-on experiences for learning.

Research Question 2

Research Question 2 focused mainly on how instructional technology affected classroom engagement, according to baby boomer community college students. The follow-up questions from the semistructured interview addressed Research Question 2. Two corresponding themes that emerged from the data were engagement and integration of technology.

Theme 6: Engagement

The theme of engagement was related to the second research question about how instructional technology affects classroom engagement. Three codes emerged from the theme: positive engagement, negative engagement, and mixed engagement. Participants who perceived positive engagement from instructional technologies enjoyed live lectures and discussion boards. Live lectures allowed for the use of both audio and visual channels, aligning with the CTML. Fayanto et al. (2019) found multimedia helped to increase interest and engagement in course content. Live communication and collaboration were also noted as reasons for perceived positive engagement.

Other participants described a negative perception of how instructional technology affected classroom engagement, stating younger students did not interact during live lectures. Such results conflicted with Colbert et al.'s (2016) argument digital natives are comfortable using technology for communication. Another reason for perceived negative engagement was the omission of real-time responses for discussion boards, even though Al-Azawei (2019) listed discussion boards as a LMS feature commonly used for increasing collaboration and engagement. Participants with a mixed perception indicated engagement depended on the group of students in the course as well as a need for balancing technology and human instruction. The results of the research indicated baby boomer perceptions of instructional technology affected classroom engagement, which was the focus of Research Question 2.

Theme 7: Integration of Technology

Participants indicated a need for education on how to use instructional technology for both the students and the instructors, as well as a need to balance instructional technology as supplemental to teaching with human interaction. Such findings aligned with Scalise's (2016)

argument instructors should scaffold hands-on activities to educate students on how to properly use instructional technology. Scalise also argued teachers should implement instructional technology thoughtfully, taking care to use technology as a supplemental tool and not as a primary method of instruction. Jones (2017) found teachers had similar attitudes toward technology use as a supplemental tool.

Summary of Findings

A gap in literature existed regarding the use of instructional technologies to engage students from the baby boomer generation, which includes anyone born between 1946 and 1964 (Moody, 2017). Through semistructured interviews, baby boomer community college students described experiences with and perceptions of instructional technology and the effect on classroom engagement. Congruent with the findings of Czaja (2019), most adults who are older had positive perceptions of technology. Supporting Ipek and Ziatdinov's (2017) argument, instructional technology should be used to aid and supplement traditional teaching methods.

Limitations

To ensure quality of research and ethical practices, confirmability, credibility, transferability, and dependability were kept in mind during the research process. Measures were taken to ensure each variable was addressed as appropriate for the study. Confirmability was ensured by creating an audit of the research process and keeping all components of the process saved on a password-protected laptop. Journaling was also conducted throughout the research process to address any biases.

Credibility relates to how the findings match reality and was ensured through use of video and audio recording as well as the process of member checking. Interviews were conducted virtually and were video and audio recorded using Zoom software for transcription

purposes. Each participant received a copy of the transcript of the semistructured interview for review. Participants were encouraged to address any errors of transcription and to confirm or deny accuracy of the transcript. The process of conducting member checks is consistent with Merriam and Tisdell's (2016) suggestions for increasing credibility.

Transferability relates to how generalizable the research may be to other populations. As the study was conducted in a community college in northern Illinois, results may not be generalizable to other parts of the United States where demographics differ. Results may be generalizable to other Midwestern baby boomer community college students.

Dependability relies on the consistency and repeatability of research. While measures were taken to ensure dependability, such as creating interview questions that were reviewed by SMEs, external circumstances may have affected the results of the study. The study took place during the COVID-19 pandemic in 2020, when most students were required to learn remotely through online education. With the removal of face-to-face classes and the new focus on online learning, many of the participants focused responses on online education instead of instructional technology and had to be redirected to the interview questions. The dependability of the study is strong as the research can be replicated. Results of the research may vary if the study is repeated at a time when a pandemic is not occurring.

A secondary limitation related to the pandemic was the format of the interviews. The original intent was for interviews to be conducted in person instead of online. Due to some Internet connectivity issues, some of the video and audio quality of interviews was poor, and two interviews were shorter than intended. Though all interview questions were asked and addressed, the two participants who had short interviews provided only concise responses to the questions. The responses given were still vital to the research, as the themes which emerged during the data

analysis were reinforced by the participants' answers.

The third limitation was the sample size. Eighteen participants were interviewed instead of 20. Recruitment occurred via email instead of in-person advertising, which may have contributed to the small sample size. Because the perceptions of and experiences with technology were explored for the research, a possible limitation could be the participants were not comfortable with or active using the student email. Due to the small sample size, generalizations may be made for baby boomer community college students in northern Illinois but not for all the United States, as demographics may vary in different regions.

Recommendations

The phenomenological study focused on baby boomer community college students' lived experiences with and perceptions of instructional technology. Findings from the study aligned with previous research that indicated adult students who are older have a positive perception of technology but are hesitant to use technology without prior knowledge. The 18 participants indicated three primary needs related to instructional technology. The first need is for instructors to be educated on how to properly implement technology in the classroom to avoid running into technological issues. The second need is for students to be educated on how to use technology in the classroom. The third need is for instructors to teach students how to use the technology for learning, as participants indicated some instructors expected students to already know how to use certain technologies.

Global Perspective of Findings

With the surge of online education, instructors should strive to narrow the digital divide and ensure students are properly educated on how to use technologies for learning. Online education allows for students from various locations globally to interact, communicate, and

connect with each other. Discussion boards, a common instructional technology used in higher education, may allow for individuals to communicate with each other asynchronously, including those who live in different time zones. Ensuring students know how to use the technologies required for class may help to enrich the learning environment for the students.

Future Research

Further research is needed to confirm the results of the study and to identify if results may be generalizable for other baby boomer community college students in the United States. Specifically, a larger sample size is recommended along with a different location for research. Future research should also take place at a time when a global pandemic is not occurring as the shift to online learning may have greatly affected participant responses and opinions of instructional technology.

Advice and Recommended Changes for Practitioners

Congruent with Czaja's (2019) findings, adults who are older have positive perceptions of technology but are less comfortable with technology. Community college instructors should strive to implement proper education and training for students when using instructional technologies by designating time in the course schedule for such training. Though Urick (2017) mentioned adults who are older prefer hands-on experiences for learning, participants indicated a need for balance of instructional technology.

A "human element" was stated as a necessity, and participants noted instructional technology should supplement teaching instead of taking over as the primary method of instruction. Instructors should also be intentional when implementing instructional technology as a supplement to traditional instruction. Participants expressed a desire to have instructors present information in a live format instead of prerecorded lectures. If possible, instructors should strive

to implement synchronous sessions for teaching in online courses. For face-to-face courses, instructors should allow for real-world application and relation to personal experiences, a preferred method of learning for adults who are older (Dole et al., 2016; Karabacak, 2018).

Community colleges should create policies to ensure instructors participate annually in professional development related to student engagement for all ages. By implementing a learner-centered approach to teaching—an important teaching practice, according to Dole et al. (2016)—instructors may be better able to engage a diverse group of learners. Professional development should also be required regarding the proper use of instructional technologies. While many features included in technologies are meant to improve communication and engagement, instructional technology should be used thoughtfully to aid and supplement instruction rather than serve as the primary method of teaching (Elaldı, 2018; Ipek & Ziatdinov, 2017; Sullivan et al., 2018).

Implications for Leadership

Results of the study aligned with the theory and model chosen to guide the research. The CTML and the TAM, based on the theory of reasoned action, were used in forming two research questions related to participants' experiences with and perceptions of instructional technology, as well as how instructional technology affects classroom engagement, according to perceptions. Participants indicated the use of instructional technology was helpful when working properly and when the participants were well educated on how to use the technology, aligning with the principles of the CTML. Another finding from the research was participants seemed to be more accepting of technology when perception of the technology was high, along with the perception of ease of use, aligning with the TAM. Results from the research led to implications for leadership.

Community College Leaders

The administration of community colleges should require instructors to participate in professional development centered on student engagement, diversity, and instructional technology. The results of the study indicate many instructors rely too heavily on instructional technology as the main source of teaching, and participants indicated a need for a human element for the primary method of teaching, with technology being used to supplement the instruction. Administrators may also take a close look at the syllabi provided by instructors to ensure technology requirements are listed or instructors are providing time for students to learn how to use required instructional technologies. As data can be collected from students on perceptions of instructional technology and student engagement, administrators can use the data to support best practices for teaching and learning.

Community College Instructors

Instructors may be considered as leaders of students, and implications apply to community college instructors. Care should be taken when designing curriculum to be inclusive of various demographics. Instructors should not only carefully design curriculum to be accessible to all learning types but also keep in mind ease of use for instructional technology. Participants indicated a need for instructors to teach students how to use instructional technology, and curriculum design should include a component of educating students on how to use technologies needed in class. If professional development on student engagement and instructional technology is not mandated, instructors should strive to include such elements of professional development to keep abreast of best practices for teaching.

Conclusion

The purpose of the descriptive phenomenological qualitative study was to explore baby boomer students' perceptions of and experiences with instructional technology in college courses and classroom engagement. Results of the study indicated most participants had a high perception of instructional technology but varied perception of ease of use. Though results aligned with the CTML and the TAM, needs were identified relating to instructors' knowledge on how to implement instructional technology in the classroom as well as a necessity for students to learn how to use the technology. Future research should be aimed at confirming results of the study across various regions of the United States. Higher education leaders, such as administrators and instructors, should also strive to take care to include all demographics in curriculum design.

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Appendix A

Research Location Permission Letter

September 5, 2019

████████

Director of IR, Wilson College

Dear ████,

My name is Brianne Mangione and I am a current adjunct faculty member in the Kinesiology and Health Education Department and past Diverse Faculty Fellow at Wilson College. I am pursuing an Ed.D. in Curriculum and Instruction at the American College of Education (ACE) writing to request permission to study Baby Boomer community college students at Wilson College through an interview. This information was used for my dissertation research related to Baby Boomers' perceptions of instructional technology in higher education. The purpose of the phenomenological qualitative study is to investigate the perceptions of Baby Boomer students on the use of instructional technology in college courses and classroom engagement. The research results was shared with instructional designers so that they may guide college instructors on best practices for effectively implementing technologies into the classroom.

My goal is to obtain 20 willing and eligible participants. I will conduct one 45-60 minute semistructured interview with the participants, asking questions regarding their experiences with instructional technology and their conceptualization as to how instructional technologies affect classroom engagement. The interview was audio and video recorded. After the interview has been transcribed, a copy of the transcription was sent to each to ensure accuracy of the data collected and analyzed through member checking.

Included as a separate file are the questions for the interview.

Important Contacts for this study include:

Principal Investigator: Brianne Mangione
E-mail: briannedurfey@gmail.com
Phone: (630)-485-8597

Dissertation Chair: Dr. Richard Herring
E-mail: Richard.herring@ace.edu

Thank you for your attention to this issue and prompt response. I appreciate your time and consideration of my request.

Regards,
Brianne Mangione, M.S.Ed

Appendix B

Letter of Support from Location Site

Office of Institutional Research

Date: September 23, 2019

Brianne Mangione
American College of Education

Dear Ms. Mangione

I am writing to express our support for your research study to investigate Baby Boomers' perceptions of instructional technology in higher education. We realize that you are still in process of writing your proposal and we look forward to hearing more details as they become available. ██████ College is very supportive of research efforts dedicated to improving success of its students. To that end, ██████ College will expedite the ██████ College Secondary IRB application once received. This secondary approval from the ██████ College IRB will permit you and your research team to conduct research on the ██████ College campus.

You agree to keep all data confidential, which includes creating special subject numbers, keeping data safeguarded, not sharing or reporting individual data to third parties for research or other purposes, and using the data only for agreed upon research. You understand and agree that no confidential information regarding any students or employees will be disclosed in any document intended for public disclosure.

We look forward to learning the results of your research.

With kind regards,

Appendix C

Notice of Approval – Expedited Review from Location Site

Protocol # FY20_012

NOTICE OF APPROVAL - EXPEDITED REVIEW

DATE: May 28, 2020

TO: Brianne Mangione

From: ▮▮▮▮▮▮▮, Institutional Research Director and Institutional Review Board Chair ▮▮▮▮

Re: Baby Boomer College Students' Perceptions of Instructional Technology: A Phenomenological Qualitative Study

Approval Date: May 28, 2020

Thank you for applying for approval through the ▮▮▮College IRB. I have reviewed the materials you submitted for ▮▮▮process as well as the approval received through the American College of Education Institutional Review Board. Based on this review, I have determined that your research qualifies for expedited review in accordance with the criteria published by the OHRP, 45 CFR 46.110 and FDA 21 CFR 56.110.

- Research poses no more than minimal risk to subjects, as assessed by the reviewer; AND
- Research for which each of the procedures falls within one of the DHHS Expedited review categories 1-7 and the Food and Drug Administration (FDA)
    - Specifically Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As outlined in our Expedited Review protocol; I am able to grant ▮▮▮College IRB approval without a review by our full IRB panel for the study identified above. This study is approved from May 28, 2020 to May 28, 2021. For each additional year of study approval, you will need to submit a Study Continuance Request along with the American College of Education letter of continued approval.

AMENDMENTS: Investigators are required to report via email to ▮▮▮▮▮▮▮▮ANY changes to the research study (such as design, procedures, study information sheet/consent form, or subject population, including size). The new procedure may not be initiated until IRB approval has been given.

AUDIT OR INSPECTION REPORTS: Investigators are required to provide to the IRB a copy of any audit or inspection reports or findings issued to them by regulatory agencies, cooperative research groups, contract research organizations, the sponsor, or the funding agency.

COMPLETION: It is your responsibility to let the IRB know when this study is complete by sending an email to ▮▮▮▮▮▮▮ In addition, please provide the ▮▮▮College IRB with a copy of any presentations or papers that result from this study. Finally, it is your responsibility to let the IRB office know of address changes and project date changes.

We suggest you keep this letter with your copy of the approved protocol. Please refer to the exact project title and protocol number in any future correspondence with our office. All correspondence must be typed.

Appendix D

Letter of Recruitment

Dear Wilson College Students:

My name is Brianne Mangione and I am pursuing my doctoral degree of education at American College of Education (ACE) and I am a current academic advisor and adjunct faculty member at Wilson College in the kinesiology/health education department. I am writing to inform of you of an opportunity to partake in a study on Baby Boomer community college students' experiences with and perceptions of instructional technologies and how Baby Boomers relate instructional technology to classroom engagement. The goal of the phenomenological qualitative study is to share results with instructional designers so that they may guide college instructors on best practices for effectively implementing technologies into the classroom.

Data was collected through an interview. This will require one 45-60 minute interview session, which will take place at a location site convenient to the participant or conducted virtually. The interview will be video and audio recorded. After the interview has been transcribed, a copy of the transcription was sent to each participant to ensure accuracy of data analyzed through the process of member checking. Participation is completely voluntary, and participants may withdraw at any time. Potential participants must meet the following requirements:

1. Be born between 1946-1964
2. Have been enrolled at Wilson College within the past two years
3. Have no prior personal or professional relationship with the researcher

Personal information was kept confidential, and no names was shared in the published results. All information was kept secure in a password-protected laptop to ensure confidentiality.

If you would like to participate in the study, or if you have any questions about the procedures, please reach out to me via email at briannedurfey@gmail.com.

Thank you for your time and consideration of participation.

Sincerely,

Brianne Mangione, M.S.Ed

Appendix E

Informed Consent

Prospective Research Participant: Read this consent form carefully and ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Project Information

Project Title: Baby Boomers' Perceptions of Instructional Technology in Higher Education: A Phenomenological Qualitative Study

Researcher: Brianne Mangione
Organization: American College of Education
Email: briannedurfey@gmail.com   **Telephone:** (630)-485-8597

Researcher's Faculty Member: Dr. Richard Herring
Organization and Position: American College of Education, Dissertation Committee Chair
Email: Richard.herring@ace.edu

Introduction
I am Brianne Mangione, and I am pursuing my doctoral degree of education at American College of Education. I am doing research under the guidance and supervision of my Chair, Dr. Herring. I will give you some information about the project and invite you to be part of this research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words you do not understand. Please ask me to stop as we go through the information, and I will explain. If you have questions later, you can ask them then.

Purpose of the Research
You are being asked to participate in a research study which will assist with understanding experiences with and perceptions of instructional technology from Baby Boomer students at Wilson College. This qualitative study will examine how Baby Boomers relate instructional technology to classroom engagement. At the end of the study, the data was shared with instructional designers so that they may guide college instructors on best practices for teaching with technologies.

Research Design and Procedures
The study will use a qualitative methodology and phenomenological research design. The study will comprise of 20 voluntary participants, who will each participate in one 45-60 minute interview and member checking. The interview was conducted at a site most convenient for participants or conducted virtually. Interview will be video and audio recorded. After the interview have been transcribed, a copy of the transcription was sent to each participant to ensure accuracy of data through member checking.

Participant selection

You are being invited to take part in this research because of your experience as a Baby Boomer community college student who can contribute much to the perceptions of instructional technologies, which meets the criteria for this study. To qualify for participation in the study, individuals are required to (a) have been born between 1946 and 1964, (b) have been enrolled in a community college course at the selected institution within the past two years, and (c) not have a professional nor personal relationship with the researcher. Not meeting one of the required criteria will result in participant exclusion from the current study.

Voluntary Participation
Your participation in this research is entirely voluntary. It is your choice whether to participate. If you choose not to participate, there was no punitive repercussions and you do not have to participate. If you select to participate in this study, you may change your mind later and stop participating even if you agreed earlier.

Procedures
We are inviting you to participate in this research study. If you agree, you will be asked to schedule one 45-60 minute video and audio recorded interview. The type of questions asked will range from a demographical perspective to direct inquiries about the topic of instructional technology. The interview was video and audio recorded. After the interview have been transcribed, a copy of the transcription was sent to each participant to check accuracy of the written analysis through member checking.

Duration
The interview portion of the research study will require approximately 45-60 minutes to complete at a location and time convenient for the participant or conducted virtually.

Risks
The researcher will ask you to share personal and confidential information, and you may feel uncomfortable talking about some of the topics. You do not have to answer any question or take part in the discussion if you don't wish to do so. You do not have to give any reason for not responding to any question.

Benefits
While there was no direct financial benefit to you, your participation is likely to help us find out more about how Baby Boomers' experience and perceive instructional technology and how Baby Boomers relate instructional technology to classroom engagement. The potential benefits of this study will aid instructional designers in guiding college instructors on how to effectively implement technologies into the classroom.

Confidentiality
I will not share information about you or anything you say to anyone outside of the researcher. During the defense of the doctoral dissertation, data collected was presented to the dissertation committee. The data collected was kept in a locked file cabinet or encrypted computer file. Any information about you was coded and will not have a direct correlation, which directly identifies you as the participant. Only I will know what your number is, and I will secure your information.

Sharing the Results
At the end of the research study, the results was available for each participant. It is anticipated to publish the results so other interested people may learn from the research.

Right to Refuse or Withdraw
Participation is voluntary. At any time, you wish to end your participation in the research study, you may do so without repercussions.

Questions About the Study
If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact me at briannedurfey@gmail.com. This research plan has been reviewed and approved by the Institutional Review Board of American College of Education. This is a committee whose role is to make sure research participants are protected from harm. If you wish to ask questions of this group, email IRB@ace.edu.

Certificate of Consent
I have read the information about this study, or it has been read to me. I acknowledge why I have been asked to be a participant in the research study. I have been provided the opportunity to ask questions about the study, and any questions have been answered to my satisfaction. I certify I am at least 18 years of age. I consent voluntarily to be a participant in this study.

Print or Type Name of Participant: _____

Signature of Participant: _____

Date: _____

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this Consent Form has been provided to the participant.

Print or type name of lead researcher: _____

Signature of lead researcher: _____

PLEASE KEEP THIS INFORMED CONSENT FORM FOR YOUR RECORDS.

Appendix F

Interview Questions

Baby Boomer Community College Student Interview – Semistructured

Demographic Questions

1. Describe your academic career with regard to completion, diplomas, or degrees prior to your current academic pursuit.

2. Tell me about what prompted you to pursue your current academic career.

3. How would you describe your current study habits and learning preferences as a student?

Content-Related Questions

1. Tell me about how technology has been used in the courses you have taken. What are some examples?

2. What is your opinion about technology being used in instruction?

3. Give me a current example of a time when technology was introduced to you as a form of instruction.

4. Can you describe your experience with instructional technologies?

5. How do you feel about using instructional technologies?

Appendix G

Subject Matter Expert Validity Request Email
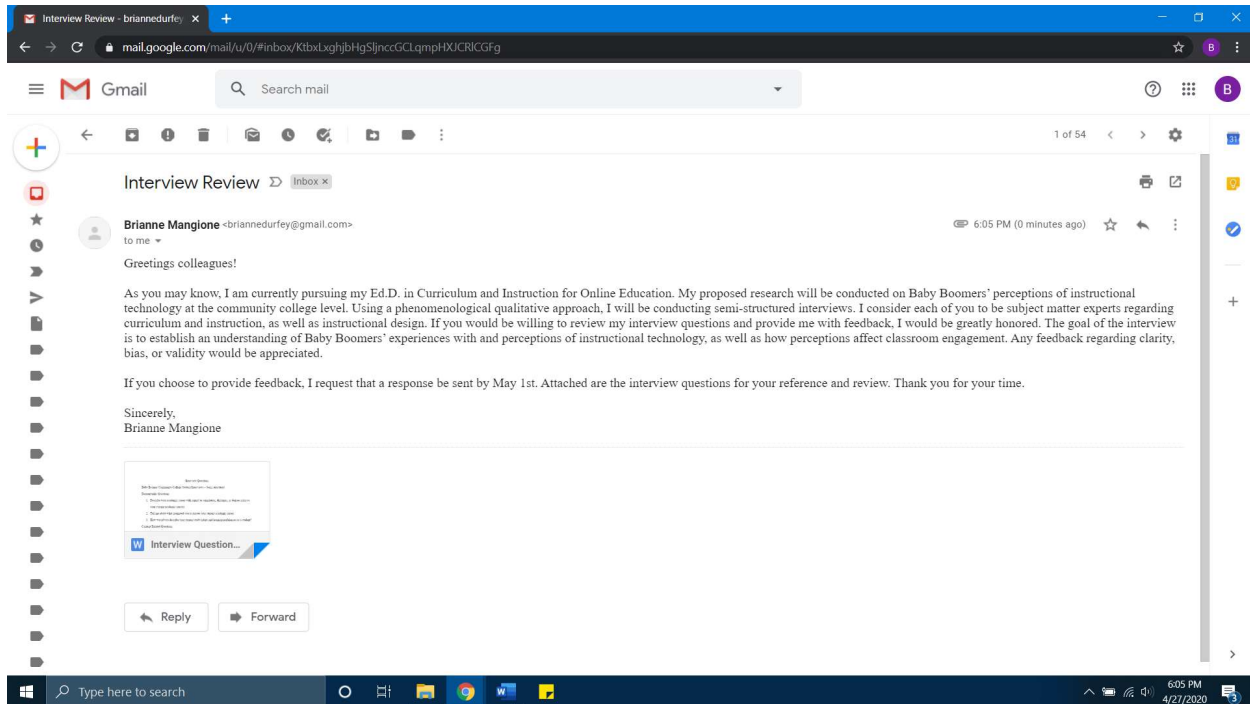
Contents of Email:

Greetings colleagues!

As you may know, I am currently pursuing my Ed.D. in Curriculum and Instruction for Online Education. My proposed research was conducted on Baby Boomers' perceptions of instructional technology at the community college level. Using a phenomenological qualitative approach, I was conducting semistructured interviews. I consider each of you to be subject matter experts regarding curriculum and instruction, as well as instructional design. If you would be willing to review my interview questions and provide me with feedback, I would be greatly honored. The goal of the interview is to establish an understanding of Baby Boomers' experiences with and perceptions of instructional technology, as well as how perceptions affect classroom engagement. Any feedback regarding clarity, bias, or validity would be appreciated.

If you choose to provide feedback, I request that a response be sent by May 1st. Attached are the interview questions for your reference and review. Thank you for your time.

Sincerely,
Brianne Mangione