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Online Teaching Self-Efficacy and Faculty ICT and Computer Attitudes in Higher Education

Sharifa Jomoke Simmons
Walden University

Walden University

College of Education

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Sharifa J Simmons

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Review Committee
Dr. Blessing Adeoye, Committee Chairperson, Education Faculty
Dr. Dennis Beck, Committee Member, Education Faculty
Dr. Shereeza Mohammed, University Reviewer, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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MS, Walden University, 2014

MPA, Fairleigh Dickenson University, 2007

BA, San Francisco State University, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Technology

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Abstract

The digital age is reshaping learning and instruction and encouraging educational technology advances within higher education institutions. However, online faculty are not integrating technology into their classes despite the technology related professional development they receive. The purpose of this quantitative study was to determine if a relationship exists between online teaching self-efficacy and Information and Communications Technology (ICT) and computer attitudes and faculty participation in technology professional development activities, gender, and age within the context of institutions of higher education. Alfred Bandura's social learning theory and Roger's diffusion of innovations theory framed the study. Using Qualtrics, survey data were collected from 42 faculty who had taught, co-taught, or developed an online course. The data were then analyzed using multiple linear regression via SPSS for two research questions. The findings showed no statistically significant relationship between technology professional development, online teaching self-efficacy, and ICT and computer attitudes. These non-significant findings indicate that factors other than those investigated in this study appear to have impeded faculty integration of technology in their classrooms. A qualitative investigation is recommended for further study to reveal these factors. Since this study indicates that neither gender nor age affects faculty online teaching self-efficacy, the implications for positive social change are that all faculty, regardless of their gender or age, can integrate technology in the classroom, thereby impacting student success.

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Dedication

It is with great pleasure that I thank my ancestors for giving me the strength and courage to pursue all my dreams. I join a host of aunts and uncles who came before me. While it started before the Pichon, I've heard stories that confirm I am because of the Edward-Johnsons, and my dearest maternal Grandmother Elnora Ruth James, who with her loving nature watched me as my own mother earned her doctorate. My paternal grandmother Lovie Gene Fultz who for who was a traveler herself yet could not understand my need to explore the world - yet showed me the world is my oyster. My grandparents Sylvia and Joel Mitchell who continue to show me hard work pays off and encouraged me throughout educational endeavors.

My parents Jonathan Thomas and Dr. Karimah AdisaThomas who demanded excellence at all cost and encouraged me to pursue my education.

I am both thankful and blessed to be able to show my own son, Asher Eze that he too is my greatest dream. That dreams are worth pursuing and that they absolutely can come true. Aspire to be and pray, as I pray for you every day. I dedicate this to you, my heart, my love.

My loving, darling sister who knew I would always achieve this monumental goal. I made it sissy! Jamila Asha Adisa, I dedicate this to you. May you rest in peace and always fly high above me, yet ever so close – I love you past eternity.

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I would also like to thank my tutors, I would also like to thank my tutors, Dr. Zin Htway and Dr. Reginald Taylor for their valuable guidance throughout my studies. You provided me with the tools that I needed to choose the right direction and successfully complete my dissertation.

Once again, I would like to thank my parents for proofreading my entire dissertation prior to submission. You both have absolutely helped me reach this point in my academic career.

Finally, last but not least Asher Eze thank you for choosing me to be your mother during the process and for the moments of joy you have awarded me when the process seemed insurmountable.

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Chapter 1: Introduction to the Study

Introduction

"Educational technology is the study of and improvement of technology that is used to facilitate and improve learning through the creation, use, and management of appropriate technological processes and resources" (Januszewski & Molenda, 2013, p. 1). The educational paradigm of the 21st century necessitates the presence of technology in teaching and learning, a multidimensional pedagogical approach to instruction, and an academic culture that fosters integrity, creativity, and lifelong learning. This shift requires that faculty create innovative, engaging, and dynamic learning materials and resources to meet the expectations and needs of online learners. Goh and Sigala (2020) contend the overarching advantages to students when instructors use ICT in the classroom including real-life experiences, allowing students to participate in cognitive activities, the provision of student-centered individualized feedback, piquing student interest, and simplification of the course preparation process. Long et al. (2019) found that despite the benefits of ICT, there are low adoption rates in classroom teaching and delivery due to the low self-efficacy and technological readiness of instructors. Faculty are reluctant to implement and use ICT in their teaching practices for various reasons, but the primary reasons include time requirements for learning modern technology and perceptions of ICT implementation as difficult (Long et al., 2019; Sigala & Christou, 2003). Barriers related to faculty attitudes, perceptions, and motivations may impact the success of ICT implementation efforts.

Additionally, social-cultural barriers such as institutional, personal, and technological obstacles may hinder faculty success and implementation efforts (Liu, et al., 2020). In this study, I examined five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. Diffusion of innovations was used as a catalyst to understand how evolving faculty expectations affect faculty online teaching experiences. The increasing number of adult and traditional learners entering, and reentering institutions of higher education may make it difficult for institutions to continue using traditional delivery methods. Institutions of higher education view distance learning as a modality of course delivery that addresses high enrollments and reduces the cost associated with traditional classroom facilities (Jones, 2003; Orr, et al., 2009). Thus, it is beneficial to understand how to adequately prepare faculty for online instruction, their efficacy as it relates specifically to online teaching, and how ICT and computer attitudes potentially correlate to these factors.

This chapter includes a brief overview of the study by describing the background of the study, the issues addressed in this study, and the purpose of the study. The research questions and variables of the study are explained, together with the theories used to guide this study. There are also descriptions regarding the terms used in the literature and throughout the study. Finally, the nature of the study, limitations, and significance are addressed.

Background

The digital age is reshaping the focus of learning and instruction and encouraging the implementation of educational technology within institutions of higher education. While research on self-efficacy of faculty is robust, it is sparse as it relates to online teaching specifically, nor does it address ICT and computer attitudes in conjunction with online teaching self-efficacy (Robinia, 2008). In this multiple linear regression study, I focused on higher education faculty by examining their pedogeological practices and attitudes within online learning environments. Faculty at institutions of higher education must be trained and supported in their use of technology in the online environment. The most considerable influence on distance learning is not technical device innovation, but the professional development of educators, designers, and learners (Johnson, et al., 2012). According to Simonson, et al. (2015), distance learning can be defined as institutionalized formal education where learning and teaching groups are separated, and active technological systems are used to connect resources, instructors, and learners. Distance learning and instructional technology efforts at institutions of higher education are dependent on faculty support (Padgett & Conceição-Runlee, 2000). The integration of technology into courses requires instructors to shift their teaching practices and their understanding of how technology can benefit their pedagogical practices (Otero et al., 2005). The successful introduction of new technologies into academic environments creates environmental dependencies such as willing and able faculty, the right time and place, and appropriate methods (Robinson, 2003). These dependencies may have positive or negative technology implementation outcomes. Designers of technology focused

faculty development programs and institution administrators must be able to convince faculty of the benefits of implementing technology in course design to combat the often-perceived increase in workload with a minimal benefit (Robinson, 2003). Padgett and Conceição-Runlee (2000) contend faculty participation in basic skills training facilitates the understanding and application of technology, which encourages faculty to use available tools and resources. Furthermore, comprehensive training includes both pedagogical and technical aspects for online course delivery (Palloff & Pratt, 2007). Gibson and Blackwell (2005) present four categories for faculty training models: formal, informal, voluntary, and required. Common variations in training models include coaching, mentoring, immersion, and workshop based.

The faculty role in an online class involves coaching, mentoring, guiding, and directing learning rather than lecturing and telling. Online courses involve more of a bottom-up development of knowledge that requires learners to interact with each other and the content. When developing online classes, the time that is traditionally spent creating lecture notes and handouts is spent preparing short mini-lectures and introductions, facilitating community-building experiences, and monitoring and guiding students in their learning experiences. Faculty members who teach distance-learning courses must learn and apply teaching practices based on current research in the field of educational technology, how people learn, and the effective use of technology (Kenney et al., 2010).

Learning is the process or experience of obtaining knowledge, skills, and attitudes. Some of the ways people learn are by doing, exploring, listening, reading,

studying, being rewarded, making and testing predictions, teaching, abstracting, observing, problem-solving, analyzing, repeating, questioning, paraphrasing, discussing, and taking notes (Spector, et al., 2014). In this study, I examined if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. Diffusion of innovations was used as a catalyst to understand how evolving faculty expectations affect faculty online teaching experiences.

Considering the ramifications to online instruction, it is imperative to examine the relationship between faculty development and online teaching self-efficacy. Self-efficacy refers to the belief in one's ability to succeed in specific situations or accomplish a task (Bandura, 1997). Understanding an individuals' perception of their ability to teach online courses after receiving online teaching professional development has the potential to provide insights that support the necessity of professional development focused on online teaching.

Online teaching efficacy refers to the teacher's belief in their capability to organize and execute courses of action and to bring about desired outcomes in an online learning environment (Robinia & Anderson, 2010). Thus, the variables in this study included faculty online teaching self-efficacy and ICT and computer attitudes. A relational analysis was conducted between faculty technology professional development participation, online teaching self-efficacy, faculty ICT and computer attitudes, gender, and age to understand faculty expectations and online teaching experiences.

Twenty years ago, Padgett and Conceição-Runlee (2000) noted that as students continue to experience technology in innovative ways, they begin to expect online access to course materials and institutions. By extension, there may be the expectation that faculty respond to students' needs on a global scale. What educational researchers have seen in the field in the last 18 years is that there is an expectation that faculty use technology in their pedagogical practice effectively. There is a high demand for students to have technical literacy, which requires that faculty be technically competent to facilitate teaching and learning in a highly technical academic environment (Padgett, & Conceição-Runlee, 2000). Robinson (2003) contended that faculty attitudes towards technology impact teaching and learning by providing two psychosocial factors that can affect a faculty member's use of technology. Ajzen and Fishbein (1988) conducted seminal research in the field of attitudes, and they described the attitude as a pre-disposition to respond either positively or negatively to objects in the world. Their research provided the foundation for much of the research on computer attitudes, which is based on asking individuals to respond to numerous scales addressing various aspects of computer use. There are many scales used to examine computer attitudes, which will be discussed more in Chapter 3. In this study, a modified version of Selwyn's (1997) CAS the ICT/Computer Attitude Scale (ICTCAS) modified by Larbi-Apau and Moseley (2012) was used.

Selwyn's (1997) CAS is a 21-item scale used to measure positive and negative attitudes towards the use of computers. Garland and Noyes (2008) found that the CAS had a mean score for the 20 items of 66.25 (SD = 8.74). A high Cronbach's alpha value

of .79 was obtained. The CAS was composed of four distinct but complementary attitude constructs that include affective, perceived usefulness, behavior, and perceived behavioral control. In totality, the scale provides data that may lead to a deeper understanding of the respondent's attitudes towards ICT and computers. Prior research has indicated that some faculty are concerned with "what's in it for me," while others will use technology if they are trained to do so; however, they will not attend group sessions because of their desire to receive individual and customized training that meets their particular needs. For example, Lisowski, et al. (2006) conducted a pilot effort to integrate technology meaningfully into pre-service teacher education and found that a "what-we-need and when-we-need-it" training component was the most successful aspect of their faculty development project. Faculty professional development programs that require faculty to attend workshop sessions on a variety of topics without promoting an understanding of how training will influence their teaching are inadequate and tend not to meet the needs of the faculty or lead to modification of teaching practices (Kenney et al., 2010). In this multiple linear regression study, I do not highlight the variations in professional development course content. Rather, I examine the single variable of whether faculty participated in technology professional development programs.

Often university programs do not advocate the use of andragogy but instead focus on new hire workshops and training sessions designed to fix a gap assumed to be present in faculty teaching style (Johnson et al., 2012). Providing learning opportunities to faculty on student-centered approaches facilitates the understanding of technologies, pedagogical best practices, encourages a shift in beliefs, and intentions of the faculty

(Rienties, et al., 2013). The application of learning theories may significantly influence learning experiences in faculty development programs (Johnson et al., 2012). The use of programs designed with andragogical considerations also have the potential to significantly enhance teaching and learning (Johnson et al., 2012). Lee and Tsai (2010) found that faculty learning experiences in distance learning courses promoted a deeper understanding of the student perspective by faculty. Faculty who attend pedagogical development programs when they have limited knowledge of learning theories are negatively impacted due to their limited ability to achieve higher order thinking and understand real-life application of online learning situations (Johnson et al., 2012).

Faculty development course designers must understand best practices relating to pedagogy, increased integration of technology, modeling, and just-in-time learning, all of which are consistent with best practices in faculty development learning (Lee et al., 2010). Institutions of higher education must understand the relationship between theory and practice when providing learning opportunities to educators and develop robust faculty development programs with these characteristics that are flexible and will endure over time (Johnson et al., 2012). Meeting faculty where they are and narrowing the audience to focus on specific needs, as well as creating larger groups with subgroups that have shared goals, accountability, and leadership, would benefit faculty and enhance learning experiences (Lee et al., 2010).

Few studies have specifically examined online teaching self-efficacy of faculty in higher education. This study is essential to better understanding online teaching self-efficacy and attitudes towards ICT and computers. The examination of these variables in

sum established whether a relationship exists and to what degree because these variables are predictive of online teaching self-efficacy and ICT and computer attitudes.

Problem Statement

The problem is that online faculty are not integrating technology into their classes despite the professional development they are receiving. Online teaching self-efficacy and computer and ICT attitudes impact pedagogical practices and, therefore, student learning experiences. It is necessary to understand whether training faculty in technology professional development programs that focus on online teaching will advance the application of online teaching techniques among faculty. Educational technology innovations create exciting times in higher education institutions, with many leaders buying into promises of better teaching and learning opportunities. Reimers (2011) contends that the convergence of innovation, technology, and educational entrepreneurship are key components that can transform the "ecosystem" and provide the most significant potential. The examination of distance learning integration occurring in higher education is one of great relevance and a necessity as higher education institutions strive to increasingly advance teaching and learning using technology as an instructional tool. I sought to determine if there is a relationship between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty computer and ICT attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. The study was guided by two theoretical frameworks: the construct of self-efficacy derived from Alfred Bandura's (1977) social learning theory and Everett Rogers's (2003) diffusion of innovations theory. Absent from the literature

are activities that may contribute to faculty online teaching self-efficacy beliefs that prepare faculty in higher education institutions to effectively integrate technology into their instructional practices (Robinia, 2008). This study had the potential to provide insight into factors that influence technology adoption by faculty in higher education.

Purpose of the Study

The purpose of this quantitative multiple linear regression study was to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, faculty ICTs and computer attitudes, gender, and age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. In this study, I examined if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. The examination of these variables acted as a vehicle to understanding how evolving faculty expectations affect faculty online teaching experiences. Determining whether there was a relationship between the variables may foster comprehension by faculty practitioners as it relates to their ability to effectively transition from traditional models of teaching into student-centered approaches required in online teaching and learning. Furthermore, one of my objectives in this study was to determine if a relationship exists among subjects' scores among demographical groups. Thus, the study includes analysis of faculty gender and age. The analysis had the potential to positively contribute to the area of educational technology in higher education.

Higher education institutions are challenged with effectively and efficiently managing environments, which are often dynamic and experience high levels of innovation and creativity due to rapid technological change, shortened product life cycles, and globalization. Creativity, innovation, and risk-taking are essential contributors to the success and competitive advantage of institutions of higher education as well as the economy (Gumusluoglu & Ilsev, 2009). This is significant to higher education technology integration efforts as the examination of the relationships between faculty technology professional development participation, online teaching self-efficacy, and faculty computer attitudes may assist faculty who teach online to effectively transition from traditional modes of teaching to student-centered approaches.

Research Questions and Hypotheses

In this study, I examined if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. The following research questions, null and alternative hypothesis, guided the examination of the variables.

RQ1: What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?

$H_0$1: There is not a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

H_a1: There is a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

RQ2: What is the relationship between faculty technology professional development, gender, and ICT and computer attitudes?

$H_0 2$: There is not a significant relationship between faculty technology, professional development, gender, and ICT and computer attitudes.

$H_a 2$: There is a significant relationship between faculty technology professional development, gender, and ICT and computer attitudes.

Theoretical Frameworks

The overarching theoretical frameworks used to shape this study were the construct of self-efficacy derived from Alfred Bandura's (1977) social learning theory and Everett Rogers's (2003) diffusion of innovations theory. Bandura's construct of self-efficacy was derived from social learning theory (Bandura, 1977). Rogers's (2003) diffusion of innovations theory was applied to examine and interpret the research findings within the context of computer integration (diffusion of innovations) within higher education. This section includes a review of the concepts of self-efficacy and diffusion of innovations. A more in-depth analysis is found in the literature review in Chapter 2.

A teacher's beliefs regarding efficacy are related to both their instructional practices and the achievement of their students (Tschannen-Moran, et al., 1998). The construct of self-efficacy derived from Bandura's social learning theory and Rogers's (2003) diffusion of innovations theory aligned with this study because online teaching is

innovative. The shared higher education situational context of the participants and online teaching self-efficacy examined concurrently in the study aligned with the findings of previous research. Researchers contended that innovation has a greater likelihood of adoption if it contextually addresses specific problems or issues or when it is relevant to the institution (higher education) and individual (faculty) and what they are being required to do (Chang & Tung, 2007; Cohen-Vogel & Ingle, 2007; Wolf, 2006). This multiple linear regression study, through the research questions posed, had the potential to highlight the relationships between faculty online teaching self-efficacy and ICT and computer attitudes within the context of the diffusion of innovations process that occurs within institutions of higher education. An individual's perceived level of self-efficacy is a valid predictor of the anticipated behavior they will demonstrate when performing a task (Koliadis, 1997).

Computer self-efficacy is derived from a previously formed sense of self-efficacy and is characterized by fundamental elements in the use and mastery of computers (Karsten & Roth, 1998). Looney, et al. (2004) found that general self-efficacy has a significant positive relationship to computing at domain and task levels. Looney et al. filled a gap in the literature related to self-efficacy generalizability frameworks. Their research supports prediction to a considerable degree of how an individual will use technology-based upon their computer self-efficacy level. Thus, those with greater levels of computer self-efficacy tend to prefer using technologies, for example using the Internet to conduct research. In contrast, participants with lower levels of computer self-

efficacy prefer more traditional methods, such as using the library to conduct research or giving traditional lectures.

In this study, issues related to technology use were examined through the consideration of technology barriers provided by Rogers's (2003) diffusion of innovations theory to establish a systemic approach to diffusion implementation. The technology innovative decision process described by Rogers contends that faculty participate in a process that involves the progression of their knowledge, attitudes, or opinions, and then decide whether to accept or reject an innovation, subsequently resulting in the implementation of the innovation and confirmation regarding their decision to implement the educational technology innovation.

Social learning and diffusion of innovation theoretical frameworks were needed to examine the interconnectedness of faculty professional development participation/non-participation, online teaching self-efficacy, faculty ICT and computer attitudes, and diffusion of innovations in higher education institutions. In this context, the effect of faculty online teaching self-efficacy, attitudes toward using computer supported education/ICT, and the examination of the diffusion of innovations process in higher education have the potential to provide much-needed contributions to literature related to the field of higher education online learning.

The examination of faculty technology attitudes was explored using an ICTCAS. The development of computer attitude scales (CAS) began in the 1980s following the introduction of the first computer in 1978. In institutions of higher education, faculty use computers and often other educational technology tools. This research was used to

examine faculty technology professional development participation, faculty online teaching self-efficacy, faculty computer and ICT attitudes, gender, and age within the framework of the diffusion of innovations theory in institutions of higher education. The frameworks that undergirded the study have shown a positive history of being applied in research studies that examined computer self-efficacy and ICT and computer attitudes. The chosen instruments collectively addressed the research questions examined and have been shown to provide reliability in prior relationship studies.

Nature of the Study

The methodology and design of this study was quantitative multiple linear regression. While researchers continued to explore qualitative approaches in the early 21st century, quantitative studies continued to dominate major educational communication technology journals, particularly in the United States (Axtell, et al., 2007; Hrastinski & Keller, 2007). A review of the literature by Kucuk, et al. (2013) revealed the various research methodologies used in educational technology research from 1990 to 2011. According to Kucuk et al., the following are the percentages of methodologies used: quantitative non-experimental approach 34.8%, qualitative approach 22.1% (case study, phenomenological, grounded theory, cultural analysis, concept analysis), quantitative experimental 18%, mixed-method approach 9.9% (explanatory, triangulation, and exploratory) and other theoretical approaches including literature reviews and meta-analysis at a rate of 15.2%.

In this study, I examined if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c)

faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. The study included the use of the Michigan Nurse Educators Sense of Efficacy for Online Teaching (MNESEOT) Instrument developed by Robinia and Anderson (2010) and Robinia (2008) and a modified CAS called the ICTCAS that was modified by Larbi-Apau and Moseley (2012).

The MNESEOT was edited with permission by the author to remove all references to nursing to facilitate use across a broader range of faculty. The MNESEOT scale title was modified for this study and is referred to throughout the study as the Educators Sense of Efficacy for Online Teaching (ESEOT). The ESEOT survey examined self-efficacy in the domains of student engagement, instructional strategies, classroom management, and the use of computers. The variables were tested to determine if a relationship exists against the ICTCAS independent variables of affective, perceived usefulness, behavior, and perceived behavioral control. I applied a non-probability purposive sampling strategy for the study. The sample was drawn from the Walden University participant pool. Walden University is an American-based, online university. Study participants were required to have taught, co-taught, or developed an online course to be eligible to participate in the study. The previously mentioned survey instruments were used to collect data for this study.

Definition of Terms

Attitude refers to a pre-disposition to respond either positively or negatively to objects in the world (Ajzen & Fishbein, 1988)

Blended or hybrid course refers to a course where a significant portion is delivered online. The defined range is between 30% and 79% (Deubel, 2007).

Computer self-efficacy refers to the judgment of one's capability to use a computer (Compeau & Higgins, 1995).

Diffusion refers to the process by which an innovation is communicated through specific channels over time to members of a social system, while innovation refers to an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003).

Distance learning refers to institutionalized formal education where the learning and teaching groups are separated and active technological systems are used to connect resources, instructors, and learners (Simonson et al., 2015).

Educational technology refers to the study and improvement of technology used to facilitate and improve learning through the creation, use, and management of appropriate technological processes and resources (Januszewski & Molenda, 2013).

Faculty development refers to traditional onboarding activities such as institutional policies and procedures and does not necessarily include online teaching instruction.

Faculty technology professional development refers to professional development activities that include some or all of the following: how to assess student learning, creating online communities, training on learning management system use, student online learning styles, and instructional design models. Training may be informal, individualized consultations or formal, instructor-led courses.

Higher education institution refers to any accredited community college, college, or university that provides 2- or 4-year post-secondary education programs leading to the conferral of a certificate, diploma, associate degree, baccalaureate degree, or post-graduate degree.

Information and communication technology (technologies) refers to hardware and software that enables and promotes communication of content, educational or otherwise, in online networks and communities of learning.

Innovation refers to an idea, practice, or object perceived as new by an individual or other unit of adoption (Rogers, 2003).

Online course refers to a course where 80% or more of the instruction and content is delivered online (Deubel, 2007).

Online teaching efficacy refers to the teacher's belief in his or her capability to organize and execute courses of action to bring about desired outcomes in an online teaching environment (Robinia & Anderson, 2010).

Professional development refers to any institutionally provided online teaching and educational technology course, workshop, or in-service.

Self-efficacy refers to the belief in one's ability to succeed in specific situations or accomplish tasks.

Teaching self-efficacy represents teachers' confidence in their ability to facilitate the development of students' knowledge, abilities, and values (Tschannen-Moran et al., 1998).

Assumptions

Based on the quantitative research design of this study, I made several assumptions regarding the participants. First, it was assumed faculty participants provided true and accurate responses to each question as representatives of institutions of higher education. Second, it was assumed faculty participants were honest in statements made in previous studies conducted at institutions of higher education related to distance-learning (see; Horvitz, et al., 2015; Kidd, et al., 2016). The third assumption was that faculty had participated in either online, blended, or hybrid course facilitation, implementation, or development and design. Lastly, it was assumed faculty provided truthful and unbiased responses to the questionnaires to the best of their ability. Due to the targeted audience, the assumptions existed to ensure the sample population included participants who were reflective of the intended demographic.

Scope and Delimitations

The scope of this study was to examine if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. This study was a catalyst for identifying how evolving faculty expectations affect faculty online teaching experiences. The examination included faculty perceptions, behaviors, and attitudes. The ICTCAS includes four distinct but complementary attitude constructs, namely affective, perceived usefulness, behavior, and perceived behavioral control. The following were identified as delimitations for this study:

- This study was limited to faculty who are members of a Walden University Participant Pool and members of LinkedIn and Facebook training groups.
- Participation was limited to faculty with experience related to teaching, co-teaching, or developing online courses.
- Because the target population was anonymous, the ability of future researchers to collect data from the same subjects as this initial study is limited. However, anonymity increased the probability that participants would provide candid responses without the distress of being identified.

Limitations

A non-probability purposive sampling strategy was used for this study, and thus, findings were limited to the Walden University Participant Pool and LinkedIn and Facebook training groups identified and sourced for participant responses. Faculty who had online teaching or development experience during the time of the study who were willing to participate were surveyed. Faculty participants were required to have taught, co-taught, or designed an online learning course. Study participants were not required to have participated in technology distance learning professional development programs. This study did not include faculty who did not have experience teaching or developing courses in distance learning environments. The results of this study were limited to participants in the Walden University Participant Pool, LinkedIn and Facebook training groups identified and sourced for participant responses and therefore were not generalizable outside of this specific population. Initially the survey was posted only on the Walden Participant Pool site, however, the proposed number of participants were not

identified during the study. A link to the study and a synopsis of the research was then posted on LinkedIn and Facebook to obtain additional participants. LinkedIn is a professional social media site used to generate responses from the targeted population. More specifically, I canvassed groups focusing on higher education and online teaching for participation.

Significance of the Study

This research addresses a gap in the literature related to educational technology implementation at institutions of higher education by focusing on faculty technology professional development participation, faculty online teaching self-efficacy, faculty ICT and computer attitudes, gender, and age within the framework of the diffusion of innovations theory. This research was unique because the field of educational technology has yet to reach a consensus on a definitive and comprehensive model of the factors influencing technology adoption (see Buchanan, et al., 2013). The results of this study provided insight into the relationship between faculty technology professional development, online teaching self-efficacy, faculty ICT and computer attitudes, and the diffusion of innovations process within the parameters of technology innovation adoption in institutions of higher education.

Insights from this study have the potential to inform institutional leadership, administrators, information technology (IT) professionals, and faculty who apply educational technology innovations in face-to-face, blended, and distance-learning instructional modalities. By focusing on relationships, the study had the potential to align with faculty priorities, which are primarily concerned with providing instruction to

learners. Understanding the relationship between these variables encourages the development of best practices that consider faculty knowledge and self-efficacy within innovation at institutions of higher education. I acknowledge that there are several implications for positive social change in the study related to distance learning. First, understanding faculty perceptions related to computers and ICT has the potential to assist in shaping how faculty are trained to facilitate in online environments. Second, understanding online teaching self-efficacy levels of online instructors can lead to targeted learning objectives for faculty development initiatives. Third, the research adds to a scarcely researched area by researching online teaching self-efficacy of faculty. Finally, understanding faculty experiences and perceptions related to online learning has the potential to create a space for dialogue and understanding between faculty, educational technologist, and leaders at institutions of higher education. Shaping the

Summary

The increasing number of adult and traditional learners entering, and reentering institutions of higher education may make it difficult for institutions to continue using traditional delivery methods. Institutions of higher education view distance learning as a modality of course delivery that addresses high enrollments and reduces the cost associated with traditional classroom facilities (Jones, 2003; Orr et al., 2009). Kenney et al. (2010) found that faculty must be self-motivated to learn new technologies and apply innovative teaching approaches available through technology. The examination of technology diffusion occurring in higher education is one of great interest and necessity.

This quantitative study included the exploration of five variables: (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. The findings of the study added to the discussion of the impact of faculty technology professional development and how it promotes, encourages, and facilitates faculty participation in online teaching.

Chapter 2 includes a presentation of the outcomes of the literature review that framed the design of this study. The concepts of self-efficacy, online teaching self-efficacy, diffusion of innovations, educational technology in higher education, faculty technology professional development, recommended best practices for online teaching, and faculty ICT and computer attitudes were explored within the context of the Rogers's (2003) diffusion of innovations theory are presented. The methods used for this study are then presented in Chapter 3.

Chapter 2: Review of Relevant Literature

Introduction

The digital age is reshaping the focus of learning and instruction and encouraging the implementation of educational technology advances within institutions of higher education. Faculty at universities must be trained and supported in their use of technology. The most significant influence on distance learning will not be technical device innovation, but the professional development of educators, designers, and learners (Johnson et al., 2012). Educational technology involves the creation, use, and management of appropriate technological processes and resources educators use to facilitate and improve learning (Januszewski & Molenda, 2013). In this study, I examined if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. Rogers's (2003) diffusion of innovations theory was used as a construct to understand and contextualize the integration of educational technology in higher education.

This chapter begins with the presentation of the literature search strategy, followed an in-depth explanation of the two theoretical frameworks for this study, which were Bandura's (1977) self-efficacy theory and Rogers's (2003) diffusion of innovations theory. These sections are followed by a review of online teaching self-efficacy, diffusion of innovations theory, educational technology issues in higher education, and faculty technology professional development. Finally, this chapter concludes with an

examination of the literature relating to recommended best practices for online teaching and faculty ICT and computer attitudes. The variables of gender and age were discussed in each section as appropriate.

Literature Search Strategies

Google Scholar, ProQuest, Science Direct through Walden University, and Cohost were the primary library databases used during the research process for this literature review. The terms that yielded the most results were *faculty attitudes*, s*elf-efficacy*, *online teaching self-efficacy*, *computer attitudes*, *ICT*, *faculty development*, *online faculty learning*, *faculty teaching anxiety*, *faculty online bootcamp*, and *faculty professional development*. A review of the research revealed the limited availability of research focusing on faculty online teaching self-efficacy in institutions of higher education. Thus, multiple key terms needed to be applied concurrently to narrow the search results to faculty instead of primary and secondary educators and online learners (students). The scope of the literature review was initially projected to span a 5- to 7-year timeframe; however, to include prior research directly related to the variables, the span was increased to 10 years with a few outliers. The research was primarily gathered from peer-reviewed journals, although appropriately distinguished authors were included as well as organizational publications whose primary focus was related to the topics being examined.

Theoretical Frameworks

This study was guided by two theoretical frameworks: the construct of self-efficacy derived from Bandura's (1977) social learning theory and Rogers's (2003)

diffusion of innovations theory. Self-efficacy refers to the belief in one's ability to succeed in specific situations or accomplish a task. Self-efficacy can greatly influence in how one approaches goals, tasks, and challenges. Diffusion refers to the process by which an innovation is communicated through channels over time among members of a social system. Innovation refers to an idea, practice, or object perceived as new by an individual or another unit of adoption (Rogers, 2003).

The overarching theoretical framework shaping this study is Bandura's (1977) construct of self-efficacy as derived from social learning theory. The research questions were designed to examine if a relationship exists between (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. This theory was applied to examine and interpret the research findings within the context of computer integration within higher education. The theoretical frameworks were needed to examine the interconnectedness of these variables on faculty technology implementation efforts. In this context, the effect of faculty online teaching self-efficacy and computer and ICT attitudes had the potential to provide much-needed contributions to the literature regarding online higher education technology.

Various theories were used that directly corresponded to faculty use of instructional technology in educational programs. Bandura's (1977) social learning theory and Rogers's (2003) diffusion of innovations theory were among the most used frameworks in the literature. Social learning theory addresses observational and social learning related to diffusion of innovations. Diffusion of innovations theory, however,

examines both adoption and the diffusion of innovations. Researchers refer to Rogers's (2003) diffusion of innovations theory as the most appropriate theory for the examination of technology adoption in higher education and educational environments (Medlin, 2001; Parisot, 1995). Within the research, Rogers used the terms "innovation" and "technology" synonymously.

Due to limited literature involving the examination of online teaching self-efficacy among faculty, this study built upon existing theories related to faculty online teaching self-efficacy, ICT and computer attitudes of faculty, and the diffusion of innovations process in higher education. Much of the research related to these variables did not focus on faculty experiences, abilities, and practices but instead focused on learner experiences. While this study does not address how innovative ideas and practices spread and become normalized, Smith (2012) contended that more research is needed to problematize the reality of diffusion of innovations through systematic research that focuses on these specific areas. Thus, further research addressing diffusion of innovations within higher education within the online teaching context has the potential to add to the limited available literature focused on higher education faculty online teaching attitudes and experiences.

Online Teaching Self-Efficacy

In 1977, Bandura published a theoretical self-efficacy framework where he asserted that behavioral change could be derived from various modes of psychological treatments due to a common "cognitive mechanism" (p. 191). Bandura described efficacy as "a generative capability in which cognitive, social-emotional, and behavioral sub-skills

must be organized and effectively orchestrated to serve innumerable purposes" (1997, p. 36-37). Therefore, self-efficacy theory acknowledges that there is diversity within human capabilities and efficacy beliefs are segregated across key areas of representation within activity domains. Efficacy beliefs function as key factors in the generative system of human competence. There is a significant difference between possessing a skill set and amalgamating those skills into appropriate actions in varying circumstances. Hence, as Bandura (1997) noted, effective functioning requires that an individual have both the skills and positive efficacy beliefs to use them well. Perceived self-efficacy is related to an individual's judgments of personal capability.

It is important to distinguish here that self-efficacy and self-esteem are not related. These two terms have been inappropriately applied interchangeably in both methodological and conceptual sources (Bandura, 1997). Self-esteem is concerned with judgments of self-worth, and there is no fixed relationship between perceived self-efficacy and self-esteem (Bandura, 1997). Furthermore, perceived personal efficacy predicts goals that people set for themselves and their attainment, whereas self-esteem correlates to neither personal goals nor performance (Bandura, 1997).

This research includes an examination of faculty self-efficacy from the perspective that self-efficacy is related to self-perception of competence rather than the actual level of competence. This distinction is important because people regularly both overestimate and underestimate their competence, and these estimations have the potential to impact the action they choose to pursue, or the effort exerted in their pursuits. This is because a belief in one's self-efficacy has several diverse effects. These effects

include influencing the courses of action people choose to pursue, how much effort they put into a given endeavor and how long they will persevere when faced with obstacles, failures, or flexibility to adversity. Additionally, self-efficacy influences whether one's thought patterns are self-hindering or increase self-awareness of accomplishments (Bandura, 1997).

Bandura (1997) differentiated between two components of self-efficacy when examining self-efficacy expectations and response-outcome expectations. Personal efficacy beliefs are a key factor in human agency. For example, if people do not believe they hold the power to produce results, then they will not attempt to produce results. High levels of self-confidence in one's ability to produce results positively influences the outcome for that individual. This makes it more likely they will participate, persevere, and perform a task that results in desired outcomes (Bandura, 1977, 1982, 1997). This is not to say that behavior is solely based on expectations. Rather, this concept involves triadic reciprocal causation, with "behavior resulting from internal personal factors in the form of cognitive, affective, and biological events all operate as interacting determinants that influence one another bidirectionally" (Bandura, 1997, p. 5-6).

The exploration of faculty online teaching experiences by researchers suggests that for some, unsuccessful technology use efforts result in negative emotions and may affect future efforts relating to technology innovation (Cron, et al., 2005; de Vries, et al., 2003; Venkatesh, et al., 2003). Furthermore, researchers suggested that regarding online teaching, an individual's failure to successfully learn how to use technology or participate in online teaching may induce a negative cycle of non-use and emotions (Cron et al.,

2005; de Vries et al., 2003; Venkatesh et al., 2003). This negative cycle may affect self-confidence and trust in technology among faculty and may have affect self-efficacy in online teaching. Bandura (1977) contended that perceived self-efficacy is a formative factor that determines behavior. Response-outcome is related to a person's estimate that a given behavior will lead to specific outcomes (Bandura, 1977). Kidd et al. (2016) conducted a study to explore the public health faculty experiences of those who engage in online teaching. Their research findings indicated that faculty experience transformations in online teaching during the developing process and associated activities. The transformation occurs within faculty in the psychological and intellectual realm and depends heavily on faculty development and training. Furthermore, the researchers suggested that new identities are developed as faculty engage in online teaching.

Along with this new identity, faculty were found to undergo an evolutionary process in their self-perception relating to how they saw themselves and their role as faculty (Kidd et al., 2016). Bandura (1977) differentiated between the two expectations when he maintained "individuals can believe that a particular course of action will produce certain outcomes, but if they entertain serious doubts about whether they can perform the necessary activities, such information does not influence their behavior" (p. 193). Efficacy beliefs function as a critical factor in the generative system of human competence. Thus, different people with similar circumstances or the same individual with different circumstances may perform poorly, adequately, or extraordinarily, depending on the fluctuations in their beliefs of personal efficacy (Bandura, 1997).

For example, Kidd et al. (2016) found that individuals experienced fear because of a lack of experience and awareness of online teaching. This psychological factor revealed itself in how faculty experienced online teaching, thereby suggesting that attitudes towards technology, self-efficacy, and computer anxiety, which are emotional reactions, play an important role in shaping one's experience with online teaching (Kidd et al., 2016). Effective functioning requires both skills and positive efficacy beliefs. Irrepressible awareness of efficacy enables an individual to do remarkable things through practical use of their skills in the face of tremendous obstacles (Bandura, 1997; White, 1982). The results of research indicate self-efficacy is an essential factor in performance accomplishments regardless of the underlying skills (Bandura, 1982, 1997; Bandura & Jourden, 1991; White, 1982; Wood & Bandura, 1989).

The effects of self-efficacy have been studied in psychology, education, and nursing (Gibson & Dembo, 1984; Maddux & Stanley, 1986; Nugent, et al., 1999; Thompson, 1992; Tollerud, 1990; Tschannen-Moran et al., 1998). A teacher's belief in their efficacy affects their approach towards the educational process as well as the specific instructional activities used (Bandura, 1997). Groves and Zemel (2000) determined that for faculty to use technology in teaching, they desire accessible hardware, training, and discipline-specific media that is easy to use. The task of creating effective learning environments that promote and encourage cognitive competencies are heavily dependent on the talents and self-efficacy of teachers. Bandura (1997) noted that teachers who have high levels of instructional self-efficacy function from the viewpoint that challenging students are teachable through increased effort and appropriate

techniques and that allow them to acquire family support and overcome negative community provocations. Conversely, teachers who have lower perceptions of instructional efficacy believe there is little they can do if students lack motivation.

Additionally, the influence teachers can exert on students' intellectual development is significantly "limited by unsupportive or oppositional influences from the home and neighborhood environment" (Bandura, 1997, p. 240). Horvitz et al. (2015) defined the construct of "teaching efficacy" or "teaching self-efficacy" as a teacher's confidence in their ability to facilitate the development of student, knowledge, abilities, and values. The definition provided by Horvitz et al. (2015) correlates with Bandura's (1997) opinion of self-efficacy. Bandura (1997) contends that self-efficacy is important because those with high self-efficacy are more likely to change and be persistent in their work.

In contrast, those with low self-efficacy are more likely to have feelings of helplessness and are less likely to be persistent in their work (Bandura, 1997). Saleh (2008) conducted a study to investigate the relationship among faculty members' computer self-efficacy, perceived barriers to computer use, and computer skill levels. Saleh found that faculty with the highest computer skill level scores were less likely to perceive the barriers related to time, belief system, and expertise as limitations to their computer utilization. Additionally, regarding participant demographics, female faculty perceived expertise to be less limiting than male faculty. Also, results indicated that as age increased among faculty time became a more limiting barrier (Saleh, 2008).

Hannafin and Peck (1988) defined computer supported education as the sharing of activities or content for the purpose of education through a digit device. This is the most widely acknowledged definition in distance learning literature. However, other definitions that align with the construct of online learning are available. For example, Arslan (2006) defined computer supported education as the "use of computers as an added tool for teachers to expand and deepen the quality of learning given during educational activities. This researcher accepts both definitions with the understanding that the utilization of computers and online tools in teaching is implemented differently depending on context. Institutions of higher education rely on computer-mediated instruction and this innovative process creates new realities for teachers. Because technologies rapidly change, upgrades to knowledge and skills are continually required. This reality necessitates a special type of self-efficacy. The adoption of computer-mediated technologies in higher education require that leaders acknowledge that a teacher's self-efficacy affects their receptivity to and adoption of innovative computer learning technologies and their plans for possible resistance (Bandura, 1997).

Diffusion of Innovations Theory

I applied Rogers's (2003) diffusion of innovations theory in this study as the basis to examine faculty professional development outcomes as well as the diffusion of online teaching technologies in higher education. Diffusion of innovations research began in the 1940s and 1950s in independent intellectual communities researching specific areas of the diffusion of innovations process. Ryan and Gross (1943) were pioneers in the study of diffusion as they examined the spread and adoption of agricultural techniques in the

cultivation of hybrid corn and weed killers in Midwest farming communities. In Rogers's 1962 seminal work, *Diffusion of Innovations*, he identified and introduced patterns and similarities in the change process. This was Rogers's (1962) initial proposal of significant and universal factors to explain how social change occurs. Gumusluoglu and Ilsev (2009) defined innovation as the successful implementation of creative ideas within an organization. Furthermore, they asserted transformational leaders are needed to spur creativity and innovation by raising the performance expectations of their followers and seeking to develop their group's personal aspirations, values, and needs to a higher level (Gumusluoglu & Ilsev, 2009). Smith (2012) analyzed literature that addressed diffusion of innovation in teaching and learning practices in higher education. Smith found that significant senior leadership support is a crucial variable in the effective spread of innovation (Smith, 2012). Creativity, innovation, and risk-taking are important contributors to the success and competitive advantage of institutions of higher education, as well as a strong economy (Gumusluoglu & Ilsev, 2009). Padgaonkar (2007) asserted that innovation begins with creating a culture that encourages making deliberate mistakes and learning from them. Key issues surrounding innovation implementation occur in institutions when the decision-makers are different than the individuals implementing the innovation. This may lead to potential institutional system innovation implementation resistance which, can occur until the innovation becomes institutionalized (Rogers, 2003).

In higher education, innovation is driven by the leadership of institutions. Rogers (2003) defined diffusion as 'a process by which innovations are communicated to

members within a social system through appropriate channels over a period' (p. 5). Bozkaya, et al. (2012) analyzed a total of 273 articles published in the *Turkish Online Journal of Educational Technology* between 2008 and 2011. The purpose of the analysis was to examine the trends, issues, and research methods published studies concentrated on in educational technology (Bozkaya et al., 2012). The findings indicated that diffusion of innovations was the most studied theme in educational technology research (Bozkaya et al., 2012). This supports the development of variable specific research in diffusion of innovations. This multiple linear regression study includes the following five variables: (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory are examined.

Diffusion of innovations research trends focus on institutions creating environments that reward and encourage innovation, creativity, and flexibility. The barriers in technology integration are the same obstacles seen in telecommunications during World Word II (Leggett & Persichitte, 1998). Institutions must shift their structures to allow for flexibility, thereby allowing for and promoting adaptability, which encourages economic longevity (New Media Consortium, 2015). The innovation-decision process should be viewed as an information seeking and processing activity where the advantages and disadvantages of a specific innovation are examined to determine *what*, *how*, and *why* innovations work (Rogers, 2003).

The digital age is reshaping the focus of learning and instruction. Innovative and timely shifts in resources, technologies, systems, and paradigms must occur to provide

value to instructors, learners, and the global educational landscape. With these thoughts in mind and using Rogers's (2003) diffusion of innovations theory as a lens to establish a systemic approach to diffusion implementation, the following four key elements were considered to examine innovation success: innovation, communication channels, time, and social systems.

The technology innovative decision process described by Rogers (2003) contends that innovation is an "idea, practice or object perceived as new by an individual or unit of adoption" (p. 36). The focus of Rogers's (1962) *Diffusion of Innovations* text is primarily on technological innovations. It is, therefore, necessary to define technology within this framework. Technology is defined as a "design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving the desired outcome" (Rogers, 2003, p. 36). Two components for this study included (a) hardware, which is the tool that embodies the technology such as computers and (b) software, which refers to the knowledge base for the tool such as ICT. Social systems and individual innovation characteristics determine the rate of adoption.

In some cases, faculty may participate in a reinvention process when change processes occur during the innovation adoption process. The reinvention process refers to the degree that an innovation is changed or modified by a user in the process of its adoption and implementation. This dynamic is discussed throughout this overview and examination of literature, where research findings suggest that faculty do not fully apply the knowledge and skills, they learn during technology professional development workshops.

Communication, which occurs during the diffusion process, should be thought of as convergence or divergence of ideas that construct meaning among members of a social system (Rogers, 2003). Furthermore, a communication channel includes how messages are sent and received from one individual to another. Within the context of higher education diffusion of innovations, Rogers (2003) contended mass media channels are more effective in creating knowledge of innovations. Thus, mass media channels rather than communication channels, are more appropriately applied to the higher education context where it is necessary to form and change attitudes towards a new idea. It is important to note, however, that peers may impact decisions. Thus, during the communication process, leadership should acknowledge dissension and address it appropriately. Doing this will prevent issues related to heterophily, which is often present in the diffusion of innovations process and may lead to special issues in attaining effective communication (Rogers, 2003).

Diffusion of innovations is a timely process and includes (a) the innovation-diffusion process, (b) innovativeness, and (c) and the innovations rate of adoption (Rogers, 2003). Within the context of this study, it was assumed that faculty participated in a process that involved the progression of their knowledge, attitudes, or opinions, the decision to accept or reject an innovation, the implementation of the innovation, and confirmation of the decision to implement the educational technology innovations.

An individual may progress through various steps during the diffusion of innovation process. The initial step is when an individual becomes cognizant of the innovation, they then develop an attitude towards innovation. While deciding to adopt or

reject the innovation the individual ratifies the decision, which is the final step. This process can be conceptualized as five steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation (Rogers, 2003).

The second process involved in the diffusion of an innovation is more relevant to this study as it correlates to the degree an individual or unit of adoption adapts to new ideas in relation to other members in their social system. There are five adopter classifications, which are linked to members of a social system based on their innovativeness. These five adopter classifications include innovators, early adopters, early majority, late majority, and laggards. The innovations rate of adoption is associated with the speed in which an innovation is adopted by the members of a social system (Rogers, 2003). Adams (2002) conducted a convenience sample study in which 231 full and part-time faculty members teaching at a postsecondary teaching institution completed a survey. The purpose of Adams's (2002) study was to investigate the degree to which attendance at technology faculty development programs corresponded to the use of technology in teaching practices at a metropolitan postsecondary institution. Specifically, the study investigated the academic task area, level of computer-integration, and concern about the innovation process. The two factors that specifically correlate to this study are faculty level of computer integration and concerns about the innovation process. Adams (2002) found that 3 years into the innovation process, 21% of respondents had peak concerns at Stage 0 (awareness), with 25% of participants reporting they were nonusers of the innovation, thus indicating that one-quarter of the faculty responding to the questionnaire were at the earliest stages of the innovation process. Furthermore, the

lowest level of faculty were innovators (2.5%), early adopters (13.5%), with an equal percent of early and late majority (34%), and finally, laggards (16%) holding the second-highest percentage (Adams, 2002).

The fourth key element in the diffusion innovation process is a social system. The social system "is a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal" (Rogers, 2003, p. 37). There are three types of individuals within social systems that influence others - opinion leaders, change agents, and aides. Opinion leadership refers to the degree an individual can informally influence other individuals' attitudes or behaviors in the desired way and with frequency (Rogers, 2003). Change agents, however, attempt to influence a client's innovation-decision deemed necessary for policy change. Change agents within institutions of higher education are essential to the innovative process and assist in timely shifts in resources, technologies, and systems. Finally, aides contact clients to influence their innovative decisions.

Within social systems, there are three main types of innovative-decisions: optional innovation-decision, collective innovation-decisions, and contingent innovation-decisions. Optional innovation-decisions refer to choices to adopt or reject an innovation that is made by an individual independent of other members of the system (Rogers, 2003). Collective innovation-decisions are made through a consensus among the members of a system. In contrast, authority innovation-decisions are made with relatively few people in a system that have power, status, or technical expertise (Rogers, 2003). The final innovation-decision that is important to distinguish is the contingent innovation-decision, which refers to the decision to adopt or reject an innovation after a prior

innovation-decision has been made (Rogers, 2003). Universities must lead the task of fundamentally reinventing public education. Change agents must commit to creating innovative design, working with entrepreneurs, industry, and governments, and learning the processes involved in implementing educational technology so that realistic expectations shape results and timeframes, responsible parties are held accountable, and institutions can provide learning opportunities that assist current and future generations in facing the challenges that lie ahead (Reimers, 2011).

Demps, et al. (2011) conducted an interpretive, critical study that examined faculty educational technology integration and institutional demands. The participant sample included 10 faculty members who met the criteria of devoting a significant amount of time preparing for educational technology course materials, experienced rich teaching using educational technology tools, and experienced adverse consequences because of their commitment to the inclusion of educational technology in their teaching practices. The study findings suggested that barriers to educational technology implementation include: the time investment required to learn technology tools, access to design learning resources, and a compensation structure focused on publication rather than instruction (Demps et al., 2011).

Time requirements related to implementation consistently appear in the research. Vodanovich and Piotrowski (2005) studied implementation and perceived effectiveness of Internet-based pedagogical approaches that faculty use in their teaching and found that the most problematic aspect of using the Internet to teach is the amount of time required to implement the instructional technology. This relates to the current research because

understanding barriers and underlining issues affecting educational technology integrations may encourage the development of appropriate tools and resources to address faculty issues and barriers in the current educational paradigm. Understanding the relationship between factors that affect technology integration, such as faculty issues and barriers, has the potential to positively affect the innovative process.

Adams (2002) investigated the degree to which attendance at technology faculty development programs corresponded to the use of technology in teaching practices at a metropolitan postsecondary institution. Adams also explored factors relating to an individual's willingness to engage in development and integration. More specifically, the researcher examined teachers' concerns related to technology integration in teaching practices (Adams, 2002). In the study, Adams compared concerns related to professional development and ancillary demographic variables, the findings of which suggest a relationship between the demographic variables of age, gender, and years of teaching experience. Findings indicated that younger female teachers with less teaching experience more readily integrated technology into teaching practices (Adams, 2002). These female faculty members were found to have less teaching experience by nature of their age.

The innovative potential of learning technologies has not been fully recognized nor systemically implemented by many institutions (Schneckenberg, 2009). There is an urgency in higher education for the development of centers or departments that focus exclusively on selecting and implementing educationally adequate learning technologies for both face-to-face and distance teaching and learning (Amemado, 2014). Numerous

innovations are readily available and continually developed within educational technology. The technologies vary depending on educational requirements; however, typically they include a combination of forums, podcasting, Rich Site Summary (RSS) blogs, wikis, tagging, and video-sharing (Amemado, 2014).

Social learning thrives in environments where the learning culture has matured in ways that promote openness, transparency, collaboration, and knowledge sharing. There is no intention among developers of educational technology that social and informal learning completely replace traditional formal learning, whether classroom instructor-led training (ILT) or traditional e-Learning, but rather complement it (Stone, 2010).

As Amemado's (2014) study found, "a good tool is one that completes the task as easily and efficiently as possible" (p. 16). Amemado (2014) examined issues related to technology integration in higher education at 15 universities and included 24 interviews. The results of the study indicated that universities do not invest in educational technologies to benefit pedagogical, teaching, or learning tasks. Instead, the benefits of pedagogy are an afterthought (Amemado, 2014). Thus, it can be assumed that institutions are seeking to implement educational technology to address a need. Once that need is met, such institutions take advantage of the opportunity the technology provides.

Rogers (2003) maintains even though organizations are relatively stable, they tend to experience innovation frequently. Furthermore, stability can often be found in organizations due to their predictable structures, which are obtained through "predetermined goals, prescribed goals, authority structures, rules and regulations, and informal patterns" (Rogers, 2003, p. 404). Changing the attitudes of (senior) faculty about

student-centered learning is a difficult, long, and cumbersome process (Marsh, 2007). Marsh's (2007) methodological study of 195 undergraduate and graduate faculty was not related to online teaching, rather, it examined whether faculty effectiveness increased or decreased with experience. A parallel can be drawn to the current study, given the need to address new and innovative ways in which faculty must apply new models of teaching, more specifically, student-centered instruction methods. Additionally, the research revealed that teaching effectiveness is remarkably stable, suggesting that teachers do not gain from experience (Marsh, 2007).

There are many difficult tasks associated with the effective implementation of innovative technologies in academia. Therefore, the process of facilitating innovative change within institutions requires an innovative-decision process. An analysis of the literature on diffusion of innovations by Smith (2012) found challenges to successful teaching and learning innovation may include support from high-level administration, a sustainability plan, time commitment, faculty support, contextual relevance, and institutional infrastructure. As new technologies are introduced into higher education, leaders of educational technology must manage challenges relating to the changing culture, educational technology, information technology infrastructure, resource allocation, and stakeholder expectations for product implementation at the individual and institutional level (Hutchings, et al., 2014). Saleh (2008) found administrative support to be a limitation with significant variation by academic specialization; however, it was the most common limitation noted among faculty in education.

Institution administrators should focus specific attention on addressing the issues of time requirements experienced by faculty. If institutions acknowledge and work to address research findings that indicate the most problematic aspects of distance learning, the focus would be on the amount of time required to implement instructional technology. Understanding faculty experiences may promote positive outcomes that facilitate goal achievement by both institutional leadership and faculty. Schneckenberg (2009) explored the underlying structural and cultural barriers to technology-enhanced innovation in higher education. The findings suggested technology development tends to outpace strategic thinking and pedagogical design within universities. Thus, the integration of eLearning into institutions of higher education remains a challenge. While the research indicates "younger" faculty members are more likely to implement educational technology in institutions of higher education, most, if not all, faculty must implement educational technologies in their online classrooms as increased numbers of institutions incorporate both traditional and online programs.

Given the early 21st century climate of technology innovation in higher education, institutional leadership must address the issues related to faculty attitudes. More specifically, changing the attitudes of (senior) faculty about student-centered learning (Hutchings et al., 2014). Changing attitudes would assist in implementing educational technology in higher education effectively. Developing innovative teaching and learning are paramount to the continued success of educational institutions. Approaches that use technology have the potential to enhance student learning because of the open and collaborative nature of educational technology applications. International

comprehensive networks allow institutions to bridge global divides previously unavailable using global networks, which facilitate interconnectivity (Hutchings et al., 2014). This allows for the alignment of research and practice, which fosters the co-construction of knowledge and releases academic staff to focus greater attention on scholarly practice, research, and education (Hutchings et al., 2014). While research indicates faculty is interested in "working tools," it is necessary they become fluent in new and innovative technologies that align with course learning objectives.

Diffusion of innovation thrives in environments that foster creativity. The restructuring of faculty workshops and development efforts will provide faculty with confidence and the ability to design courses without significant assistance. This, in turn, will aid academic technology staff in focusing efforts on institutional, educational technology issues and promoting an appropriate understanding of best practices and technologies, which are available in the educational technology arena to all institutional stakeholders (Rienties et al., 2013).

Educational Technology Issues in Higher Education

The implementation of educational technologies is an extremely political process in higher education, where public, private, and governmental organizations have considerable influence (Persichitte, 2013). Planning is a necessary blueprint for action to meet the demands and constraints of internal and external environments in higher education. The development of appropriate blueprints occurs through developing three-tiered plans that include strategic planning, operational planning, and task planning (Sorcinelli, et al., 2006). Persichitte (2013) contends successful leaders in educational

technology must be aware of dynamic federal guidelines and effectively manage human resources and technology products. Additionally, communicating the positive impacts of technology in higher education using decades of available research is also a requirement of effective leadership (Persichitte, 2013). Institutions of higher education are experiencing a period of fundamental change where they must adapt to new normative value systems and relative frameworks where restructuring is necessary to become more entrepreneurial (Schneckenberg, 2009).

Distance learning is often viewed as a modality of course delivery that addresses high enrollments and reduces the cost associated with traditional classroom facilities by universities (Jones, 2003; Orr et al., 2009). George (2000) noted that leaders need to develop a compelling vision but also effectively communicate it throughout the organization in such a way that it becomes shared and 'collective.' Ensuring the vision of leadership is shared within an institution is fostered by accurately appraising how followers currently feel, relying on knowledge of emotions to understand why they feel a specific way, and influencing followers' emotions (George, 2000). Such actions encourage collective reception to and support of the leader's goals or objectives for the organization and their proposed methods of achieving them. This in turn encourages a collective reception that is supportive of leadership's goals, objectives, proposed methods of achieving them.

Technology is changing the way research is conducted by changing the way people learn and formulate new ideas. Furthermore, technology is changing the way scientific research is communicated to the scientific communities and the public. By

nature, these changes impact teaching, the methods that new knowledge is transmitted, and how research findings are communicated to students (Bates, 2010; Gibbons et al., 1994; Nowotny, et al., 2001; Schneckenberg, 2009). Distance learning was traditionally a single sector idea that now includes several technology-enhanced learning (TEL) strategies, such as blended and online learning (Bates, 2010). The survival and continued prosperity of universities in the 21st century is dependent on institutions effectively managing often contradictory agendas, multi-layered functions, and an evolving role definition (Hutchings et al., 2014). As described by Rogers's (2003) diffusion of innovations theory, organizations will experience resistance when they are unable to adapt to the introduced learning environment adequately. Instituting change in higher education presents challenges to educational technology professionals, students, and faculty. For many decades, educational technology has become integrated into the daily lives of society. The digital space that institutions are beginning to embrace has fostered a sense of educational globalization, and leaders are being asked to ensure that knowledge is disseminated globally and made available to those who might not otherwise have access.

Educational technology advancements cannot be viewed using a one size fits all approach. Leaders must be prepared to perform risk assessments, make decisions without discussion or consensus, determine, and follow institutional visions, and commit to predetermined institutionally desired outcomes (Persichitte, 2013). Educational concepts, teaching, and learning may benefit from information communication technologies by encouraging innovation realization (Schneckenberg, 2009). Faculty must improve and

update their skills, knowledge, and abilities to acclimate themselves to the growing expectations of technologically savvy students (Filiz, et al., 2013). The procurement of appropriate resources and support systems encourage the facilitation of faculty members receiving necessary training, which promotes the development of high-quality online instructional content.

Faculty Technology Professional Development

The shift in educational institutions, learners, and instructor needs require academic environments to embrace new, innovative, and creative technologies that enhance teaching and learning. Batts, et al. (2010) conducted a study to examine whether community college faculty members who teach online courses participated in online training opportunities, either on- or off-campus. The researchers were also interested in determining the specific training faculty received and what online practices were incorporated into their courses. The results of the study indicated that faculty knowledge relating to online teaching-learning and the training they received directly impacted the success of academic programs and, ultimately, the university (Batts et al., 2010). Therefore, thorough online technology training programs include pedagogy as one of the main components. Faculty members who participate in formal training are successful in online course instruction and achieve positive student outcomes (Batts et al., 2010).

In a separate study, Adams (2002) explored factors that influence an individual's willingness to engage in faculty development and educational technology integration. Adam's research findings indicated a correlation exists between faculty with higher attendance at faculty development activities focused on technology integration and those

reporting greater integration of technology in teaching practices. Additionally, faculty with higher integration levels also expressed higher-order concerns than those reporting lower integration levels (Adams, 2002). The procurement of appropriate resources and support systems encourages the facilitation of faculty members receiving the necessary training, which promoted the development of high-quality online instructional content. Faculty must improve and update their skills, knowledge, and abilities to acclimate themselves to the online learning environment and student-centered approaches to instruction (Filiz et al., 2013).

Faculty acknowledgement of technology being used during training has the potential to facilitate learning and create positive learning experiences (Klein, et al., 2013). Thus, in some instances, digital natives are being taught by digital immigrants who tend to teach in traditional formats or have difficulties implementing technology in the online classroom environment (Filiz et al., 2013). Klein et al. (2013) used Facebook as a faculty development tool and managed the tool in a closed Facebook group. Activities included postings of educational technology goals, abstracting an article, and commenting on peers' postings, while sources of quantitative data included Facebook postings and survey responses (Klein et al., 2013). The study yielded higher participation rates than institutional learning management system courses. Eighty-eight percent of participants already had a Facebook account, 64% felt somewhat or very confident using Facebook, 77% thought social media would be useful for professional networking, and 12% had used it professionally; however, 6 months after the course completion, professional use increased to 35% (Klein et al., 2013).

The development of face-to-face mentoring sessions also has the potential to impact faculty teaching and technology applications positively. A study by Filiz et al. (2013) revealed professional development needs of faculty changed at the beginning of a technology mentoring program due to different professional fields that arranged practice hours for faculty mentees who would ensure the process progressed efficiently. The study involved faculty members and doctorate students of the Computer Education and the Instructional Technology departments observing faculty members' professional development needs through the scope of a "Technology Mentoring Program." The study allocated one semester for faculty to progress through the four stages (survival stage, mastery stage, impact stage, and innovation stage) of technical mastery (Filiz et al., 2013). However, the researcher's faculty felt an additional semester would positively impact their knowledge and technology use.

The observations in Filiz et al.'s (2013) study revealed that peer-to-peer communication is one of the most critical components of mentoring programs. When faculty cannot address issues relating to technology use, they may adopt negative attitudes or problems with adjusting to the new technology, this results in resistance to the technology (Filiz et al., 2013). Accessibility and positive feelings towards the use of Facebook by faculty were encouraging and promoted its use as a social media tool that may be used by designers of faculty development programs (Klein et al., 2013). Research has indicated faculty must participate in effective training and practice opportunities to facilitate their learning of how to effectively redesign learning opportunities (Ebert-May, et al., 2011; McCarney, 2004; Stes, et al., 2010) that include the integration of ICT

(Alvarez, et al., 2009; Kirschner & Erkens, 2013; Lawless & Pellegrino, 2007; Ziegenfuss & Lawler, 2008).

There is an influx of computers and information technology being integrated into every aspect of the global culture. There is a growing dependency on technology to facilitate processes in schools, colleges, home settings, and workplaces (Adams, 2002). Rienties, et al. (2014) implemented an online teacher-training program, working with 49 teachers. Data were gathered in an explorative, quantitative manner using the Teacher Beliefs and Intentions and TPACK questionnaire using a pre-posttest design. The study revealed 59% of business faculty and 75% of other discipline participants did not actively apply ICT in their current teaching practices (Rienties et al., 2014).

In an online learning environment, the role of the instructor shifts from lecturer to coach, to mentor, and to guide. This requires that the instructor engaging in direct learning rather than lecture (Morrison, et al., 2011). Thus, online courses should be thought of as a bottom-up development of learner knowledge that requires learners to interact with their peers and the content (Morrison et al., 2011). This shift in the role of faculty is one that must be communicated and directed to ensure appropriate alignment to what is often a new modality for faculty. Traditional methods used for ICT training approaches, where faculty participate in one or two-day seminars on pedagogical and technical aspects of eLearning have shown major flaws in online learning teaching efficiency (Schneckenberg, 2009). Traditional ICT training courses tend to be expensive, limited in scope, and time-consuming. However, more importantly, they are not directly related to real teaching and learning contexts of institutions of higher education (Bates,

2010; Hagner & Schneebeck, 2001; Kerres, & Voß, 2006; and Salmon, 2004). To effectively prepare faculty for online teaching and learning, trainings must allow faculty to apply learner knowledge contextually. Kenney et al. (2010) conducted an evaluation of the e-Teaching and e-Learning Initiative (ETLI) comprised of 23 volunteers. The initiative was an intensive, one-week immersion training program focused on structured adult learning research.

The training comprised five areas: concept building, leading-edge technologies, collaboration, community building, and individual professional development (Kenney et al., 2010). The evaluation included both quantitative and qualitative data. It was conducted by outside evaluators who used pre- and post-online surveys and interviews to measure the program's impact on faculty technology literacy, technology use in the classroom, and effects on student learning (Kenney et al., 2010). Longer-term data collection was conducted at 18 months and 5 years. Faculty participants provided anecdotal narratives describing their use of technology 18 months after the project. The 5-year follow-up included an online survey and individual telephone interviews, which included open-ended questions to measure ongoing successes and challenges to technology use and faculty needs for further training and support, respectively (Kenney et al., 2010). The evaluation results indicated faculty must be self-motivated to learn new technologies and pursuit finding and applying innovative approaches made available by technology (Kenney et al., 2010). Additionally, faculty were concerned about being able to maintain technology inclusion with ever-emerging technologies (Kenney et al., 2010). An analysis of instructor beliefs and intentions revealed participants were not more likely

to implement student-centered pedagogical practices into their instruction after course completion (Rienties et al., 2013).

In a Johnson et al. (2012) study, the researchers documented the implementation of a faculty development model that successfully helped faculty overcome technology anxiety using concepts confirmed during a "Bootcamp" presentation. The researchers contended that professional development of faculty must be consistent with the principles of andragogy and transfer of learning to assist faculty in technology adoption for teaching and learning in an online environment (Johnson et al., 2012). Furthermore, additional research regarding why technology should be used in online environments is needed, because research indicates faculty do not understand why they need to incorporate technology in the classroom (Johnson et al., 2012). Kenney et al. (2010) presented an evaluation, which revealed that despite faculty interest and commitment, faculty did not adopt new technologies learned during development programs within their classrooms.

Understanding the relationship between faculty technology professional development programs and online teaching self-efficacy and faculty ICT and computer attitudes may provide further insight into why faculty are interested in the content of technology professional development programs, yet do not always implement the learned educational technologies within their online classrooms. Factors influencing faculty decisions are important to consider from an institutional, learner, and user perspective. This research attempted to fill the gap in research that exists between online teaching self-efficacy, ICT and computer attitudes, and implementation of educational technology in higher education.

Recommended Best Practices for Online Teaching

As leaders in educational institutions, training programs and learning resources must be designed to facilitate faculty knowledge attainment in distance learning best practice standards and learning technologies. Determining best practices and defining evaluative measurements for determining educational effectiveness and efficiency, are core functions of an educational technology transformational leader. Strategies for distance learning are designed to promote the distance education paradigm and develop strategies for introducing quality distance learning courses in higher education. Johnson et al. (2012) offered the academic community a framework as a faculty development program at a small liberal arts university to helped ease faculty into redesigning their online courses. The faculty "Bootcamp" implementation evaluation indicated that technology anxiety barriers are the most difficult to overcome. These anxieties arise from designing and teaching online courses but can also extend into technology application in general. In an evaluation of the ETLI at a regional university on the east coast, researchers found that administrative awareness and support were important components of faculty development initiatives (Kenney et al., 2010). However, while researchers found incentives to be important motivators for participation (participants were provided a laptop computer and $300 stipend), stronger administrative and institutional support may have contributed to the increased participation in the workshop (Kenney et al., 2010). Secondly, Johnson et al. (2012) contended there were several issues that needed addressed, such as further research to determine how to overcome technology anxiety in older instructors. Institution leaders must determine the impact of faculty incentives to be

able to address and overcome possible issues associated with the lack of incentives related to compensation, recognition, tenure, and promotion.

Incentives must be examined to determine if there is a relationship between faculty incentives and faculty course participation. Furthermore, an examination of institutional infrastructure is necessary to determine how to overcome frustrations related to technology infrastructures, such as a lack of technology resources, support, slow connectivity, inadequate software and hardware, and low levels of technical ability among faculty. Lastly, there needs to be further research that examines faculty learning rather than faculty teaching. Otero et al. (2005) found that faculty and instructors are concerned with technology reliability and knowledge about how to use technology and fear their inexperience with technology could lead to a classroom disaster. Faculty technology professional development programs provide faculty learning opportunities regarding student-centered approaches to teaching. Such programs encourage the understanding of educational technology and pedagogical best practices, which promote shifts in beliefs and intentions of faculty (Rienties et al., 2013).

Rienties et al. (2013) conducted an online teacher training program that was created and implemented by 14 teachers and facilitated the study of 67 faculty members' TPACK using a pre-post-test instrument. Perceived learning satisfaction was measured to determine if the design was appropriate. Rienties et al. found that while most participants were positive about the design and implementation of the online professional program, participants who completed technology professional development training were not more likely to implement student-centered pedagogical practices into their instruction.

Furthermore, not all faculty can learn within this modality, thus indicating a need for additional research and development in this area of research (Rienties et al., 2013).

Negative faculty perceptions about educational technology have the potential to impact learning and application of technology (Rienties et al., 2013). Online learning professionals often are called upon to design content for faculty or assist faculty in the development of online course content. Designers must counter negative beliefs and anxiety experienced by faculty and establish technology as a means of improving teaching. They must also inform and demonstrate how to use informatics in distance learning platforms and to learn about technology as well as associated anxiety (Robinson, 2003).

Wolf (2006) conducted a case study that included a meta-analysis of over 300 books, dissertations, periodicals, and Web sites that dealt with the subject of training faculty and trainers to teach online. The research included interviews with 25 experts in the field of distance education and higher education faculty training and administrators of distance education programs. Several important trends were found related to online training and teaching. First, Wolf (2006) found that formal educational technology training results in successful teaching. Secondly, classroom teaching does not have a relationship to successful online teaching and thirdly, effective training programs use the course delivery system. Finally, Wolf found that motivation is a primary factor for successful online teaching. Regarding faculty support, skills, and institutional processes, the results indicated that minimum computing skills are required for successful online teaching, successful training encompasses pedagogy, and ongoing faculty support is

necessary (Wolf, 2006). Therefore, faculty should be recruited specifically to teach online and be involved in course design, while institutional support is essential.

Malik (2015) contends distance education programs should not be launched without up-to-date technology-based laboratories with the appropriate infrastructure and personnel to provide support for distance learning programs. Furthermore, determining if an institution has enough qualified faculty, resources, and facilities to provide distance learning is essential to the success of online learning at institutions of higher education (Malik, 2015). Therefore, funding is a key component of the overall success of online learning. Institutional funding should be available to provide faculty participation incentives to support faculty involvement (Johnson et al., 2012). When institutions value online teaching and have policies in place that support faculty, faculty satisfaction is generally higher (Bolliger & Wasilik, 2009). There is a need to develop pre-workshop surveys to assess current levels of anxiety and to correlate them to post-workshop surveys (Johnson et al., 2012). The examination of both surveys has the potential to encourage a richer understanding of faculty attitudes pre- and post-technology professional development. Faculty satisfaction in online learning is positively influenced when they believe they can promote positive student outcomes (Allen & Seaman, 2007). Numerous researchers have found that when faculty feel they are being recognized for the work they are doing, they are more satisfied (Allen & Seaman, 2007; Schauer, et al., 2005).

In summary, many factors support online learning environments, such as (a) timeliness in responding to student questions; (b) responding to students using their names, which helps to personalize communication; and (c) explicitly communicating the

tone of voice using “lol” (laugh out loud), winking, or other emoticons, which may contribute positively to creating a supportive, positive learning environment and promote interactivity (Durrington, et al., 2006). Courses that are designed well and engage learners are interesting, informative, inspiring, and memorable. Learners are focused on ease of access and use, precise instruction, instinctive navigation, and integrated technology tools (Simonson et al., 2015).

Therefore, faculty should ask themselves what pedagogy they ascribe to, how they will foster a sense of community online if they are comfortable working in an online environment, and if they are willing to devote more time to an online class than a traditional face-to-face course (Buchanan, 1999). When teaching in a distance learning environment, the role of the instructor is often more of a facilitator rather than a presenter or instructor. Environments that promote faculty success have appropriate instruction methodology, consistent standards, are fluid, and have customizable Learning Management Systems (LMS) and technologies that are easily updated and assessable (Simonson et al., 2015). Faculty that plan activities that promote group work and collaboration will find it helps in constructing a social community.

Simonson et al. (2015) noted numerous barriers to distance education. These barriers include (a) increased faculty time commitments, (b) compensation, (c) incentives, (d) lack of budgetary allotment to implement distance learning programs and platforms, (e) organizational resistance, (f)inconsistent organizational vision for distance learning, (g) difficulty keeping up with technology, (h) lack of technology-enhanced infrastructure and facilitates, and (i) a lack of organizational policies related to local,

state, and federal regulations (Simonson et al., 2015). Institutions of higher education that address the barriers to distance learning have the potential to thrive in a highly innovative, ever-changing, and adaptive learning environment.

Faculty Online Teaching Self-Efficacy

Research indicates that beliefs of personal efficacy play a key role in career development, with people eliminating entire vocations on perceived efficacy (Bandura, 1997). Zhen, et al. (2008) identified factors that influence faculty members' decisions to use any form of online course management applications (OCMA). Their sample included 400 randomly selected faculty participants. Faculty members were considered part of the population even if their primary roles were in administration, research, or if they taught only one course at the university (Zhen et al., 2008). The research findings revealed motivational factors such as self-efficacy and philosophy had a strong impact on OCMA utilization at a significant level of .01. Other variables examined included experience, time, peer-pressure, and class-innovation, all of which were found to be not statistically significant (Zhen et al., 2008). The researchers contended that in relation to time, faculty who believe online teaching is a useful option and that students will learn at an equal or better degree than traditional face-to-face modalities will most likely overcome time constraints and be motivated to use OCMA versus faculty who do not believe in the effectiveness of online teaching (Zhen et al., 2008).

Knupfer and Muffoletto (1993) viewed the teacher's role as crucial in computer integration in the educational process, depending largely on the "preconceptions teachers bring to the implementation of innovation; their attitude about change in the school; their

social prejudices about race, class and gender and their sense of their own professional status" (p.166). Optimal performance often fails to occur even when people are aware of required tasks and possess the appropriate skill set (Schwartz & Gottman, 1976). Zhen et al. (2008) investigated the important factors influencing faculty members' decisions to use or not to use any form of online course management applications. They suggested faculty who have high self-beliefs about efficacy regarding online tools are more likely to invest time and apply their knowledge by posting course content online, designing course web pages, or creating online assessments. Modeling and practicing online teaching best practices and skills in simulated environments positively correlates to creating competencies; however, these skills are unlikely to be applied for extended periods if they are not perceived as useful when put into practice in real-life scenarios (Bandura, 1997).

Furthermore, sufficient success must be obtained when new skills are explored for people to believe in themselves and the value of the new methods of facilitating courses (Bandura, 1997). An individual's adoption of educational technologies depends on their perceived complexity (Rogers, et al., 1971). Although individuals may experience success at varying degrees and within differing timeframes, progress towards the development of new skills promotes a positive progression towards self-efficacy. Complexity is not a general component of technology; rather, it reflects the relationship between an individuals' technology skills and their capabilities to meet technology task demands (Bandura, 1997; Rogers et al., 1971).

Rienties et al. (2013) contended participants who completed technology professional development training were not more likely to implement student-centered pedagogical practices into their instruction. The examination of educational technology implementation occurring in higher education is one of great interest and necessity. To identify factors affecting the implementation of online courses, Shea (2007) conducted an exploratory study that surveyed 386-faculty teaching online in a multi-institutional online program in a single states university system in the northeastern part of the United States. The results indicated the top prohibitive factors were online educational quality, the unfamiliarity of effective online pedagogy, lack of face-to-face interaction, and inadequate professional development opportunities before course implementation (Shea, 2007).

Mehdinezhad (2012) examined professor self-efficacy and its relationship to teaching experience, discipline, rank, and gender and found that professors with 20 years or more of experience had significantly greater self-efficacy in student assessment than their colleagues with less experience, while professors in education had greater self-efficacy in curriculum and instruction as well as higher levels of self-efficacy in creating effective learning environments. Furthermore, when Chang, et al. (2011) examined professor gender and self-efficacy, they found significantly greater self-efficacy among female professors than males in class management and assessment, greater self-efficacy among professors in the field of education than in other fields, and greater self-efficacy among professors with greater than 6 years of experience.

The scale used in this study included demographic information, which allowed for further analysis of factors relating to gender and age. Factors that show a significant relationship to self-efficacy relate to the number of semesters taught online, future interest in online teaching, gender, online teaching satisfaction, and academic discipline (Horvitz et al., 2015). Presno (1998) conducted a study to determine the instructional techniques and behaviors that either reduced or aggravated anxiety in an online class for new adult students. Through observation, interviews, and document analysis, it was determined that low self-efficacy played a role in both student and faculty anxiety (Presno, 1998). Additionally, Presno (1998) found low self-efficacy played a role in each type of a teacher's anxiety.

In contrast, Lee and Tsai (2010) examined the relationship between web-based teaching self-efficacy and technological pedagogical content knowledge (TPCK) that included a web component. They identified a significant relationship between web-based teaching self-efficacy and their TPCK-W score. This conflicts with Presno's (1998) findings that low self-efficacy played a role in each type of teacher's anxiety. Lee and Tsai found that professors with more teaching experience had higher levels of teaching self-efficacy, albeit not web based.

Hutchings et al. (2014) conducted a case study that concentrated on benefits and outcomes rather than examining evidence of processes and people at work in the disjuncture, flux, and movement within education initiatives. The research context entailed a collaborative life world-led, trans-professional curriculum for health and social work disciplines, which harnessed technology to connect learners to humanizing

practices and evidence-based approaches (Hutchings et al., 2014). Data was gathered from student and staff focus groups to highlight individual and organizational benefits and barriers, including cultural resistance recognized in staff skepticism, uncertainty, and organizational resistance recognized in lack of timely and responsive provision of technical infrastructure (Hutchings et al., 2014). The findings suggested that when implementing technology, the introduction of technology into the curriculum dramatically changes the methods of interaction between faculty and students and encourages the exploration of new elements not previously explored (Hutchings et al., 2014).

Additionally, technology implementation induces a level of fear for both faculty and students who are unsure of how to cope with new methods of teaching and learning that have been altered by the introduction of technology (Hutchings et al., 2014). More research is needed to understand beliefs and behaviors of students, staff, and environments where technological innovations are introduced to enable learning practices (Greener, 2010; Hutchings et al., 2014). Buchanan et al. (2013) examined factors associated with implementation of learning technologies by faculty in higher education. Faculty Internet self-efficacy was measured, and participants reported on their use of learning technology within the barriers of adoption (Buchanan et al., 2013). Internet self-efficacy was found to be positively associated with implementation of learning technologies.

There are many barriers to faculty implementation of distance learning courses. These barriers include lack of compensation for curriculum development, lack of

recognition for embracing new technological pedagogies in tenure and promotion decisions, and technology anxiety, which is associated with the design and facilitation of distance learning courses and may also include technology in general (Brogden, & Couros, 2002; Franklin & Blankson, 2001; Grosse, 2004; Johnson et al., 2012; Lorenzetti, 2004;). Johnson et al. (2012) contends the most difficult barrier to overcome, however, may be technology anxiety, which primarily arises from the design and teaching of online courses, but can be extended to include technology in general. Developers of distance learning must adequately address the identified barriers and other negative beliefs related to technology integration into curriculum, technology anxiety, and informatics that are embedded within distance learning platforms (Robinson, 2003). Across studies, faculty have reported concerns related to their perceived ability to teach online. This perception is the personification of what I sought to examine in this study: faculty online teaching self-efficacy and ICT and computer attitudes.

Faculty ICT and Computer Attitudes

Many studies have been conducted on university faculty that examine the relationships between ICT competence and attitudes, the relationship between computer attitudes and self-efficacy, and the assessment of attitudes towards computers and implementation practices (Horvitz et al., 2015; Larbi-Apau & Moseley, 2012; Lee & Tsai, 2010; Presno, 1998)). In this study, I sought to fill a gap in the literature as it relates to professional development programs, online teaching self-efficacy, faculty ICT and computer attitudes, and the diffusion of innovations process in higher education.

Vodanovich and Piotrowski (2005) conducted a study that assessed interconnectedness of faculty attitudes and perceived drawbacks to web-based teaching. Their research revealed faculty perceived a lack of formal training in the use of the Internet for teaching purposes, with 58.1% indicating they had either "no" or "very little" formal didactic training in the use of the Internet as an instructional method (Vodanovich & Piotrowski, 2005). Based on their findings, Vodanovich and Piotrowski contended that the majority of faculty who incorporate web-based instructional methods rely on rudimentary operations, such as email and posting the syllabus, as the most used applications. The study found 89.7% of online faculty were using email, 70.1% were posting their syllabi online, 64.4% were accessing scholarly literature for instructional purposes, 63.2% were giving assignments online, 47.1% engaged students with exercises, 28.7% engaged in distance learning, and 21.8% involved them with testing (Vodanovich & Piotrowski, 2005).

The *2013 Inside Higher Ed Survey of Faculty Attitudes on Technology* was conducted to draw an understanding of how university faculty members and campus leaders in educational technology perceive and pursue online learning and other emerging opportunities for delivering course content. The study conducted by Inside Higher Ed and Gallup revealed few faculty members (7%) strongly agreed online courses could achieve student learning outcomes, which are at least equivalent to in-person courses (Gallup Inc., 2013). This contrasts with the *2016 Inside Higher Ed Survey of Faculty Attitudes on Technology* study. The 2016 survey revealed instructors who have taught online courses remain more likely to disagree than agree that online courses can achieve equivalent

outcomes compared to in-person instruction at any institution (Gallup Inc., 2016). Faculty participants are more likely to agree than disagree that online education can match the quality of in-person education at their own institution, in their department or discipline, and in the courses, they teach (Gallup Inc., 2016).

While Vodanovich and Piotrowski (2005) did not include a recommendation for further research based on their research findings, the researchers found that their research and earlier empirical research suggest various types of interventions. Interventions such as faculty load reduction during online course development, availability of permanent technology support personnel, expert "in-house" workshops, financial incentives, faculty centered support websites, and the availability of peer-reviewed online resources for enhancing computer-competency through a "teaching" center (Vodanovich & Piotrowski, 2005). These interventions aligned with Shea (2007), who conducted a study about the factors that enable and constrain faculty participation in online teaching and learning environments. Shea's findings suggested the top motivator for faculty was a more flexible work schedule. The top demotivator was inadequate compensation for perceived greater work than for traditionally delivered courses, especially for online course development, revision, and teaching (Shea, 2007). The aim of the 2016 Faculty Inside Higher Ed Survey of Faculty Attitudes on Technology survey was to understand how college professors and academic technology leaders perceive online learning and view other issues related to the use of technology (Gallup Inc., 2016). The findings revealed overall that faculty have a generally negative view of online education and that faculty members do not view it as superior to in-person instruction in any of the ten specific

course objectives defined in the study including, delivering course content, engaging students in the course material, and interacting with students (Gallup Inc., 2016).

Hall (2013) examined faculty perceptions regarding the role of new technologies in graduate management education. Faculty members who were currently using or planned to use Internet-based learning systems soon recognized the importance of the web in management education. However, the survey results revealed both a significant divide between faculty innovators and resisters and indicated that technology implementation differed significantly across disciplines (Hall, 2013). These attitudes and implementation effort rates coincided with faculty who may be struggling with a lack of competence, confidence, and motivation to grasp and become proficient in online/computer-based skills (Vodanovich & Piotrowski, 2005). This is supported by research in the field which contends that attitudes of college and university faculty towards educational technology innovation growth have varied, partly based on discipline, i.e., education, social sciences, sciences, and professional studies (Vodanovich & Piotrowski, 2005). It is important to note, favorable attitudes of faculty towards web-based instruction does not necessarily translate into actual implementation and use of online teaching approaches.

Furthermore, Vodanovich and Piotrowski's (2005) study revealed faculty implementation reluctance appears to stem from a lack of formal technology training and the substantial time requirements needed for its implementation. Since the 1990s, studies have revealed obstacles to embracing the Internet and its shortcomings. Some of these issues are lack of privacy, poor/limited interaction, technology difficulties, software

limitations, increased time and commitment by faculty, limited knowledge, training and support, technology-driven instead of content focused processes, as well as feelings of instructor and learner about isolation, archival, and retrieval concerns (Auter & Hanna, 1996; Daly, 1998; Hantula, 1998; Hardy, 1999; Iseke-Barnes, 1996;;; Mitra & Hullett, 1997; Sherman, 1998; Vodanovich & Piotrowski, 1999; Wachter & Gupta, 1997). Larbi-Apau and Moseley (2012) conducted a study that examined the validity of Selwyn's computer attitude scale and its appropriateness for technology-based performance. The study included (n=167) random multidiscipline teaching faculty in higher education (Larbi-Apau & Moseley, 2012). Larbi-Apau and Moseley's findings suggested surveyed faculty had a relatively high positive attitude towards computers and ICT (only 1.2% reflected a negative attitude towards computers within the study). Much like the literature presented in this section, overall research findings related to faculty ICT and computer attitudes are mixed.

Summary

There is a gap in the research as it relates to faculty online teaching self-efficacy, where only a few studies have examined the importance of professors teaching self-efficacy concerning the Internet and computer applications (Horvitz et al., 2015). In this study, I examined the relationship between five variables that include (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. Understanding the needs of faculty as they relate to educational technology skills is an essential consideration when developing

professional development resources and tools and designing training. The literature demonstrates that an individuals' self-efficacy is dependent on numerous variables. It is through the development of scholarly research, best practices, and appropriate design methods that faculty gain the skills needed to effectively implement educational technology in higher education.

Communication is key in persuading people to consider new innovations. The examination of faculty online teaching self-efficacy and ICT and computer attitudes within institutions of higher education within the context of the diffusion of innovations process has the potential to impact the future of technology integration in higher education. Effective, consistent, and proactive communication is essential when implementing projects. These methods are even more important when implementing change that will transform institutions and requires faculty to develop new and often complex technical skills.

Chapter 3: Research Method

Introduction

An examination of faculty online self-efficacy and ICT and computer attitudes can provide institutions of higher education with the knowledge needed to convert traditional learning effectively and efficiently to more technologically enhanced modalities with the support of faculty. The purpose of this quantitative descriptive multiple linear regression study was to determine if a relationship exists between (a) faculty participation in technological professional development activities, (b) online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. The study examined demographical differences among online instructors focusing specifically on gender and age.

Presented in the literature review in Chapter 2 were concepts related to self-efficacy, online teaching self-efficacy, diffusion of innovations, educational technology in higher education, faculty technology professional development, recommended best practices for online teaching, and faculty ICT and computer attitudes within the context of the Rogers's (2003) diffusion of innovations model. More specifically, self-efficacy has previously been investigated as a predictor of online faculty teaching behavior. This chapter describes the research, rationale for the research design, researcher's role, research methodology, and data collection instruments. Procedures for subject selection are also discussed as they relate to data collection, operationalization of constructs, data analysis, threats to validity, and ethical procedures.

Research Questions

In this descriptive multiple linear regression study, I examined the relationship between five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. An examination of demographic data occurred to determine if a relationship exists between gender and age and the non-demographic variables. The following research questions guided the examination of the variables:

RQ1– What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?

RQ2 – What is the relationship between faculty professional development, gender, and ICT and computer attitudes?

Research Design and Rationale

The purpose of this study was to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, and faculty ICT and computer attitudes, gender, and age within the context of higher education and Rogers's (2003) diffusion of innovations theory. In the study, I examined five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age. Teaching efficacy has been quantified in previous studies (e.g., Horvitz et al., 2015).

Authors such as Woodworth (1937) and Cronbach (1957), have examined the importance of relationship research. Woodworth established that there are two significant distinctions in quantitative research methods: (a) the distinction between experimental and correlational methods and (b) the difference between independent and dependent variables. In Woodworth's view, correlational research must be distinguished from the experimental methods but standing on par within a value, rather than above or below (Woodworth, 1937). Cronbach was concerned that researchers in the scientific community considered correlational research second-rate; his opinion was that a synthesis should occur between designs and adopting both strategies. According to Leedy and Ormrod (2010), the purpose of correlational research is to investigate how characteristic differences of variables, and the degree of their difference, relates to the variances in one or more other variables or factors. A correlation occurs if one variable (X) increases and another variable (Y) increases or decreases.

In this study, I collected data using two survey tools: the ESEOT instrument developed by Robinia and Anderson (2010) and Robinia (2008) and ICTCAS modified by Larbi-Apau and Moseley (2012). Using the ESEOT survey, I examined online teaching self-efficacy in the domains of student engagement, instructional strategies, classroom management, and the use of computers. ICT and computer attitudes were tested for a relationship against the ICTCAS independent variables of affective, perceived usefulness, behavior, and perceived behavioral control (embedded in the instrument). To obtain survey data from the study subjects I employed Qualtrics, a web-based surveying tool.

Quantitative strategies in the late 19th and 20th centuries were associated with a postpositivist worldview. These included true experiments, quasi-experiments, correlational studies (Maddux & Stanley, 1986), and single-subject experiments (Cooper et al., 1987; Neuman & McCormick, 1995). Relationship research is the predominant quantitative design employed in social sciences. It can often be identified with survey research. Data are used to examine the relationships between variables, establish causal relationships, or describe the relationship patterns before any attempt of causal inference is made (Frankfort-Nachmias, et al., 2015). A correlative non-experimental design was selected for this study because it could be used to describe the trends, attitudes, and opinions of faculty online teaching self-efficacy (see Babbie, 1990). While I examined participation in technology professional development activities, the primary goal was not to determine if participation specifically influenced outcomes of online teaching self-efficacy and ICT and computer attitudes. The nature of the study did not call for a treatment. Therefore, neither a quasi-experimental nor experimental design were appropriate for this study.

Methodology

Population

The sample for this study was initially drawn from the Walden Participant Pool; however, due to a low response rate, a link to the survey was posted in relevant LinkedIn and Facebook groups to obtain participant responses. The estimated target population size was 80. Demographic information for the sample was only available after data collection concluded. The Walden Participant Pool is a website, researchers can use to obtain

participants; essentially, it is a virtual bulletin board. The site is a valuable tool for Walden University researchers as it provides access to a unique and diverse American-based university community. The virtual bulletin board allows researchers to post their studies on the site, and members of the university community interested in participating in research can visit the site to see if there were any studies in which they would like to participate. While this study was visible to all site users, researchers can specify the inclusion criteria when describing the study on the site. Subjects are expected to only participate in studies for which they meet the inclusion criteria. Subjects for this study were screened to determine if they met the study criterion. If they did not successfully answer the qualification questions, then they did not advance to the survey questions.

Sampling and Sample Procedures

Kucuk et al. (2013) found that groups of 31 to 100 (35.9%) and 101 to 300 (28.6%) were the most preferred sample sizes in educational technology quantitative studies. Sample sizes of more than 1000 persons were used in very few studies (Kucuk et al., 2013). G*Power software was used to calculate if the sample size for this multiple linear regression was large enough. A statistical test that analyzed the difference between two independent means was used to estimate the sample size. An appropriate sample size is recommended to establish relationships between independent variables and dependent variables.

A power analysis using G*Power 3.1.9.4 was conducted to determine the sample size for my study. The G*Power 3.1.9.4 is a tool used to determine the appropriate sample size calculation based on effect size, alpha level, and power level input (Faul, et

al., 2009). For RQ1, four predictors determined the appropriate sample size: faculty technology professional development, ICT and computer attitudes, gender, and age. For RQ2, two predictors determined the appropriate sample size: faculty technology professional development and gender. The alpha level was used to determine the risk associated with committing a Type I error or the probability of rejecting the null hypothesis incorrectly (see Ellis, 2010). A significance level ($\alpha = .05$) was selected to determine the sample size. Alpha is normally set at $\alpha = .05$ or lower (Cowles & Davis, 1982). The statistical power is related to the Type II error rate, commonly designated as β. If .20 is the acceptable level of β, then the power is .80 ($1 - \beta$) (Ellis, 2010). The degree to which a phenomenon is present in a population is detected by the effect size and can be identified by the chosen statistical test (Cohen, 1988). According to Cohen (1988), effect sizes for multiple linear regression vary from .02 for small, .13 to .15 for medium and .26 to .35 for large. Based on the considerations mentioned and results from studies that used similar constructs (Herold et al., 2008), for RQ1, I calculated a minimum sample size of 80 to achieve .80 statistical power ($1-\beta$) and a medium effect size of .15. For RQ 2, a minimum sample size of 68 to achieve .80 statistical power ($1-\beta$), and a medium effect size of .15.

Initially the study was closed to participants outside of Walden University's community (Participant Pool). However, low response rates required a change to the data collection procedures. Walden University requires that those who access the Participant Pool website register. Eligible participants were identified as faculty with online teaching experience during the time of the study. Alternatively, faculty subjects were required to

have taught or designed an online learning course. Participants responded to eligibility criteria questions and consented to participate. Upon satisfactory completion participants automatically navigated to the Qualtrics survey site to complete the surveys used in this study. Although participants were automatically navigated to the Qualtrics site when determining eligibility, the survey rules did not allow participants to progress within the survey if they did not meet the eligibility requirements and consent to participating in the survey.

Procedures for Recruitment, Participation and Data Collection

The nature of this study was quantitative. While researchers have continued to explore qualitative approaches in the early 21st century, quantitative studies continue to dominate major educational communication technology journals in the United States (Axtell et al., 2007; Hrastinski & Keller, 2007). A review of literature by Kucuk et al. (2013) identified various research methodologies used in educational technology research from 1990 to 2011. According to the results, they found researchers used quantitative non-experimental approaches 34.8% of the time (Kucuk et al., 2013). Therefore, the rationale for the described procedure aligns with current U.S. trends in educational technology research.

In this study, I applied a non-probability purposive sampling strategy. This strategy required that I use my subjective judgment to select units representing the population (Frankfort-Nachmias et al., 2015). Frankfort-Nachmias et al. (2015) contended that it is generally challenging to determine why a researcher judges the sampling unit as a representative of the sample. However, social scientists have applied

this sampling strategy with some success (Frankfort-Nachmias et al., 2015). Convenience sampling was initially the preferred design for this study; however, the benefits of being able to select participants from any available sampling units encouraged the non-probability purposive sampling strategy. Unfortunately, this method did not allow for the estimation of population parameters from the data collected from the sample. Therefore, this study is generalizable to populations outside of the study context (see Frankfort-Nachmias et al., 2015).

Recruitment

An introduction to the study and a link to access the qualifying questions was posted on the Walden University Participant Pool website. The recruitment process was expected to run a total of 4 weeks. An additional 2 weeks were added based on the number of responses received during the initial 4-week period. The study was designed to be anonymous. Demographical information was collected, including the age and gender of the participants.

Participation

Participants were screened to determine if they met the study criteria. Potential participants must have had experience related to distance learning and online courses. Participants were asked if they had ever taught or developed a distance learning course. If they responded yes, they progressed in the study. If they answered no, they did not progress to the survey questions. Potential participants were informed that the nature of the study required that they had taught or developed online courses either at the time of survey completion or in their past. Denied participants were thanked for their eagerness

to participate in the survey and automatically navigated to the end of the survey. If participants met the study criteria, they were prompted to review an online informed consent statement. Participants consented to participate by selecting next and continued to the study questions after viewing the informed consent statement.

Data Collection

After Institutional Review Board (IRB) approval, the study was posted on the Walden University Participant Pool site. Participants were asked to complete a questionnaire to determine eligibility. If they were eligible for the study, they were presented with the questionnaire. If participants agreed and qualified to be in the study, they were asked to complete a web-based survey that took approximately 20 minutes. I employed Qualtrics, a web-based surveying tool to obtain survey data from the study participants. Original scale items were entered into Qualtrics online system for participant access. Any identifying participant information was automatically removed.

All responses were kept confidential, and participants were able to exit the survey to the extent allowed by state law. To exit the study participants simply closed the Internet browser during the survey or after completing the survey. Participants were asked to delete their browser history and close the survey browser window once they finished the survey. The purpose of the request was to protect the data entered the survey and prevent anyone who may have used their computer from manipulating data that may have been left open within the browser window. Once participants completed all the survey questions, they were presented with a thank you page. Participants were not

contacted after the thank you page was generated, nor was their contact information saved. Subjects participating in this study remained anonymous.

Instrumentation and Operationalization of Constructs

Research supports that faculty feel converting a course from face-to-face to online instruction is hard or limited (Ray, 2009). Additionally, faculty were found to believe that converting courses from traditional modalities to online courses of equal quality involved a tremendous amount of work (Prottas, et al., 2016). Through this study I sought to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, faculty ICTs and computer attitudes, gender, and age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. Online teaching efficacy refers to the teacher's belief in his or her capability to organize and execute courses of action to bring about desired outcomes in an online teaching environment (Robinia & Anderson, 2010). Attitude refers to a predisposition to respond either positively or negatively to objects in the world (Ajzen & Fishbein, 1988). Computer self-efficacy refers to judging one's capability to use a computer (Compeau & Higgins, 1995). The two scales used for this research were the ESEOT and the ICTCAS.

The Educators Sense of Efficacy for Online Teaching

A review of the literature presented only the ESEOT instrument scale as specifically concerned with online teaching self-efficacy in higher education. The ESEOT was modified using the Teachers' Sense of Efficacy Scale (TSES), developed and validated by Tschannen-Moran et al. (1998). The TSES was based on a scale advocated

by Bandura (1997) with an expanded list of teacher capabilities. The original scale included a pool of over 100 items and, through an interactive process, was reduced to a scale with 24 items. The TSES was modified (with permission) to address online teaching efficacy. Robinia and Anderson (2010) revised the wording of the existing 24 items. They added eight new items to address the online teaching focus of their study instead of the traditional face-to-face teaching focus of the original TSES. Wording changes in the 24 items were concentrated on changing "in your classroom" to “in your online course," and the additional new items addressed the areas specifically related to online instruction: teachers' confidence with technology, knowledge of online copyright law, and perceptions of ability to teach using online collaborative teaching strategies.

Through factor analysis, Robinia and Anderson (2010) confirmed four factors: self-efficacy in online student engagement (.93), self-efficacy in online instructional strategies (.94), self-efficacy for online classroom management (.93), and self-efficacy in the use of computers (.86) with a total score for the entire instrument (.93). Robinia’s (2008) initial examination of the ESEOT scales revealed Cronbach's coefficient alphas of 92.6% for student engagement, 92.9% for classroom management, 92.4% for instructional strategies, and 85.7% computer skills. The overall reliability coefficient for the entire instrument was 92.6%. Three educators conducted face validity with online teaching experience and 15 nurse educators with various online teaching experience. Additionally, construct validity was supported as indicated by the scale author, who found the survey results often concurred with prior research findings (Robinia, 2008).

ICT/Computer Attitude Scale

In this study, I used a modified version of Selwyn's (1997) ICTCAS revised by Larbi-Apau and Moseley (2012). All the items were modified to fit the target audience and tested for construct validity through expert reviews and field testing with six comparable audiences. The reliability test using Cronbach's alpha (α) was computed for the overall computer attitude scale and all sub-scales. Items that were constructed negatively for external consistency were reversed for the analysis. Levene's test was performed to validate the assumption of variance equality (Larbi-Apau & Moseley, 2012).

Selwyn's CAS contains four distinct constructs: affective attitude, perceived control, perceived usefulness, and behavior attitude. An affective attitude refers to fear, discomfort, and hesitation. Perceived control attitude is related to ease or difficulty of computer use. Perceived usefulness represents the degree of relevance to improving job performance. Finally, the behavioral attitude represented intentions and actions. In sum, the set of individual items in these sub-domains represents the computer attitude and reflects the degree to which respondents' attitude is favorable or unfavorable towards the attitude object.

Selwyn's (1997) CAS has provided comparative measures for computer attitude in many contexts and audiences due to its high internal significant consistency and reliability score (0.87 to 0.93), coefficient of stability, and construct validity ($p < 0.001$). While initially used to measure student perspectives toward computer-technology (e.g., Cázares, 2010) and teachers in general (Yaghi & Abu-Saba, 1998), studies of university

teachers have ranged from relationships between ICT competence and attitude to computer attitudes and how it correlates to computer self-efficacy (Jegede, et al., 2007).

Selwyn's (1997) CAS instrument was partly influenced by Ajzen and Fishbein, (1988) theory of planned behavior. Ajzen and Fishbein (1988) describe attitude as a predisposition to respond favorably or unfavorably to objects globally. Furthermore, individuals rate their feelings towards an object using several scales. It can be argued that they provided the foundation for much of the work on computer attitudes, which is based on asking people several questions using various scales that address aspects of computer use. Ajzen (2005) defined attitude as "a disposition to respond favorably or unfavorably to an object, person, institution or event" (p. 3). (Ajzen, 2005; Ajzen & Fishbein, 1988) linked his theory of planned behavior by describing three types of belief systems: behavioral beliefs, normative beliefs, and control beliefs. The behavioral belief system produces consequences based on favorable or unfavorable attitudes towards a behavior. Normative beliefs describe the expectations of others and may produce outcomes based on subjective or perceived social pressure. Control beliefs create perceived behavioral control and may encourage or impede performance or behavior. It is the amalgamation of these belief systems that develop a behavioral intention, which can be assumed as an immediate antecedent of behavior. Attitude can, therefore, be influenced by actual behavior directly. As Cázares (2010) contends, proficiency in specific information technologies encourages or increases the belief and self-efficacy of managing more complex technologies. This is in contradiction to Garland and Noyes (2008), who found that computer use, and experience are increasingly less able to predict computer attitudes.

Garland and Noyes (2008) conducted a study to examine several scales' relevance to determine if they were still appropriate for use. The results of their examination found that the CAS had a mean score for the 20 items of 66.25 (SD = 8.74). A high Cronbach's alpha value of .79 was obtained. The removal of one item on the scale ("computers will never replace human life") would increase the alpha to .81. Spearman's correlations of the test and the retest data indicated high levels of consistency over time with a significant relationship for the two tests ($p = .802$, $p < .01$). Principal components' analysis (PCS) extracted five components, which explained 59.82% of the variance (Garland & Noyes, 2008).

Study participants responded to a set of 20 statements on a 5-point Likert scale: from Strongly Agree (4) to Strongly Disagree (0). The ICTCAS was composed of four distinct but complementary attitude constructs: affective attitude, perceived control attitude, perceived usefulness, behavioral attitude. Affective attitude contained six items representing feelings such as fear, apprehension, discomfort, and hesitation towards computers and ICT. Perceived behavioral control attitude (shortened to perceived control attitude) encompassed five items and measured management, ease, or computer use difficulty. Perceived usefulness attitude comprised five items and measured the degree to which the subject found the computer relevant in improving job performance. The final construct measured intentions and actions regarding computers and was called behavior attitude and included five items. General computer attitude was the summated set of the 20-item constructs. It reflected the degree to which respondents' attitudes towards ICT and computer technology, which means the statements were composed to reflect

heterogeneity and measurable responses from which the computer attitude was inferred. Potential scores ranged from 0 to 84. As a hypothetical construct, attitude can be deduced from measurable responses and is most beneficial when applicable responses are organized into various subgroups or domains (Ajzen, 2005).

Operationalization of Constructs

Construct validity occurs when a researcher applies a general theoretical framework to a measurement instrument to determine if the instrument is theoretically and empirically connected to the constructs and theoretical assumptions investigated (Nachmias & Nachmias, 1976). Robinia (2008) verified the construct validity of the ESEOT instrument by collecting data from the tool. The findings suggested that increased scores of self-efficacies were linked to the amount of teaching experience as predicted by the theoretical construct of self-efficacy (Robinia, 2008). Bandura (1977) established construct validity by collecting data from the tool and finding that increased scores of self-efficacies were linked to the amount of actual teaching experience as predicted by the theoretical construct of self-efficacy (Bandura, 1977). Additionally, this study used the ICTCAS, a modified CAS. The CAS is generic and has been shown to have acceptable reliability, stability over time, and construct validity (Rainer & Miller, 1996).

Instrument Scoring

In this study, five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of

innovations theory were examined. Perceived online teaching self-efficacy was divided into four constructs: student engagement, instructional strategies, classroom management, and computers. Faculty ICT and computer attitudes were identified through four components: affective attitude, perceived control attitude, perceived usefulness, behavioral attitude. The following operational definitions provided the lens through which I examined the results of the scales.

Faculty professional development participation was examined within the demographic section of the questionnaire. Faculty responded either "yes" or "no" to participating in faculty professional development.

Perceived online teaching self-efficacy was measured by examining efficacy in student engagement. Specifically, items 1, 2, 4, 6, 9, 12, 14, and 22 on the ESEOT scale informed whether a faculty member had efficacy in student engagement.

Perceived online teaching self-efficacy was measured by examining efficacy in instructional strategies. Specifically, items 7, 10, 11, 17, 18, 20, 23, and 24 on the ESEOT scale indicated whether a faculty member had efficacy in instructional strategies.

Perceived online teaching self-efficacy was measured by examining efficacy in classroom management. Specifically, items 3, 5, 8, 13, 15, 16, 19, and 21 on the ESEOT scale established whether a faculty member had efficacy in classroom management.

Perceived online teaching self-efficacy was measured by examining efficacy in the use of computers. Specifically, items 25, 26, 27, 28, 29, 30, 31, and 32 on the ESEOT scale advised whether a faculty member had efficacy in using computers.

ICT and computer attitudes were measured by examining the faculty affective attitude, which referred to fear, discomfort, and hesitation. Specifically, items 1-6 on the ICTCAS informed the respondents' affective attitude.

ICT and computer attitude were measured by examining the perceived control attitude related to ease or difficulty of computer use. Specifically, items 7-11 on the ICTCAS informed the respondents perceived control attitude.

ICT and computer attitude were measured by examining the perceived usefulness, representing the degree of relevance in improving job performance. Specifically, items 12-16 on the ICTCAS guided the respondents perceived usefulness attitude.

ICT and computer attitude were measured by examining the behavioral attitude that denoted intentions and actions. Specifically, items 17-21 on the ICTCAS pointed to the respondents' behavioral attitude.

ESEOT

The ESEOT instrument responses varied along a nine-point scale defined by the categories "Nothing," "Very little," "Some Influence," "Quite A Bit," and "A Great Deal." (1 through 9 respectively). The higher the aggregate score on the scale, the greater sense of efficacy for the specific aspect of online teaching. The means of the subscales were then calculated and added to these means to determine an overall online teaching efficacy score ranging from 4 through 36. Higher scores indicated greater overall teachers' sense of efficacy for online teaching.

To determine the efficacy on the subscale, efficacy in online student engagement, efficacy in online instructional practices, efficacy in online classroom management, and efficacy in use of computers subscale scores the following scoring should be computed.

Efficacy in Student Engagement:

Add Score from Items: 1+2 + 4 + 6 + 9 + 12 + 14 + 22=

Total score divided by 8 to get a mean score

Efficacy in Instructional Strategies:

Add Score from Items: 7 + 10 + 11 + 17 + 18 + 20 + 23 + 24=

Total score divided by 8 to get a mean score

Efficacy in Classroom Management:

Add Score from Items: 3 + 5 + 8 + 13 + 15 + 16+19 + 21=

Total score divided by 8 to get a mean score

Efficacy in Use of Computers:

Add Score from Items: 25 + 26 + 27 + 28 + 29 + 30 + 31+32=

The total score was divided by 8 to get a mean score (Robinia, 2008).

ICT/Computer Attitude Scale

The ICTCAS was scored by eight of the 20-item statements designed to measure positive attitudes, while the remainder indicate negative attitudes. Responses to the items were made on a 5-point Likert scales from 4- Strongly Agree, 3- Agree, 2 – Neutral, 1-Disagree, and 0-Strongly Disagree. Scores from each item aligned to the four-level computer attitudinal constructs (perceived affective construct, perceived usefulness construct, perceived control construct, and perceived behavioral construct) and were

totaled to represent individual scores. The individual scores' total values were calculated as the overall respondent's attitude towards ICT and computer technology, ranging from 0 to 84. Results were reported as percentages, means, and standard deviations. Computer attitude as a controlling factor is critical in understanding faculty perceptions and behaviors towards ICT. To score the ICTCAS researchers first reverse the scores for the following items: 2, 3, 5, 6, 8, 9, 12, 13, 15, 16, 18, 20. For example, a score of "1" becomes "5." Next, researchers add up all twenty scores to obtain the total CAS score. This score should range from 20 to 100, with a neutral score of 60 (See Appendix C).

The ICTCAS, a modified version of the CAS, was piloted to test for both content and construct validity by two expert reviewers and six academic staff. Validity and reliability were tested with Cronbach's alpha (α) general (21 items) measured at 86.8%, affective component (6 items) measured at 83.6%, usefulness component (5 items) measured at .86.5%, control component measured (5 items) at 73.4% and behavior component (5 items) measured at 95.3%. Data is representative of computed survey data $N=162$; $p < .001$. Overall, the results are indicative of a high and significant overall percentage of reliability and construct validity. All scores were positive and were equal to 73.4% and higher, which suggests a positive measure of the retained and modified ICTCAS instrument (see Morgan, et al., 2004). These results were comparable to Cázares (2010); Jegede et al. (2007); and Selwyn (1997). These results indicated that the instrument was appropriate for measuring faculty ICT and computer attitudes (see Larbi-Apau & Moseley, 2012).

Data Analysis Plan

IBM SPSS 25 statistics software (SPSS) was used to analyze the data collected in this study. The data was collected using Qualtrics, a web-based surveying tool. The survey package software converted the data to an excel dataset, which was then imported into SPSS. Data cleaning methods involved the detection and removal (or correction) of errors and inconsistencies in the data set. Incomplete, inaccurate, or irrelevant data was identified and replaced, modified, or deleted as appropriate. The data was visually reviewed to ensure that selections were accurate. The data was double-checked and cleaned for errors before statistical analysis.

Correlational methods are applied when assessing the association strength between two variables (Field, 2017). In this multiple linear regression study, I examined the variance between these variables. In the correlative component of the research study, the association between online teaching self-efficacy and ICT and computer attitudes of faculty who have participated in technology professional development were examined as well as the association between online teaching self-efficacy and ICT and computer attitudes of faculty who have not participated in technology professional development. This multiple linear regression component of this study examined the relationship between five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory.

Research Questions and Hypotheses

In this multiple linear regression study, I examined five variables that included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of diffusion of innovations theory. Demographic data was examined to determine if a relationship exists between gender and age and the remaining predictor variables. The following research questions, null and alternative hypothesis, encourage the examination of the variables.

RQ1– What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?

$H_0$1 – There is not a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

H_a1 – There is a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

RQ2 – What is the relationship between faculty professional development, gender, and ICT and computer attitudes?

$H_0$2 – There is not a significant relationship between faculty professional development, gender, and ICT and computer attitudes.

H_a2 – There is a significant relationship between faculty professional development, gender, and ICT and computer attitudes.

Threats to Validity

External Validity

Threats to external validity correlated to the electronic modality of the survey instrument. Other threats included data loss and that data sample pool was limited to the participant pool's online network. Additionally, subjects may not have responded due to lack of direct communication, and there may have been misinterpretations of language as participants were left to confer meaning without feedback. The study limitations included weaknesses intrinsically found in descriptive statistic design, such as a lack of generalizability and respondent bias. Four important limitations included:

1. Respondent bias due to personal preference or comfort level with a web-based survey.
2. Because the ESEOT and ICTCAS are self-report instruments, data is vulnerable to over-rater or under-rater bias. Rater bias occurs due to differing interpretations of the research scale or an individual's unique perceptions of the topic studied (Kenny, 1991). It is important to note the experiences faculty face are impacted by various factors, including their environment, attitude, subject matter area, and prior experiences using technology within education and as a social tool. When a participant under-rates there online teaching self-efficacy, it may be because they made inappropriate comparisons to colleagues. An over-rater may rate their overall attitudes related to computers in general, while not fully considering their attitudes related to educational computer technologies.

3. All participants were Walden University Participant Pool, and results cannot be generalized to other universities outside of the sample population.
4. The study only described relationships between variables and did not identify cause and effect between variables. The approach design was less laborious than an experimental approach due to the limitation of control over variables.

Internal Validity

Threats to internal validity may have included participant demographics such as age, gender, and race. These threats may cause a variation between subject responses; however, due to the nature of the online participant pool membership, it was expected to minimize validity threats. The location of participants produced minimal conflict for participation; thus, low levels of external validity may have been experienced. The web-based online modality of this study allowed participants to participate from any Internet-connected device. They could participate from a mobile device, computer, or other electronic devices, such as a tablet, with minimal survey presentation shifts. Two scales were used to analyze the data in this study. They were administered at the same time, which facilitated minor threats to validity.

It was predicted that the participants would examine each scale as an independent scale since they examined the variables separately and they were presented within separate sections of the survey. Therefore, it was expected that responses to the first instrument may only minimally influence the second instrument. The ESEOT was

presented before the ICTCAS, which was followed by demographics questions. While the web-based modality allowed for a wider net to be cast for subjects, it also allowed for higher mortality rates. Loss of subjects likely occurred when subjects were distracted during completion of the instrument and did not return to complete it. The loss of subjects was expected to possibly reduce the magnitude of the relationship between variables.

History refers to subjects that may not remember all their emotions and experiences while teaching or developing an online course. It was assumed participants did not participate in the study if they did not remember their experiences. It was also expected that participants would remember their attitudes towards ICT, computers, and their perceived online teaching self-efficacy if they met the study guidelines. Experiences shape attitudes, therefore, it was assumed that subjects remembered how they felt during their teaching or development experiences. The history threat was addressed by including the following text, "recall your attitudes towards ICT and computers and online teaching self-efficacy when responding to the following questions." The purpose was to prompt participants to remember the experiences and emotions felt during teaching or developing online courses. Maturation likely did not pose a threat as faculty may experience psychological changes such as receiving additional instructional designers' services or having a poor experience teaching an online course. These factors may have influenced their overall experiences and affected their responses.

Ethical Procedures

It was expected that members of the university community would have various opinions regarding the study. Faculty were expected to be interested in research

outcomes, because they are directly impacted by the design of new courses and shifts in the provision of instruction to an online format. Numerous ethical considerations were applied, including applying national and international associations' published codes of ethics in educational research. An examination to determine if there was a conflict of interest was conducted to ensure the research findings were not jeopardized due to financial gain, nor other conflicts that might impact project design, data interpretation, or the presentation of findings. It was determined that no conflicts of interest were present at the time of the study submission. The following ethical guidelines were implemented for the entire research period and beyond as appropriate:

1. The research data remained confidential throughout the study and consent was obtained for each survey. An anonymous survey link was posted, this link was reusable, and unable to track respondents' identifying information.
2. Participation incentives were not provided for participation in this study.
3. Participants were informed about the study's nature, including the social and educational implications of research findings.
4. Before the publication of this study, IRB approval was received to ascertain if the study had scientific, educational, or societal value.
5. There was no risk to potential participants due to study subject confidentiality.
6. Participants could choose not to participate or withdraw early without facing any adverse consequences.

7. Survey data processed through Qualtrics was stored in a specific location and was not moved to another jurisdiction.
8. After a participant began a survey, they had a specific time allotted to complete the survey.
9. Survey findings were kept secure on a password-protected site for 5 years before being destroyed.
10. Once the timeframe for data collection expired, uncompleted surveys were automatically closed, and respondents were not permitted to complete their survey submission. Access to the data was available to the researcher and committee members as needed as it related to satisfying the dissertation's requirements. Data was secured on the Qualtrics website. Additional copies may have been exported for statistical analysis. Downloaded files were password protected to ensure the confidentiality of collected data.

Access to the Walden University Participant Pool was obtained by requesting approval from both the university's IRB and the Institutional Approver. Approval from the IRB and the Institutional Approver were not mutually exclusive; thus, approval from one did not constitute approval from the other. Several steps were completed to obtain approval. Determining eligibility of the study occurred through the submission of an application. An initial form was submitted before the proposal approval. Once approval was received, the IRB application and supporting documentation was submitted to the University Research Reviewer (URR) and IRB.

Summary

This section included the presentation of the research design and data collection strategy for this study. A descriptive and multiple linear regression quantitative approach was used to conduct this study. IBM SPSS 25 Statistics software was used for statistical analysis, and G*Power analysis was used to calculate the sample size. Two survey instruments were used to measure online teaching self-efficacy and ICT and computer attitudes of faculty who teach/taught or developed online courses, determine participation in technology professional development and obtain demographics data from study participants. The benefits of conducting this study included adding to existing literature related to faculty online teaching self-efficacy and ICT and computer attitudes by further understanding the relationship between online teaching self-efficacy and ICT and computer attitudes in higher education. I implemented the study by applying two theoretical frameworks, namely the construct of self-efficacy derived from Alfred Bandura's (1977) social learning theory and Everett Rogers's (2003) diffusion of innovations theory. This multiple linear regression study examined the variance between five variables which included (a) faculty technology professional development participation, (b) faculty online teaching self-efficacy, (c) faculty ICT and computer attitudes, (d) gender, and (e) age within the framework of the diffusion of innovations theory. Chapter 4 presents the findings from the ESEOT survey and the modified ICTCAS posed to faculty educators who were members of Walden University Participant Pool and relevant LinkedIn and Facebook groups.

Chapter 4: Introduction to the Study

Introduction

Included in this chapter is an outline of the data collection process and a reporting of the findings. The purpose of this quantitative descriptive multiple linear regression study was to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, and faculty ICT and computer attitudes, gender, and age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. The study also included an examination of demographical differences among online instructors focusing specifically on gender and age. The research design included an online survey administered using Qualtrics and analyzed using IBM SPSS 25 software. This chapter includes a presentation of the findings from the ESEOT survey and the modified ICTCAS (see Appendix B & C).

The following research questions, null and alternative hypotheses, guided the examination of the variables.

RQ1: What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?

$H_0$1: There is no significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

H_a1: There is a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy.

RQ2: What is the relationship between faculty technology professional development, gender, and ICT and computer attitudes?

$H_0 2$: There no significant relationship between faculty technology professional development, gender, and ICT and computer attitudes.

$H_a 2$: There is a significant relationship between faculty technology professional development, gender, and ICT and computer attitudes.

This chapter includes a review of the data collection procedures, a reporting of the baseline descriptive and demographics characteristics of the sample, and an assessment of the treatment and intervention fidelity. Finally, there is a reporting of the findings using descriptive statistics, an evaluation of statistical assumptions, and a review of the statistical analysis findings.

Data Collection

A power analysis was conducted using G*Power 3.1 analysis with an alpha level of .01 with four (faculty technology professional development participation, ICT and computer attitudes, gender, and age) predictors variables for RQ1 and two (faculty technology professional development participation and gender) predictor variables for RQ2. Use of this tool provides a method to determine the appropriate sample size calculation based on effect size, alpha level, and power level input. According to Cohen (1988), the effect sizes for multiple regression vary from .02 for small, .13 to .15 for

medium, and .26 to .35 for large effect sizes. For RQ1, I calculated a minimum sample size of 80 to achieve .80 statistical power (1-β), and a medium effect size of .15. Using G*Power 3.1 software, an F test was used to conduct a multiple linear regression: Fixed model, R^2 deviation from zero sensitivity test. The alpha was set to $\alpha = .05$, with a power of .80 and a sample size of 42 with four predictors. According to Cohen, the effect size for RQ1 was large ($f^2 = .322$).

For RQ2, I calculated a minimum sample size of 68 to achieve .80 statistical power (1-β), and a medium effect size of .15. A total of 82 faculty responses were recorded. Of the 82 responses, 80.49% of faculty indicated that they had taught an online course (n = 66). The remaining 19.51% of faculty responded that they had never taught an online course (n = 16). From this sample, 51.21% of faculty who responded completed the entire survey (n = 42).

Utilizing G*Power 3.1 software, an F test was used to conduct a multiple linear regression: Fixed model, R^2 deviation from zero sensitivity test. The alpha was set to $\alpha = .05$, with a power of .80 and a sample size of 42 with two predictors. Again, the effect size of the study was large ($f^2 = .247$). Any faculty with missing values were excluded from the data set.

An introduction to the study was posted on the Walden University Participant Pool website, LinkedIn, and Facebook. Initially, the survey was only planned to be administered through the Walden University Participant Pool website. I obtained data only after receiving IRB approval (# 10-19-18-0332746) from Walden University. Data collection began on October 24, 2018 and concluded on August 27, 2019. Due to

indications of a low response rate almost 3 months into data collection (10 total sign-ups), an IRB modification request was submitted to adjust the recruitment process. Once approval was granted, the survey was reposted on LinkedIn and Facebook group pages related to online teaching, as well as on my personal LinkedIn and Facebook pages.

A change of procedures was requested on two separate occasions. The first change of procedure was requested on January 20, 2019 and approved on February 1, 2019. This initial request for a change in procedures granted me permission to post the survey link with the original notice in various LinkedIn group sites. Table 1 provides the names and number of members for each LinkedIn group the survey was posted. The second change of procedures was requested on March 30, 2019 and approved on April 12, 2019. This final approval granted me permission to post the original notice with a link to the survey on my personal LinkedIn and Facebook pages and groups.

Demographic data were collected from all participants (n=42) who responded yes to having taught, co-taught, or developed an online course (see Table 2). Demographic questions requested that participants select their gender, age range, institution, academic appointment, academic rank, highest degree, and specialty area. The sample was 69% female (n = 29) and 31% male (n = 13). It included a widespread age range with participants' ages ranging from 20 to 30 to over 71 years of age. More specifically, 4.8% were 20-30 years old (n = 2); 14.3% were 31-40 years old (n = 6); 33.3% were 40-50 years old (n = 14); 51-60 years old (n = 9); 61-70 years old (n = 10) and 2.4% for 71 years old and older (n = 1). The sample consisted of 83.3% 4-year college faculty (n = 35) and 16.7% community college faculty (n = 7).

Through self-identification, 52.4% identified themselves as instructors (n = 22); 16.7% were associate professors (n = 7); and professors and assistant professors were in the minority with 11.9% (n =5) and 2.4% (n=1) respectively. The remaining 16.7% identified as other (n =7). The education level of faculty respondents was split between master's degree and a doctorate and post-doctorate, with 45.2% and 4.8% (n =19 and (n = 2) having obtained a doctorate and post-doctorate, respectively. The remaining 50% of faculty had earned only a masters (n = 21). Faculty ranking for respondents indicated that 52.4% were adjunct (n = 22); 21.4 were tenure (n = 9); the remaining 26% included other (n = 8), tenure earning (n = 2) and term (n = 1). Given the recruitment efforts, it is not surprising that 45.2% of respondents reported education (n = 19) as their area of specialty; 21.4% of faculty reported that they worked in technology (n = 9); an equal number of participants identified as other (n = 9); 7% of science, engineering and mathematics faculty (n = 3) completed the survey, while the remaining 4.8% of respondents reported being within the humanities (n = 2).

Due to the data collection method applied and the low level of responses, the sample does not represent any specific population of interest. Therefore, the study only represents participants responses and cannot be compared to other faculty within the areas identified above.

Table 1

Names of LinkedIn Groups Where Survey was Posted

Group name	Number of members
TechinEDU OFFICIAL SITE (Technology Integration in Education)	48,414
Online Professionals: Teaching College Online and Hybrid	3,674
Higher Education Adjunct Faculty	24,607
Walden University Doctoral Study Group	1,862
Virtual Instructor-Led Training	2,554
Friends & Peers of OLC	8,177
The eLearning Guild	58,673
EDUCAUSE	40,453
eLearning Global Network	32,920

Note: Participant LinkedIn Groups (these figures illustrate the groups on LinkedIn where the survey was posted and the number of participants at survey implementation).

Table 2

Baseline Descriptive and Demographics Characteristics

	Responses	n	%
Gender	Male	13	31
	Female	29	69
Age range	20-30 years old	2	4.8
	31-40 years old	6	14.3
	41-50 years old	14	33.3
	51- 60 years old	9	21.4
	61-70 years old	10	23.8
	71 years and older	1	2.4
Institution type			
	Community college	7	16.7
	4-year college or university	35	83.3
Academic appointment			
	Adjunct	22	52.4
	Term	1	2.4
	Tenure earning	7	16.7
	Tenure	5	11.9
	Other	7	16.7
Current academic rank			
	Instructor	22	52.4
	Assistant professor	1	2.4
	Associate professor	7	16.7
	Professor	5	11.9
	Other	7	16.7
Highest degree held			
	Master's	21	50
	Doctorate	19	45.2
	Post Doctorate	2	4.8
Specialty area			
	Humanities	2	2.4
	Technology	9	11.0
	Education	19	23.2
	Science/engineer/math	3	3.7
	Other	9	11

Results

Descriptive Statistics

The sample consisted of 42 professors who had taught online courses; 69% of the respondents were female (n = 29) and 31% were male (n = 13). The age group of 41 to 50 years old had the highest response rate of 33% (n = 14). I found that 52% of respondents held an adjunct academic appointment (n = 22). While there were responses from the humanities, technology, science, engineering, and math, education was the specialty area with the single largest response (n=19); however, they only accounted for 23.2% of all responses.

Table 3 displays the means and standard deviations of the variables. Online teaching self-efficacy (the dependent variable) had a mean of 7.44 (SD = 1.23). Faculty technology professional development had a mean of .71 (SD = .45). ICT and attitudes towards computers had a mean of 65.9 (SD = 3.73). Gender had a mean of.30 (SD = .46), and age had a mean of 3.52 (SD = 1.21).

Table 3

Descriptive Statistics for Online Teaching Self-Efficacy, Faculty Technology Professional Development, ICT and Attitudes Towards Computer, Gender, and Age

	N	Min	Max	Mean	SD	Variance
Online teaching efficacy	42	1.09	9.00	7.4464	1.23301	1.520
Faculty technology professional development	42	.00	1.00	.7143	.45723	.209
ICT and computer attitudes	42	55.00	76.00	65.9762	3.73179	13.926
Gender	42	.00	1.00	.3095	.46790	.219

Evaluation of Statistical Assumptions

The multiple linear regression assumptions were analyzed to ensure a linear relationship between variables, normality in the variables, multicollinearity, no auto-correction, and homoscedasticity (Tabachnick, et al., 2007). Scatterplots provided the results of linearity, normality, and homoscedasticity simultaneously through the examination of residuals scatterplots; thus, this method of examination was applied for each of the research questions.

Linear modeling in regression assumes the relationship between the dependent variable and the explanatory variables is linear. However, it is important to note that this may not always be the case. Additionally, non-linear relationships may be difficult to notice due to complex dependencies within the data. Non-linear effects can sometimes be spotted by a curve or a cubic shape in the scatter plot residuals (Tranmer & Elliot, 2008). A linear relationship was not present between variables for RQ1, "What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?" Scatterplots between the dependent variables (online teaching self-efficacy) and each of the independent variables (faculty professional development, ICT, and attitudes towards computers, gender, and age) did not demonstrate a positive linear relationship (see Figure1).

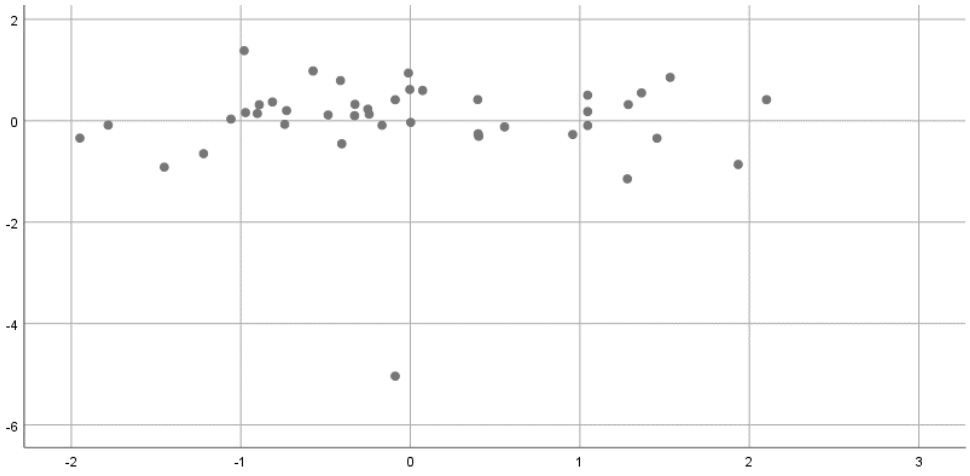

Figure 1. Scatterplot of online reaching self-efficacy. This figure does not show a positive linear relationship.

A linear relationship was not present between variables for RQ2, "What is the relationship between faculty professional development, gender, and attitudes toward technology?" Scatterplots between the dependent variables (ICT and computer attitudes) and each of the independent variables (faculty technology, professional development, and gender) did not demonstrate a positive linear relationship (see Figure 2).

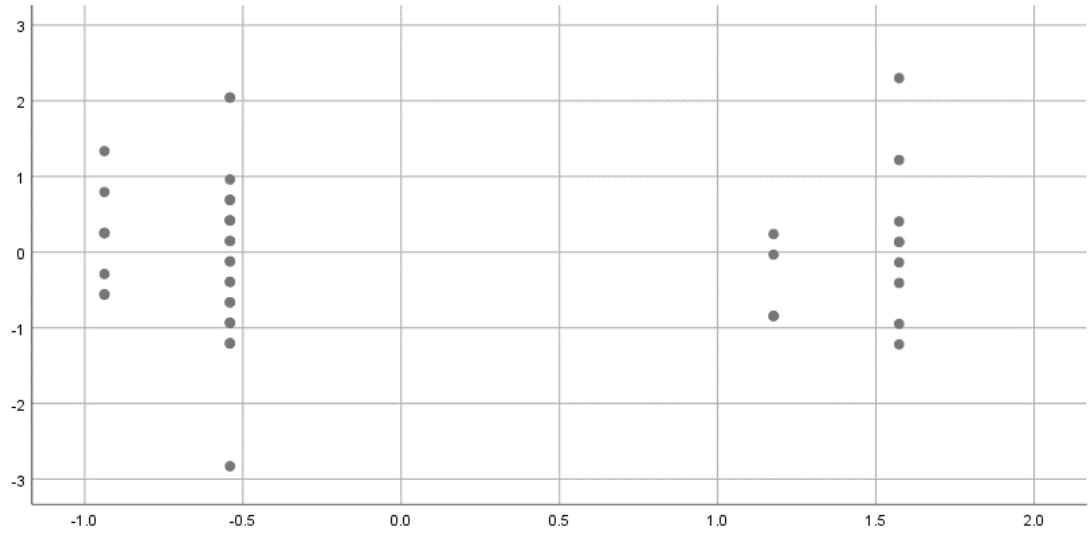

Figure 2. Scatterplot of Attitudes Towards Technology. This figure does not show a positive linear relationship.

The results illustrated the failure of normality (see Figure 2), which skewed the distribution of residuals. Failure of linearity of residuals in regression does not invalidate the analysis; however, it does weaken it (Tabachnick et al., 2007). To test for normality in the variables, the scatterplots were used to confirm results and the Shapiro-Wilk test was conducted. Table 4 displays the results of the Shapiro-Wilk test for normality, skewness, and kurtosis. The Shapiro-Wilk test showed that the data were not normally distributed for all variables and that the assumption for normality was not met. The kurtosis results indicated the distribution was not normal.

Table 4

Normality Testing for Online Teaching Self-Efficacy, Faculty Technology Professional Development, ICT and Attitudes Towards Computers, Gender, and Age

	Statistic	*df*	p	Skewness	Kurtosis
Online teaching efficacy	.698	42	.000	-3.404	17.043
Faculty technology professional development	.567	42	.000	.984	-1.085
ICT and attitudes towards computers	.958	42	.129	.108	1.651
Gender	.582	42	.000	-.855	-1.335
Age	.925	42	.009	-.101	-.636

Table 5 shows the output for RQ1 tests to see if the data met the assumption of collinearity. The results indicated that multicollinearity was not a concern (Technology Professional Development Scores, Tolerance = .89, VIF = 1.11; ICT and Computer Attitudes, Tolerance = .84, VIF = 1.18; Gender Tolerance = .92, VIF = 1.08; and Age, Tolerance = .80, VIF = 1.24). The data indicated limited or no autocorrelation and independence from each other. The Durbin-Watson test was used to test for the presence of serial correlation among the residuals. A value of 2 indicated no autocorrelation. This study had a Durbin-Watson d = 1.98; thus, only a little autocorrelation was found.

P-P plots for the multiple linear regression show the normal distribution of residuals. When the residuals are normally distributed, they lie approximately on the diagonal (Tranmer & Elliot, 2008). The results showed points that deviated from a straight line, which suggest departures from normality.

Table 5

Collinearity Diagnostics

	Collinearity Statistics	
	Tolerance	VIF
Faculty technology professional development	.894	1.18
ICT and computer attitudes	.845	1.18
Gender	.923	1.08
Age	.802	1.24

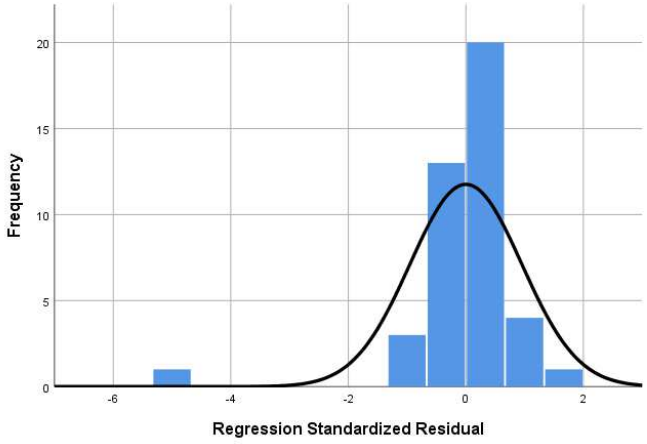

Figure 3. Histogram of online teaching self-efficacy. This figure shows the positive results of the Shapiro-Wilk test.

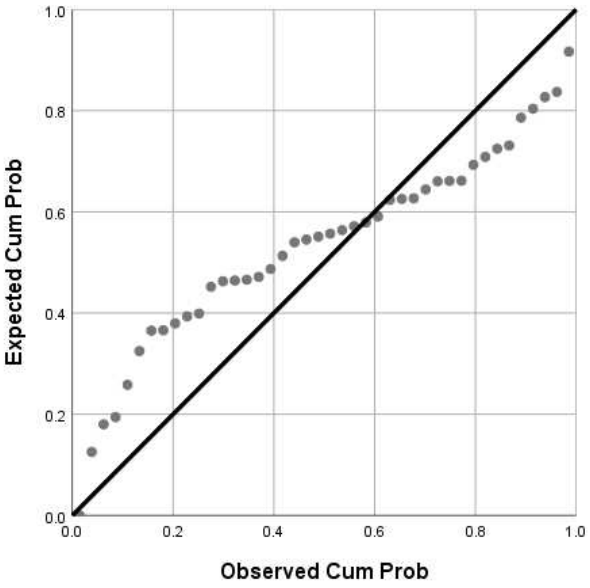

Figure 4. Normal P-P plot of online teaching self-efficacy. This figure shows a failure of normality with a skewed distribution of residuals

The purpose of histograms is to demonstrate through graphs is to a summary of data sets. The histogram of standardized residuals supports the results of the Shapiro-Wilk test; the histogram is skewed towards the right (see Figure 3). The results illustrate a failure of normality with a skewed distribution of residuals (see Figure 4).

Table 6

Collinearity Diagnostics

	Collinearity statistics	
	Tolerance	VIF
Faculty technology professional development	. 999	1.00
Gender	. 999	1.00

Collinearity tests are used to determine if the data meets the assumption of collinearity. Table 6 shows the output for RQ2.The results of the test indicated that multicollinearity was not a concern (*Technology Professional Development Scores,*

Tolerance = .99, VIF = 1.00, and Gender Tolerance = .99, VIF = 1.00). The data should indicate limited or no autocorrelation and independence from each other. The Durbin-Watson test was used to test for the presence of serial correlation among the residuals (see Table 6). A value of 2 indicated no autocorrelation. This study had a Durbin-Watson d = 1.93; thus, only a little autocorrelation was found.

The histogram of standardized residuals indicated that the data contained approximately normally distributed errors (see Figure 5). The normal P-P plot of standardized residuals showed points not entirely on the line, but close (see Figure 6). Homoscedasticity verifies whether the variance is an error or is similar across independent variables. The scatterplot of the standardized residual and standardized predicted value indicated no violation in the linearity of homoscedasticity (Appendix I).

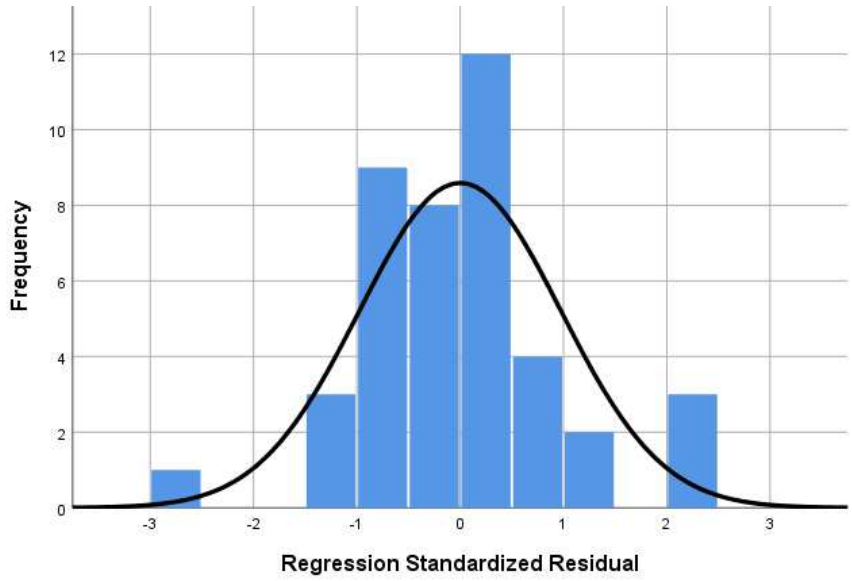

Figure 5. Histogram of online teaching self-efficacy. This figure shows the data contained approximately normally distributed errors.

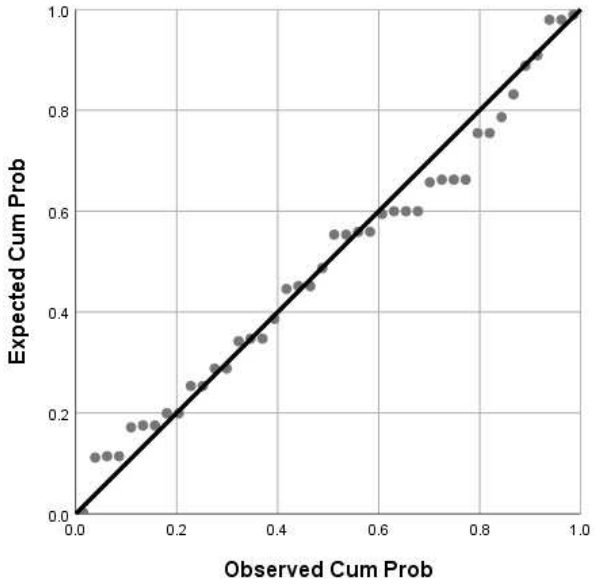

Figure 6. Normal P-P Plot of online teaching self-efficacy. This figure of standardized residuals showed points not entirely on the line.

The scatterplot of standardized residuals value showed that no relation exists between the variables. The data did not meet the assumptions of homogeneity of variance and linearity. The data met the assumption of the non-zero variances (*Technology Professional Development, Variance = .209 and Gender, Variance = .219).*

Multiple Regression Analysis

A standard multiple linear regression was conducted to evaluate the relative strength of the predictor variables of faculty technology professional development, ICT and computer attitudes, gender, age, on the criterion variables of online teaching self-efficacy and ICT and computer attitudes.

To approach RQ1, a multiple linear regression analysis was conducted to evaluate the prediction of online teaching self-efficacy from faculty technology professional development, ICT and computer attitudes, gender, and age. The multiple linear regression

analysis results revealed faculty technology professional development, ICT and computer attitudes, gender, and age were not statistically significant predictors to the model ($p > .05$).

The multiple linear regression results (see Table 7 and Table 8) indicated that the model did not significantly predict online teaching self-efficacy as measured by the Educators Sense of Efficacy for Online Teaching Survey, $F(4,37) = .64$, $p > .05$, $R^2_{Adjusted} = -.04$). Table 9 presents the coefficients for each predictor variable. Table 7 presents the module summary. The model summary table provides the strength of the relationship between the model and the dependent variable. The multiple correlation coefficient is the linear correlation between the observed and model-predicted values of the dependent variable. A small value indicates an insubstantial relationship. Table 8 describes the output of the ANOVA analysis. The results indicated there was not a statistically significant difference between the means. Table 9 presents the coefficient for each predictor variable. The table provides the information to predict online teaching self-efficacy from faculty technology professional development, ICT and computer attitudes, gender, and age. The data indicates that the regression model does not statistically significantly predict the outcome variables.

Table 7

Model Summary: Online Teaching Self-Efficacy, Faculty Technology Professional Development, ICT and Attitudes Towards Computer, Gender, and Age

R	R square	Adjusted R square	Std. error of the estimate
.254[a]	.064	-.037	1.255

Table 8

ANOVA[a] Results of Relationship Between Variables

Model	*SS*	*df*	*MS*	*F*	*p*
Regression	4.010	4	1.003	.636	.640b
Residual	58.322	37	1.576		
Total	62.333	41			

Table 9

Coefficients

	B	SE	β	t	p	VIF
(Constant)	10.977	3.587		3.060	.004	
Faculty technology professional development	-.505	.453	-.187	-1.113	.273	1.11
ICT and computer attitudes	-.051	.057	-.153	-.884	.382	1.18
Gender	.229	.436	.087	.525	.603	1.08
Age	.026	.180	.026	.145	.886	1.24

A multiple linear regression analysis was conducted to approach RQ2, which related to the relationship between faculty technology professional development, gender and ICT, and attitudes towards computers. The method was used to evaluate ICT's prediction and attitudes towards computers from faculty technology, professional development, and gender. The multiple linear regression analysis results revealed faculty technology professional development and gender were not statistically significant predictors to the model ($p > .05$).

The multiple linear regression results (see Table 10 and Table 11) indicated that the model did not significantly predict ICT and attitudes towards computers as measured by the ICTCAS, ($F(2,37) = 1.41$, $p > .05$, 640, $R^2_{Adjusted} = .02$). Table 10 presents the module summary for the variable's ICT and computer attitudes towards computers,

faculty technology, professional development, and gender. Table 11 describes the output of the ANOVA analysis. The results indicate there was not a statistically significant difference between the means. Table 12 presents the coefficient for each predictor variable. The table provides information to predict ICT and computer attitudes from faculty technology, professional development, and gender. The data indicates that there is not a statistically significant prediction in the regression model of the outcome variables.

Table 10

Model Summary: ICT and Attitudes Towards Computer, Faculty Technology Professional Development, and Gender

R	R square	Adjusted R square	Std. error of the estimate
.260[a]	.068	.020	3.69

Table 11

ANOVA[a] Results of Relationship Between Variables

Model	*SS*	*df*	*MS*	*F*	*p*
Regression	38.61	2	19.30	1.41	.255
Residual	532.35	39	13.65		
Total	570.97	41			

Table 12

Coefficients

	B	SE	β	t	p	VIF
(Constant)	69.94	2.74		25.48	.000	
Faculty technology professional development	-.385	1.26	-.47	-.305	.762	1.00
Gender	-2.05	1.23	-.257	-1.66	.104	1.00

Summary

The purpose of this quantitative descriptive multiple linear regression study was to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, and faculty ICT and computer attitudes, gender, and age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. In Chapter 4, I provided the study results from the ESEOT survey and the modified ICTCAS at community colleges and 4-year institutions in the United States. Both surveys resulted in non-significant findings ($p = >.05$), revealing the variables of technology professional development, gender, age and ICT and computer attitudes were not predictors of online teaching self-efficacy and technology professional development and gender were not predictors of ICT and computer attitudes. This section also included participant demographics, data collection procedures and data analysis. In Chapter 5, I conclude with the interpretation of the findings, the study's limitations, implications for social change, and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative descriptive multiple linear regression study was to determine if a relationship exists between faculty participation in technology professional development activities, online teaching self-efficacy, and faculty ICT and computer attitudes, gender, and age within the context of institutions of higher education and Rogers's (2003) diffusion of innovations theory. I examined demographical differences among online instructors, focusing specifically on gender and age. I also examined the relationship between the dependent variables (online teaching self-efficacy and ICT and computer attitudes) and the independent variables, which were quantified by numerical data and statistically analyzed. Surveys were used to gather data from faculty who have taught online courses. My analysis found the nature of the study did not require treatment. Therefore, neither a quasi-experimental nor an experimental design was appropriate for this study. This study's findings may provide scholars and institutions of higher education a better understanding of factors that do not lead to online teaching self-efficacy and ICT and computer attitudes from faculty perspectives.

The research questions that guided this study were:

RQ1− What is the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy?

RQ2− What is the relationship between faculty professional development, gender, and attitudes toward technology?

The research questions were examined through multiple linear regression analysis. For RQ1, the dependent (outcome) variable was online teaching self-efficacy. The independent variables (predictors) were faculty technology professional development, ICT and computer attitudes, gender, and age. A standard multiple regression model showed that none of the independent variables were statistically significant predictors of online teaching self-efficacy.

For RQ2, the dependent (outcome) variable was ICT and computer attitudes. The independent variables (predictors) were faculty technology, professional development, and gender. A standard multiple regression model showed that neither faculty technology professional development nor gender was a statistically significant predictor of online teaching self-efficacy.

This chapter includes an interpretation of the findings for the research questions. Also included is a discussion regarding how the research questions connect to the literature review and theoretical framework. I also provide recommendations for future research and practice, implications for positive social change, and a conclusion.

Interpretation of Findings

This section describes how the findings confirm, disconfirm, or extend knowledge by comparing them to what was shown in previous research. I also share an interpretation of the research questions related to Rogers's (2003) diffusion of innovations theory. Diffusions of innovations theory was selected for its prominence in research studies in instructional technology and faculty development (Drape, et al., 2013; Grosz, 2012; Huun

& Hughes, 2014). It is essential to understand the findings through this theory to contextualize the faculty teaching environment.

Online Teaching Self-Efficacy

The first research question examined the relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy. The design of this question was to determine if there was a relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy. The scales used to measure participant responses included the ICTCAS, which was used to measure ICT and computer attitudes. Technology professional development, gender, age, and online teaching self-efficacy were measured by the ESEOTS. The results of the current study found that there was not a statistically significant relationship between the variables.

The hypothesis for RQ1 predicted a significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy. The results failed to reject the null hypothesis. The findings indicated no statistically significant relationship between faculty technology professional development, ICT and computer attitudes, gender, age, and online teaching self-efficacy. This finding adds to the limited research in online teaching self-efficacy.

In previous research, Chang et al. (2011) examined professor gender and self-efficacy. They found significantly greater self-efficacy among female professors. Chang et al. and Horvitz et al. (2015) found higher self-efficacy in online student engagement for female instructors. The results of this study did not corroborate either of these

findings, as gender was not found to be a statistically significant predictor of online teaching self-efficacy.

Since the results of this study did not indicate a statistically significant relationship between online teaching self-efficacy and faculty technology professional development, the implication did not support previous studies that faculty technology professional development programs are beneficial in developing online teacher self-efficacy (Chai, et al., 2010; Graham, et al., 2012; He, 2014; Hernandez, et al., 2014; Hung, et al., 2010; Moore-Adams & Jones, 2015; Woodcock, et al., 2015; Wright, 2011).

Corry and Stella (2018) noted, "any investigation into the association between teacher self-efficacy and student outcomes in online education could bring much new knowledge to the field" (p. 22). Practitioners in education and educational technology must seek innovative ideas and implement teaching practices and online learning worthy of further exploration.

ICT and Computer Attitudes

The key finding for RQ2 revealed no significant relationship between faculty technology professional development, gender and ICT, and computer attitudes. The design of the second research question was to explore if there was a relationship between faculty technology professional development, gender, ICT, and computer attitudes as measured by the ICTCAS. The scales used to measure participant responses included the ICTCAS, which was used to measure ICT and computer attitudes. Technology professional development and gender were measured by ESEOTS, which was used to obtain demographic data. The study results failed to reject the null hypothesis. The study

results indicated no significant relationship between faculty technology professional development, gender, and ICT and computer attitudes.

The study results indicated that faculty technology professional development and gender were not predictors of online teaching self-efficacy and ICT and computer attitudes. The study findings are consistent with Kenney et al.'s (2010) evaluation that indicated faculty must be self-motivated to learn new technologies. Furthermore, faculty were not more likely to implement student-centered pedagogical practices into their online teaching (Kenney et al., 2010; Rienties et al., 2013).

Moreover, the study findings were neither consistent nor inconsistent with researchers Horvitz et al. (2015), Lee and Tsai (2010), and Presno (1998), with overall research findings revealing faculty ICT and computer attitudes were mixed. This research confirmed inconsistent findings related to ICT and computer attitudes among faculty. It is not surprising, given the results of this study, that Rienties et al. (2013) found that faculty that participated in technology professional development were not more likely to implement student-centered pedagogical practices into their instruction. While I did not seek to understand the benefits of faculty technology professional development, it is interesting that faculty are not incorporating the skills learned. It is also not surprising that it is not a predictor of online teaching self-efficacy and ICT and computer attitudes. The causality of ICT and computer attitudes needs to be further validated in experimental and longitudinal studies. This study contributes to the body of knowledge by investigating the predictors of online teaching self-efficacy and ICT and computer attitudes among higher education faculty. Few studies have investigated online teaching

self-efficacy. Online teaching self-efficacy is still considered a new construct in educational technology. This study provided four predictors of online teaching self-efficacy (faculty technology professional development, ICT and computer attitudes, gender, and age) and two predictors for ICT and computer attitudes (faculty technology professional development and gender). Therefore, more research should be conducted using both quantitative and qualitative measurements to determine significant predictors and understanding of online teaching self-efficacy. It may be beneficial to develop a blind mixed-method study that includes a technology professional development component where faculty can participate, design, and facilitate online courses concurrently.

Diffusion of Innovations Theory

As a framework, diffusion of innovations theory includes four overarching components: the innovation itself, communication channels used for education and outreach, time involved in adopting the idea, and the social system that is being introduced to the innovation (Rogers, 2003). The rate at which people assume innovation is related to an individual's adoption decisions (Scott & McGuire, 2017). Diffusion occurs within social systems made up of members who share common objectives (Rogers, 2003). While the study results did not indicate a significant correlation between the predictors, they raised another good question: Is online learning a common objective among faculty, or is it a request by leadership? According to Scott and McGuire (2017), innovativeness relates to individuals and their decision to adapt to online learning within this context. Often studies refer to the diffusion of innovations process as slow initially with more rapid growth as the innovations take hold (Scott & McGuire, 2017). Use of the

diffusion of innovations theory provided a framework to examine thought-provoking questions in an ongoing effort to understand and promote effective online learning in college instruction.

As outlined by Rogers (2003), using a trialability method for innovations is a crucial attribute that positively impacts the rate of innovation adoption. According to Goh and Sigala (2020), there are four practical implications for motivating faculty. It begins with administrators who must recognize that there is diversity among faculty and that they cannot force faculty to adopt technology all at the same time. Second, persuasive strategies must be used to ensure that positive attitudes are formed related to new classroom technologies. Third, technical support is essential once a faculty member has decided to adapt to the latest technology. All issues and doubts must be rectified before faculty lose confidence in adopting the latest technology. Finally, early and late majority academics must adopt online learning technologies, because these two groups of adopters form 68% of faculty (Goh & Sigala, 2020).

Limitations

The study involved a non-probability purposive sampling strategy. The results of the study were limited to participants of Walden University Participant Pool and relevant Facebook and LinkedIn groups and were not generalizable outside of this specific population. Data collection was initially planned to last 4 to 6 weeks; however, due to low response rates, it was extended to 10 months. Due to the low response rate and the substantial passage of time, the data collection only yielded a sample size of 42 participants resulting in a power of 80%.

This study's two main limitations were interconnected and related to the data collection method and the number of responses. The decision to use the Walden University Participant Pool and social media sites did not produce the necessary responses. This ultimately led to issues relating to generalizability. Thus, these results cannot be applied to a broader group of online teaching faculty. It is recommended that future studies do not omit incomplete surveys and aim to have a large sample population. Additionally, given the length of the study, to ensure participants know when the study is complete, the entire survey should be presented instead of individual questions.

The final limitation involved the sample size. This study had a small sample size of 42 participants, due to the limited number of responses and incomplete data collected. Therefore, replicating this study will require a larger sample size to improve power. Trustworthiness is evaluated by how the threats to internal validity have been controlled. While there were issues with the instrument's implementation, the instrument itself did not have any problems. Participant attrition occurred and 66 participants were eligible to complete the survey; however, only 42 completed the survey in its entirety. The results of the research provide useful information for faculty and leaders of institutions of higher education. I believe faculty will be able to make connections between their own experiences, preparing, and teaching online courses. This research may encourage faculty to conduct self-assessments of their wants, needs, and experiences. The procedures for this study are outlined in detail and aligned with dependability standards. The limited sample size negatively impacted the study's validity and reliability. Prior studies have

successfully used the ESEOT and ICTCAS. Thus, these issues associated with validity and reliability may be overcome through a more robust study.

Recommendations

With this research, I sought to address a gap in the literature by investigating the predictors of online teaching self-efficacy and ICT and computer attitudes. More research is needed in faculty self-efficacy in online education. Although there is significant empirical research on teacher self-efficacy in face-to-face environments, it continues to be a new construct in online education (Corry & Stella, 2018). Rice (2006) contended comparison of the qualities and characteristics of the teaching/learning experience in the face-to-face classroom context are overwhelming enough to warrant separate study.

Future studies may explore the research questions using a different method, such as a qualitative or mixed-method approach, to assist in understanding participant online teaching self-efficacy and ICT and computer attitudes. Given this study's results, various predictors should be introduced to encourage the discovery of a significant predictor for both models. At the very least, as noted by Corry and Stella (2018), more research is needed to define and specify the construct of self-efficacy in online education. The application of one of these methods will encourage more in-depth exploration of participant experiences. Understanding faculty experiences may act as a catalyst to successfully study additional predictors of online teaching self-efficacy and ICT and computer attitudes.

Further studies may also concentrate on the same topic but offer different research questions and predictors to find significant models. For example, future research might

only focus on programs designed to improve faculty self-efficacy and student success. Additionally, other studies might explore the participants' perspectives on the impact of faculty ICT, and computer attitudes on their learning experiences. Finally, future researchers may explore the effects and implications of participation in faculty online teaching development programs and faculty online teaching self-efficacy and ICT and computer attitudes.

A mixed-method approach has the potential to foster a deeper understanding of faculty experiences. Use of a mixed-method approach would allow faculty to share their online teaching experiences and explain why they have specific ICT and computer attitudes, while concurrently allowing the researcher to access their online teaching self-efficacy and ICT and computer attitudes. Faculty ICT and computer attitudes may also impact learners. A study that examines both faculty and student experiences would allow practitioners to understand more deeply how their online teaching methods affect learners.

Qualitative research has the potential to foster a deeper understanding of an individual’s experiences. Use of a case study model would allow for an in-depth look at faculty to understand their individual experiences related to online teaching self-efficacy and ICT and computer attitudes. With the push to have faculty teach online courses, universities might benefit from a historical approach to research where faculty could describe their past experiences teaching online, using computers, and their associated efficacy to understand present patterns, and anticipate how faculty may behave in the future. Finally, a narrative model would allow faculty to participate in technology

professional development and progress to online teaching while being monitored. Thus, faculty would all begin at a starting point (technology professional development participation) and progress to online teaching. This would allow the researcher to review situations, obstacles, and opportunities to better understand faculty's experiences entering online teaching practice.

Online faculty self-efficacy is under the explored topic in academic research. Thus, scholarly research in the areas of online teaching self-efficacy, ICT, computer attitudes, and faculty technology professional development combined produced an even more limited output of literature based on my literature review. Corry and Stella (2018) contend that faculty efficacy influences student outcomes in face-to-face education, and one might assume the same is true for online education. Therefore, research in online education must continue, be it quantitative, qualitative, or through mixed-method approaches.

Implications

This study examined the predictive power of faculty technology professional development, ICT and computer attitudes, gender, and age on online teaching self-efficacy. Additionally, technology professional development and gender on ICT and computer attitudes were explored using Walden University's Participant Pool and LinkedIn (training and development groups), and my personal Facebook account and Facebook groups (training related). The findings of this study have the potential to positively impact practitioners in the field of educational technology if they apply the knowledge learned through research to real-world situations. Research in education is

vital for supporting positive social change. Helping educators reach their fullest potential in the online classroom can provide them with the skills they need to be prepared to make a difference in their students' lives. Even though this study's findings found the variables did not statistically predict online teaching self-efficacy, a contextual analysis is needed within higher education institutions.

Additionally, the findings/number of responses to this study indicated the overall lack of research in the field and the scholarly community would benefit from a deeper understanding of the effects of online teaching among faculty. According to Corry and Stella (2018), various research studies in online teacher self-efficacy were undertaken to discover if teachers might readily adopt online teaching. Understanding the readiness of faculty through their self-efficacy and ICT and computer attitudes can foster an understanding between university leadership and faculty.

Methodological Implications

The methodological approach selected for this study presented limitations related to the sampling method and data collection. The anonymous online modality created a barrier between the participants and the researcher. In hindsight, it would have been beneficial to contact the participants who did not complete the survey in its entirety. The survey showed one question at a time to participants. Due to the incomplete responses, it seems that participants may have stopped completing because they assumed it was over. Many participants stopped after completing Section 1 of the survey. Future researchers should ensure surveys are presented in their entirety.

Theoretical Implications

The inclusion of prior studies provides the theoretical foundations for research questions. A significant limitation discovered early in the research process was a lack of previous research studies that looked at online teaching self-efficacy and ICT and computer attitudes. While this was limiting, it presented two valuable opportunities: identifying gaps in the research and the need for further development in online teaching self-efficacy and ICT and computer attitudes within the theoretical framework of the diffusion of innovations theory.

Empirical Implications

While the effect size of the study was large, the sample size for statistical measurement was insufficient. This led to difficulty identifying significant relationships in the data. A larger sample of faculty would have strengthened the results. There might be other variables that would be predictive if there was a larger sample size. For example, obtaining approval from a university with a robust development program where questionnaires as part of their development process can garner a higher response rate from faculty. Faculty buy-in is a significant factor in obtaining responses.

Conclusion

Descriptive statistics analysis and multiple linear regression analyses were conducted to test the research questions and hypotheses posed in this study. The data was collected to answer two research questions. The study results add to the limited available scholarly research on the topic and supported available literature conclusions.

For RQ1, the multiple linear regression results showed that faculty technology professional development, ICT and computer attitudes, gender, and age explain a non-significant amount of variance in the value of faculty's online teaching self-efficacy. For RQ2, the multiple linear regression results showed that faculty technology professional development and gender explain a non-significant amount of variance in the value of ICT and computer attitudes of faculty. The literature review indicated that there are benefits to teacher self-efficacy that have been measured using various instruments before and after an online teacher educational event. A review of the literature suggested that online teacher education programs and professional development delivered online or focused on technology benefits teachers in developing online teaching self-efficacy (Chai et al., 2010; Graham et al., 2012; He, 2014; Hernandez et al., 2014; Hung et al., 2010; Moore-Adams & Jones, 2015; Smith, 2012; Woodcock et al., 2015; Wright, 2011).

A large effect size was found for both research questions. The magnitude of differences suggests possible changes to the way institutions manage faculty and distance learning initiatives may be needed. Policy changes such as the assignment of hardware by institutions to faculty are likely to positively impact faculty and online teaching self-efficacy and ICT and computer attitudes. It is a fallacy to assume that faculty have the required hardware and software on their home computers that they have on their work computers. Recognizing that not everyone has the computer support and infrastructure at home and, therefore, may not have the tools available to them is essential to ensure that faculty are prepared wherever they are to provide instruction.

As leaders in educational technology, it is essential to understand that technology innovations move at lightning speed. People that are not on the frontlines of technology are often left behind. Providing access and professional development is at the foundation of readying faculty to provide instruction. As practitioners in education, the question should be: What needs to be done to ready faculty, increase their online teaching self-efficacy, and improve their positive attitudes towards ICT and computers? As educators continue researching this phenomenon, it is essential to remember that faculty are depending on subject matter experts and students deserve to have innovative, engaging, and memorable learning experiences offered by instructors.

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Appendix A: Teachers' Sense of Efficacy Teaching Scale

(Tschannen-Moran, et al., 1998)

Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Educator Beliefs How much can you do?

Nothing Very little Some Influence Quit a Bit A Great Deal

(1) (2) (3) (4) (5) (6) (7) (8) (9)

1. How much can you do to get through to the most difficult students?
2. How much can you do to help your students think critically?
3. How much can you do to control disruptive behavior in the classroom?
4. How much can you do to motivate students who show low interest in schoolwork?
5. To what extent can you make your expectations clear about student behavior?
6. How much can you do to get students to believe that they can do well in schoolwork?
7. How well can you respond to difficult questions from your students?
8. How well can you establish routines to keep activities running smoothly?
9. How much can you do to help your student's value learning?
10. How much can you gauge student comprehension of what you have taught?

11. To what extent can you craft good questions for your students?
12. How much can you do to foster student creativity?
13. How much can you do to get children to follow classroom rules?
14. How much can you do to improve the understanding of a student who is failing?
15. How much can you do to calm a student who is disruptive or noisy?
16. How well can you establish a classroom management system with each group of students?
17. How much can you do to adjust your lessons to the proper level for individual students?
18. How much can you use a variety of assessment strategies
19. How well can you keep a few problem students from ruining an entire lesson?
20. To what extent can you provide an alternative explanation or example when students are confused?
21. How well can you respond to defiant students?
22. How much can you assist families in helping their children do well in school?
23. How well can you implement alternative strategies in your classroom?
24. How well can you provide appropriate challenges for very capable students?

Directions for Scoring the Teachers' Sense of Efficacy Scale

Developers: Megan Tschannen-Moran, College of William and Mary Anita Woolfolk Hoy, of Ohio State University.

Factor Analysis

It is important to conduct a factor analysis to determine how your participants respond to the questions. We have consistently found three moderately correlated factors: Efficacy in Student Engagement, Efficacy in Instructional Practices, and Efficacy in Classroom Management, but at times the makeup of the scales varies slightly.

Subscale Scores

To determine the Efficacy in Student Engagement, Efficacy in Instructional Practices, and Efficacy in Classroom Management subscale scores, we compute unweighted means of the items that load on each factor. Generally, these groupings are:

Long Form

Efficacy in Student Engagement: Items 1, 2, 4, 6, 9, 12, 14, 22

Efficacy in Instructional Strategies: Items 7,10, 11,17, 18, 20, 23, 24

Efficacy in Classroom Management: Items 3, 5, 8, 13,15, 16, 19, 21

Appendix B: Michigan Nurse Educators Sense of Efficacy for Online Teaching Scale

Revised from: Teachers' Sense of Efficacy Teaching Scale (Tschannen-Moran and Hoy; 2001)

Directions: You are invited to participate in this study because the institution at which you are employed has you on record as teaching a theoretical course this winter/spring 2008 semester. You meet the parameters of the sample set for this study if you are indeed teaching a face-to-face and/or an online theory course. This questionnaire is designed to help us gain a better understanding of the current self-perceptions nurse educators hold regarding their abilities to successfully teach in online environments. Perceptions are sought from educators with little or no online teaching experience and educators having some or extensive online teaching experience. Please indicate your opinion about each of the statements below. Your answers are confidential.

Questions 1-32 are concerned with understanding how nurse educators judge their current capabilities for teaching online nursing lecture courses. Even if you have little or no experience with online teaching, please try to answer each question. A helpful prefix to each answer is, **"I can do…."**

1. How much can you do to help your students think critically in an online class?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

2. How much can you do to get through to disengaged students in an online class? (e.g. passive learners who might lurk online, but fail to actively contribute to their own learning.)

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

3. How much can you do to control disruptive behavior (e.g. disrespectful posting or failure to adhere to outline policies for posting) in an online environment?)

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

4. How much can you do to motivate students who show low interest in online work?

Nothing	Very Little	Some	Quite a Bit	A Great Deal

1 2 3 4 5 6 7 8 9

5. To what extent can you make your expectations clear about student behavior in an online class?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

6. How much can you do to get students to believe that they can do well in an online class?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

7. How well can you respond to difficult questions from online students?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

8. How well can you establish routines (e.g. facilitate or moderate student participation) in coursework to keep online activities running smoothly?)

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

9. How much can you do to help online students' value learning?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

10. How much can you gauge student comprehension of what you have taught in an online course?

Nothing Very Little Some Quite a Bit A Great Deal

1 2 3 4 5 6 7 8 9

11. How well can you craft questions or assignments that require students to think by relating ideas to previous knowledge and experience?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

12. How much can you do to foster individual student creativity in an online course?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

13. How much can you do to get students to follow the established rules for assignments and deadlines during an online class?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

14. How much can you do to improve the understanding of a student who is failing in an online class?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

15. How much can you do to control students dominating online discussions?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

16. How well can you establish an online course (e.g. convey expectations; standards; course rules) with each group of students?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

17. How much can you do to adjust your online lessons for different learning styles?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

18. How much can you do to use a variety of assessment strategies for an online course?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

19. How well can you develop an online course that facilitates student responsibility for online learning?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

20. To what extent can you provide an alternative explanation or example when students in an online class seem to be confused?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

21. How well can you respond to defiant students in an online setting?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

22. How well can you structure an online course that facilitates collaborative learning?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

23. How well can you structure an online course that provides good learning experiences for students?

Nothing	Very Little		Some		Quite a Bit			A Great Deal
1	2	3	4	5	6	7	8	9

24. How well can you provide appropriate challenges for very capable students in an online environment?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

25. To what extent can you use knowledge of copyright law to provide resources for online students?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

26. How well can you navigate the technical infrastructure at your institution to successfully create an online course?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

27. How well can you navigate the technical infrastructure at your institution to successfully teach an established online course?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

28. To what extent can you use asynchronous discussions to maximize interactions between students in an online course? (Asynchronous means not online at the same time)

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

29. To what extent can you use synchronous discussions (e.g. same time chat rooms) to maximize interaction between students in an online course?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

30. How well can you use computers for word processing, internet searching and

e-mail communication?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

31. To what extent does your comfort level with computers facilitate participation in online teaching?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

32. How well can you navigate the internet to provide links and resources to students in an online course?

Nothing		Very Little		Some		Quite a Bit		A Great Deal
1	2	3	4	5	6	7	8	9

Hang in there- you have completed over 50% of the survey! Thank you for your participation! The next section will ask for background information from participants. All information collected is confidential. You will be given an opportunity to provide a contact email if you wish to be included in a drawing for one of six $50.00 gift certificates and/or you wish for a copy of the summarized results from this survey.

Background Information Section

33. What type of institution do you work for?
    Community College _____
    4-year College or University _____
34. Please indicate your gender:
    Male _____
    Female _____
35. What was your age on your last birthday?
    _____
36. Please identify your current academic appointment type:
    Adjunct _____
    Term _____
    Tenure earning _____
    Tenure _____
    Other _____
37. Please indicate your current academic rank:
    Instructor _____
    Assistant Professor _____

Associate Professor _____
Professor _____
Other _____

38. Please identify the highest degree that you hold:
    Bachelor's _____
    Master's _____
    Doctorate _____

(Respondents with doctorates go to 39. All others skip to 40.)

39. Please indicate type of doctorate and year obtained.
    Ph.D in Nursing _____
    Ph.D. _____
    Ed.D _____
    ND _____
    Other _____
    Year obtained _____

40. How many years of experience do you have teaching nursing courses (clinical and/or lecture)?

41. How many years of experience do you have teaching lecture courses?

42. What is your specialty area? (Please check all that apply):
    Maternal/Newborn _____
    Pediatric _____
    Adult/Medical Surgical _____
    Mental Health _____
    Community Health _____
    Nursing Administration _____
    Nursing Research _____
    Nursing Informatics _____
    Other _____

43. Have you ever taught an entire course online?

    Yes ____
    No ____

    If yes, approximately how many courses?

44. Have you ever taught portions of a course online?

    Yes ___
    No ___

45. Do you have a degree in education?

    Yes ___

No ___

(Participants answering "yes" skip to question 48; all others proceed to question 46)

46. Have you ever taken a course that focused on skills, techniques, problems, and/or preparation for teaching?

Yes ___
No ___

If yes, approximately how many courses? _____

47. Have you ever taken a seminar in teaching that focused on skills, techniques, problems and/or preparation for teaching?

Yes ___
No ___

If yes, approximately how many seminars? _____

48. Have you ever had a course that focused on skills, techniques, problems and/or preparations for online teaching?

Yes ___
No ___

If yes, how many courses? _____

(Participants answering "yes" directed to question 49; all others go to question 50)

49. To what extent to you agree that courses adequately prepare you in the skills needed for online teaching?

Strongly Disagree	Slightly Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

50. Have you ever taken a seminar in teaching that focused on skills, techniques, problems, and/or preparation for online teaching?

Yes ___
No ___

If yes, how many seminars? _____

(Participants answering "yes" directed to question 51; all others go to question 52)

51. To what extent to you agree that seminars adequately prepare you in the skills needed for online teaching?

Strongly Disagree	Slightly Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

52. Have you ever met formally on a regular basis with a faculty person (e.g. mentor or peer support person) during an online teaching experience to discuss the skills, techniques, problems, and/or preparation for online teaching?

Yes ___
No ___

If yes, approximately how many formal meetings? _____

(Participants answering "yes" directed to question 53, all others go to question 54)

53. To what extent do you agree that formal meetings with a faculty person adequately prepare you in the skills needed for online teaching?

Strongly Disagree	Slightly Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

54. Have you ever met formally with an instructional support expert during an online teaching experience to discuss the skills, techniques, problems, and/or preparation for online teaching?

Yes ___
No ___

If yes, approximately how many formal meetings? _____

(Participants answering "yes" directed to question 55; all others go to question 56)

55. To what extent do you agree that instructional support meetings adequately prepare you in the skills needed for online teaching?

Strongly Disagree	Slightly Disagree	Neutral	Agree	Strongly Agree

1	2	3	4	5

56. Have you ever been given release time for developing an online course?

Yes ___
No ___

If yes, approximately how many clock hours per course? ____

57. To what extent do you agree that release time is necessary for developing an online course?

Strongly Disagree	Slightly Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

58. Please feel free to type in any other comments related to your experiences or perceptions of teaching nursing courses online.

59. Please type in a contact email address if you wish to be placed in a drawing for one of six $50.00 gift certificates.

60. Please type in a contact email address if you wish to have a copy of the summarized results from this survey.

Thank you for your participation in this survey!

Directions for Scoring the Educators' Sense of Online Teaching Efficacy Scale (Questions 1-32)

Subscale Scores: To determine the *Efficacy in Online Student Engagement, Efficacy in Online Instructional Practices, Efficacy in Online Classroom Management, and Efficacy in Use of Computers* subscale scores:

Efficacy in Student Engagement:

Add Score from Items: 1 + 2 + 4 + 6 + 9 + 12 + 14 + 22=
Total Score divided by 8 to get mean score

Efficacy in Instructional Strategies:

Add Score from Items: 7 + 10 + 11 + 17 + 18 + 20 + 23 + 24=
Total Score divided by 8 to get mean score

Efficacy in Classroom Management:

Add Score from Items: 3 + 5 + 8 + 13 + 15 + 16 + 19 + 21=

Total Score divided by 8 to get mean score

Efficacy in Use of Computers:

Add Score from Items: 25 + 26 + 27 + 28 + 29 + 30 + 31 + 32=

Total Score divided by 8 to get mean score

Appendix C: ICT and Computer Attitude Scale (ICTCAS)

The following questions are intended to capture attitude towards the use of ICT/Computer technology. Please, on a scale of Strongly agree to Strongly disagree, complete questions based on your level of agreement to each of the statements.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Affective Component					
When I use ICT/computer technology, I am afraid that I might damage it in some way.					
I hesitate to use ICT/computer technology for fear of making mistakes I cannot correct.					
Using ICT/computer technology does not scare me.					
I rarely use ICT/computer technology because it makes me feel uncomfortable.					
I avoid contact with ICT/computer technology at all times.					
I hesitate to use ICT/computer technology at work in order to avoid looking clumsy to others.					
Perceived Usefulness Component					
Computers help me to organize my work.					
I am more productive when I use the computer.					
Computers allow me to do more imaginative work.					
Using computers help to improve my presentations.					
I can easily adapt to ICT/computer technology					
Perceived Control Component					

I can teach myself most of the things I need to know about computers.					
I always require the assistance of an expert when I use a computer.					
I have absolute control when I use a computer and need no assistance.					
I can solve most applications problems when I use computers.					
I cannot solve any of the ICT/computer related problems.					
Behavioral Component					
I avoid a job that requires working with ICT/computer technology.					
I only use computers at home, not on campus.					
I only use computers on campus, but not at home.					
I use ICT/computers when it is absolutely necessary.					

Appendix D: Permission to Replicate Scale

Michigan Nurse Educators Sense of Efficacy for Online Teaching Survey

From: [redacted] <[redacted]>
Date: Wednesday, May 2, 2018 at 9:07 AM
To: Sharifa Simmons <[redacted]>
Subject: Re: Letter Seeking Permission to Use Survey Tool
Hello Sharifa:
You are welcome to use the "Michigan Nurse Educators Sense of Efficacy for Online Teaching Survey" and modify the title to make it generic as long as you continue to cite the original tool in your work- it was based on the Teachers' sense of efficacy teaching scale by Tschannen-Moran, Hoy and Hoy (2001), so I think keeping the citation thread is very important (see attached final survey). I would appreciate knowing the results of your research.
Throughout the last five years I have been asked many times to use the survey tool and you might want to investigate if anything more recent with modifications has been published that might better meet your needs. I always ask for a copy of completed research and to date have never received anything, so I'm not sure if the tool was used or abandoned. The two articles published using the tool that I'm aware of are:

1. Online Teaching Efficacy: A Product of Professional Development and Ongoing Support
Author
Richter, Sally; Idleman, Lynda
Publication title
International Journal of Nursing Education Scholarship; Berlin
https://search.proquest.com/docview/1982837701?pq-origsite=gscholar

2. Horvitz, B., Beach, A. & Anderson, M. (2011). The Transition to Online Teaching: Examining Faculty Motivators, Demotivators and Self-Efficacy. In T. Bastiaens & M. Ebner (Eds.), *Proceedings of ED-MEDIA 2011--World Conference on Educational Multimedia, Hypermedia & Telecommunications* (pp. 2726-2731). Lisbon, Portugal: Association for the Advancement of Computing in Education (AACE).http://www.learntechlib.org/noaccess/38244/
Good luck with your research!
[redacted]

[redacted]
906-227-2042
1401 Presque Isle Ave, Marquette, MI 49855

On Sun, Apr 29, 2018 at 12:09 PM, Sharifa Simmons <[redacted]> wrote:

Dear [redacted]:

I am an Educational Technology doctoral student from Walden University writing my dissertation titled "The Relationship Between Faculty Development, Online Teaching Self-Efficacy, Faculty Computer and ICT Attitudes in Higher Education and Diffusion of Innovation", under the direction of my dissertation committee chaired by Dr. Blessing Adeoye, who can be reached at [redacted]. The Walden University IRB Committee Chair, Dr. Leilani Endicott can be contacted by email at [redacted].

I reviewed your dissertation and modified “Teachers' Sense of Efficacy Scale" in which you refer to as “The Michigan Nurse Educators Sense of Efficacy for Online Teaching Survey.” I would need to modify the title to make it generic so that it can be applied to various faculty members. No additional changes are necessary. I would like your permission to use “The Michigan Nurse Educators Sense of Efficacy for Online Teaching Survey” instrument in my research study. I would like to use and print your survey under the following conditions:

- I will use the surveys only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send a copy of my completed research study to your attention upon completion of the study.

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: [redacted]

Sincerely,
Sharifa Simmons
Doctoral Candidate
[redacted]

Appendix E: Educators Sense of Efficacy for Online Teaching and ICT/ Computer Attitude Scale

Educators Sense of Efficacy for Online Teaching and Computer/ICT Attitudes Scale

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Start of Block: Introduction & Eligibility

This survey is designed to capture the individual teaching faculty's online teaching self-efficacy and computer/ICT attitudes. The purpose is to determine where information communication and technology, instructional strategies, personal influence, and performance merge for meaningful learning and application.
Have you ever taught an online course in higher education and want to share your perspective? This research seeks to understand how faculty/instructors feel about their online teaching skills and computer and ICT. Please respond to the following question to determine your eligibility for participation in the study.

---

00 Have you ever taught or developed an online course in higher education? (this includes co-teaching efforts)

- ○ Yes (1)
- ○ No (2)

Skip To: Q61 If Have you ever taught an online course in higher education? (this includes co-teaching efforts) = No

Skip To: End of Block If Have you ever taught an online course in higher education? (this includes co-teaching efforts) = Yes

---

Q61 *I am sorry. You do not meet the qualifications for this survey. I sincerely thank you and appreciate your time and eagerness to participate in my doctoral research study.*
If you have any comments on the survey or the project, please email the researcher at sharifa.simmons@waldenu.edu

Skip To: End of Survey If I am sorry. You do not meet the qualifications for this survey. I sincerely thank you and appreci...() Is Displayed

End of Block: Introduction & Eligibility

Start of Block: Introduction & Directions

Directions: You are invited to participate in this study because you are a member of the Walden Participant Pool. You meet the parameters of the sample set for this study if you are have indeed taught or developed an online course. This survey is designed to capture the individual teaching faculty's online teaching self-efficacy and computer/ICT attitudes. The purpose is to determine where information communication and technology, instructional strategies, personal influence, and performance merge for meaningful learning and application. Your response will be treated with the utmost confidentiality, and only GROUP data will be reported as the outcome of this study. This questionnaire will take approximately 20 minutes to complete. Thank you for your time and input This questionnaire is designed to help us gain a better understanding of the current self-perceptions and computer and ICT attitudes educators hold regarding their abilities to successfully teach in online environments. Perceptions are sought from educators with minimal or online teaching experience and educators having extensive online teaching experience. Please indicate your opinion about each of the statements below. Your answers are confidential.

When responding to the questions recall your attitudes towards computers and online teaching self-efficacy. *There are 68 questions in this* questionnaire.

End of Block: Introduction & Directions

Start of Block: Online Teaching Self-Efficacy

00 Questions 1-32 are concerned with understanding how educators judge their current capabilities for teaching online lecture courses. Even if you have minimal experience with online teaching, please try to answer each question. A helpful prefix to each answer is, **"I can do…."**

Q1 How much can you do to help your students think critically in an online class?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q2 How much can you do to get through to disengaged students in an online class? (e.g., passive learners who might lurk online, but fail to actively contribute to their own learning.)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q3 How much can you do to control disruptive behavior (e.g. disrespectful posting or failure to adhere to outline policies for posting) in an online environment?)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q4 How much can you do to motivate students who show low interest in online work?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q5 To what extent can you make your expectations clear about student behavior in an online class?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q6 How much can you do to get students to believe that they can do well in an online class?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q7 How well can you respond to difficult questions from online students?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q8 How well can you establish routines (e.g. facilitate or moderate student participation) in coursework to keep online activities running smoothly?)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q9 How much can you do to help online students' value learning?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q10 How much can you gauge student comprehension of what you have taught in an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q11 How well can you craft questions or assignments that require students to think by relating ideas to previous knowledge and experience?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q12 How much can you do to foster individual student creativity in an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q13 How much can you do to get students to follow the established rules for assignments and deadlines during an online class?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q14 How much can you do to improve the understanding of a student who is failing in an online class?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q15 How much can you do to control students dominating online discussions?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q16 How well can you establish an online course (e.g. convey expectations; standards; course rules) with each group of students?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q17 How much can you do to adjust your online lessons for different learning styles?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q18 How much can you do to use a variety of assessment strategies for an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q19 How well can you develop an online course that facilitates student responsibility for online learning?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q20 To what extent can you provide an alternative explanation or example when students in an online class seem to be confused?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q21 How well can you respond to defiant students in an online setting?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q22 How well can you structure an online course that facilitates collaborative learning?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q23 How well can you structure an online course that provides good learning experiences for students?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q24 How well can you provide appropriate challenges for very capable students in an online environment?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q25 To what extent can you use knowledge of copyright law to provide resources for online students?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q26 How well can you navigate the technical infrastructure at your institution to successfully create an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q27 How well can you navigate the technical infrastructure at your institution to successfully teach an established online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q28 To what extent can you use asynchronous discussions to maximize interactions between students in an online course? (Asynchronous means not online at the same time.)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q29 To what extent can you use synchronous discussions (e.g. same time chat rooms) to maximize interaction between students in an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q30 How well can you use computers for word processing, internet searching and e-mail communication?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q31 To what extent does your comfort level with computers facilitate participation in online teaching?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

Q32 How well can you navigate the internet to provide links and resources to students in an online course?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)
Rate your level of agreement. (1)	○	○	○	○	○	○	○	○	○

End of Block: Online Teaching Self-Efficacy

Start of Block: Computer & ICT Attitudes

00 The following questions are intended to capture attitude towards the use of ICT/Computer Technology. Please, on a scale of Strongly agree to Strongly disagree, complete questions 14 to 35 based on your level of agreement to each of the

statements. When responding to the questions recall your attitudes towards computers and online teaching self-efficacy. Q34 *Affective Component*

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
When I use ICT/computer technology, I am afraid that I might damage it in some way. (1)	○	○	○	○	○
I hesitate to use ICT/computer technology for fear of making mistakes I cannot correct (2)	○	○	○	○	○
Using ICT/computer technology does not scare me. (3)	○	○	○	○	○
I rarely use ICT/computer technology because it makes me feel uncomfortable. (4)	○	○	○	○	○

I avoid contact with ICT/computer technology at all times. (5)	○	○	○	○	○
I hesitate to use ICT/computer technology at work in order to avoid looking clumsy to others. (6)	○	○	○	○	○

Q35 *Perceived Usefulness Component*

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
Computers help me to organize my work. (1)	○	○	○	○	○
I am more productive when I use the computer. (2)	○	○	○	○	○
Computers allow me to do more imaginative work. (3)	○	○	○	○	○
Using computers help to improve my presentations. (4)	○	○	○	○	○
I can easily adapt to ICT/computer technology. (5)	○	○	○	○	○

Q36 *Behavioral Component*

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
I avoid a job that requires working with ICT/computer technology. (1)	○	○	○	○	○
I only use computers at home, not on campus. (2)	○	○	○	○	○
I only use computers on campus, but not at home. (3)	○	○	○	○	○
I use ICT/computers when it is absolutely necessary. (4)	○	○	○	○	○

Q37 *Perceived Control Component*

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
I can teach myself most of the things I need to know about computers. (1)	○	○	○	○	○
I always require the assistance of an expert when I use a computer. (2)	○	○	○	○	○
I have absolute control when I use a computer and need no assistance. (3)	○	○	○	○	○
I can solve most application problems when I use computers. (4)	○	○	○	○	○
I cannot solve any of the ICT/computer related problems. (5)	○	○	○	○	○

End of Block: Computer & ICT Attitudes

Start of Block: Demographics Questions

00 You are almost finished - you have completed over 75% of the survey! Thank you for your participation! The next section will ask for background information from participants. All information collected is confidential. You will be given an opportunity to provide a contact email if you would like to receive the summarized results from this survey.

Q39 What type of institution do you work for?

- Community College (1)
- 4-year College or University (2)

Q40 Please indicate your gender

- Male (1)
- Female (2)
- Other (3)

Q41 What was your age range on your last birthday?

- 20-30 years old (1)
- 31-40 years old (2)
- 40-50 years old (3)
- 51- 60 years old (4)
- 61-70 years old (5)
- 71 years and older (6)

Q42 Please identify your current academic appointment type:

- ○ Adjunct (1)
- ○ Term (2)
- ○ Tenure earning (3)
- ○ Tenure (4)
- ○ Other (5)

Q43 Please indicate your current academic rank:

- ○ Instructor (1)
- ○ Assistant Professor (2)
- ○ Associate Professor (3)
- ○ Professor (4)
- ○ Other (5)

Q44 Please identify the highest degree that you hold:

- ○ Bachelor's (1)
- ○ Master's (2)
- ○ Doctorate (3)

Q45 What is your specialty are:

- ○ Humanities (1)
- ○ Technology (2)
- ○ Education (3)
- ○ Science/Engineering/Math (4)
- ○ Other (5)

Q46 Have you ever had a course that focused on skills, techniques, problems and/or preparations for online teaching?

- ○ Yes (1)
- ○ No (2)

Skip To: Q47 If Have you ever had a course that focused on skills, techniques, problems and/or preparations for o... = Yes

Skip To: Q48 If Have you ever had a course that focused on skills, techniques, problems and/or preparations for o... = No

Q47 To what extent to you agree that courses adequately prepare you in the skills needed for online teaching?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Rate your level of agreement. (1)	○	○	○	○	○

Q48 Have you ever met formally on a regular basis with a faculty person (e.g. mentor or peer support person) during an online teaching experience to discuss the skills, techniques, problems, and/or preparation for online teaching?

- ○ Yes (1)
- ○ No (2)

Skip To: Q50 If Have you ever met formally on a regular basis with a faculty person (e.g. mentor or peer support... = Yes

Skip To: Q51 If Have you ever met formally on a regular basis with a faculty person (e.g. mentor or peer support... = No

Q49 To what extent do you agree that release time is necessary for developing an online course?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Rate your level of agreement. (1)	○	○	○	○	○

Q50 To what extent do you agree that formal meetings with a faculty person adequately prepare you in the skills needed for online teaching?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Rate your level of agreement. (1)	○	○	○	○	○

Q51 Have you ever met formally with an instructional support expert during an online teaching experience to discuss the skills, techniques, problems, and/or preparation for online teaching?

- ○ Yes (1)
- ○ No (2)

Skip To: Q52 If Have you ever met formally with an instructional support expert during an online teaching experie... = Yes

Skip To: Q53 If Have you ever met formally with an instructional support expert during an online teaching experie... = No

Q52 To what extent do you agree that instructional support meetings adequately prepare you in the skills needed for online teaching?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Rate your level of agreement. (1)	○	○	○	○	○

Q53 Have you ever been given release time for developing an online course?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Rate your level of agreement. (1)	○	○	○	○	○

End of Block: Demographics Questions

Q55 Thank you for taking the time to complete this survey. I truly value the information you have provided.

Your responses will contribute to completion of my doctoral studies along with an analysis of faulty online teaching self-efficacy and computer and ICT attitudes so that the scholarly community is able to gain further understanding about the correlation of the concepts being examined.

If you have any comments on the survey or the project, please email the researcher at sharifa.simmons@waldenu.edu

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Start of Block: Ineligible Thank You Message

Appendix F: Permission to Replicate Scale: ICTCAS Scale

From: [redacted] <[redacted]>
Date: Tuesday, May 8, 2018 at 9:36 AM
To: Sharifa Simmons <[redacted]>
Subject: Re: Letter Seeking Permission to Use Survey Tool - 2nd Request

Dear Simmons,

You are welcome. I look forward to receiving your documents as refers; and how they compare.

Best.

On Tue, May 8, 2018 at 9:17 AM, Sharifa Simmons <[redacted]> wrote:
Dear [redacted],

Thank you for your permission as described below. I am very excited about this study and look forward to analyzing the data. Once my research is completed, I will provide you with a synopsis of my research and findings.

Best,

Sharifa Simmons

Sent from my iPhone

On May 8, 2018, at 9:14 AM, [redacted] <[redacted]> wrote:

Dear Sharifa Simmons:

I write to acknowledge your request for permission to use the "Section B. Computer/ICT Attitude" in my research, Thank you for your interest.

Please note that the survey tool for the dissertation was a modified version of Selwyn (1997) and the clean copy can be accessed online. Example: https://www.sciencedirect.com/science/article/pii/S0360131596000358. The CAS was available to use for educational purposes at the time of my research. I cannot guarantee same, today.

So long as the usage is for academic or educational purposes only, noncommercial and not for profit, you have the permission to use the modified version of the survey tool. The scoring is described on pages 56-57 and the questions on pages 194-195 of the dissertation.

I trust all copyrights and related rights will be observed.

I wish you every success with your study.

Best regards,

[redacted]
Educational/Instructional Technology Consultant
[redacted]

On Mon, May 7, 2018 at 4:19 PM, Sharifa Simmons <[redacted] wrote:
Hi [redacted],

Thank you so much! I look forward to your more detailed response.

Best,

Sharifa Simmons

Sent from my iPhone

On May 7, 2018, at 2:19 PM, [redacted] <[redacted] wrote:

Hi Sharifa:

Here's a quick response. I will get back to you asap.
[redacted]

On Mon, May 7, 2018 at 6:13 AM, Sharifa Simmons <[redacted] wrote:

Dear [redacted]:

I am an Educational Technology doctoral student from Walden University writing my dissertation titled "The Relationship Between Faculty Development, Online Teaching Self-Efficacy, Faculty Computer and ICT Attitudes in Higher Education and Diffusion of Innovation", under the direction of my dissertation committee chaired by Dr. Blessing Adeoye, who can be reached at [redacted] The Walden University IRB Committee Chair, Dr. Leilani Endicott can be contacted by email at [redacted]

I read your dissertation, and the article you co-wrote with Dr. Moseley titled “Computer Attitude of Teaching Faculty: Implications for Technology-Based Performance in Higher Education.” I would like your permission to use the Teaching Faculty ICT/Computer Technology Integration Survey (modified CAS survey) instrument in my research study. More specifically I would like to use section "B. Computer /ICT Attitude" in my research. I would like to use and print your survey under the following conditions:

- I will use the surveys only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send a copy of my completed research study to your attention upon completion of the study.

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: [redacted] Please also provide the scoring procedure and a clean copy of the scale.

Please note, since this request specifically is referencing the scale used in your dissertation which you obtained permission for I do not believe I need to contact him for approval.

Sincerely,

Sharifa Simmons
Doctoral Candidate
[redacted]

From: Sharifa Simmons
Sent: Sunday, April 29, 2018 11:51 AM
To: [redacted]
Subject: Letter Seeking Permission to Use Survey Tool

Dear [redacted] and [redacted]

I am an Educational Technology doctoral student from Walden University writing my dissertation titled "The Relationship Between Faculty Development, Online Teaching Self-Efficacy, Faculty Computer and ICT Attitudes in Higher Education and Diffusion of Innovation", under the direction of my dissertation committee chaired by Dr. Blessing Adeoye, who can be reached at b[redacted]. The Walden University IRB Committee Chair, Dr. Leilani Endicott can be contacted by email at [redacted]

I read your article titled "Computer Attitude of Teaching Faculty: Implications for Technology-Based Performance in Higher Education." I would like your permission to use the modified CAS survey instrument in my research study. I would like to use and print your survey under the following conditions:

- I will use the surveys only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send a copy of my completed research study to your attention upon completion of the study.

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: [redacted]

Sincerely,

Sharifa Simmons
Doctoral Candidate
[redacted]

From: Sharifa Simmons
Sent: Thursday, November 9, 2017 7:37 AM
To [redacted]
Subject: Modified CAS Request

Dear [redacted] and [redacted],

I am a doctoral student at Walden University examining faculty online teaching self-efficacy and computer attitudes. I read your article titled "Computer Attitude of Teaching Faculty: Implications for Technology-Based Performance in Higher Education." Is it possible to obtain a copy of the scale and potentially use it for my dissertation? While an official request will be required in the future, I thought it best to contact you at this time.

I look forward to your response.

Best,

Sharifa Simmons, Ed Tech PhD Candidate

[redacted]

[redacted]