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Effect of Early Exposure to Technology on Student Satisfaction with Online Education

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This is to certify that the doctoral dissertation by

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Walden University
2018

Abstract

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MS, Robert Morris University, 2003

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Dissertation Submitted in Partial Fulfillment

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Abstract

U.S. student enrollment in online classes in the higher education sector has grown rapidly since 2001. Researchers have found that student satisfaction often leads to higher student retention, yet more research was needed to understand reasons for student satisfaction with online education. The purpose of this nonexperimental study was to examine the relationship between students' early exposure to technology (i.e., before college) and their satisfaction with online education in college. The unified theory of acceptance and use of technology were the theoretical framework. A convenience sample of 103 participants from the population of online students at colleges and universities in the United States took a survey on their past exposure to information and communication technology (ICT); their expectations for, and willingness to continue using ICT; and their satisfaction with online education. Several statistical tests, such as ANOVA, Spearman Rho correlation, and t-tests were conducted to analyze collected responses. Results indicated there was an indirect relationship between the early exposure to technology and student satisfaction based on the statistically significant correlation found between the early exposure to technology and effort expectancy, then between effort expectancy and use behavior and finally between use behavior and student satisfaction. By implementing study findings, educators and managers may be better able to bring positive social changes necessary to prepare all students and workers for the technology-driven education and the workplace regardless of their socioeconomic status.

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Dedication

I would like to dedicate my study to my family and to my friends from Pittsburgh who encouraged me to pursue this path to a terminal degree. Especially, I would like to thank my wife, Fatiha, who has been my main support throughout this difficult journey. Also, I would like to thank my children, Amine, Leila, Sabah, and Reem, for allowing me to use the time (that should have been dedicated to them) to study and write papers over the past couple of years to complete this long-time dream of mine.

Finally, I would like to thank my parents, Khadidja and Ahmed (who passed away), for instilling the appreciation for education and for seeking academic knowledge when I was growing up. For all of you, thank you from the bottom of my heart.

Acknowledgments

First of all, I would like to thank my committee chair, Dr. Robert Haussmann, for his patience and valuable guidance. Dr. Haussmann made the transition very smooth when he took over from my previous committee chair, Dr. Oscar Hauptman, who also helped me tremendously in shaping my proposal. Special thanks to my committee member, Dr. David Gould, who believed in me and stayed with me throughout the changes of committees that I had to go through. I also thank my University Research Reviewer, Dr. Thomas Butkiewicz, who started his feedback on the draft of my proposal with some kind words of congratulations and encouragement.

I also want to send a thank you to all my professors who contributed to my learning journey as a doctoral student and guided me throughout this wonderful journey in the path of becoming a scholar-practitioner. I also want to acknowledge the Walden University community, from librarians and advisors to program officials, who provided any kind of support to my overall project in pursuing my terminal degree.

Finally, I would like to thank the wonderful scholars who gave me the permission to use their research instruments to conduct the survey for my study. I am grateful to all, and please forgive me if I fail to recognize the contribution of others who I did not name here in the acknowledgment section.

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Chapter 1: Introduction to the Study

Online education is a relatively new phenomenon with limited knowledge about its effectiveness in delivering on the central goals of teaching and learning (Lack, 2013; Nguyen, 2015). According to a 2011 Government Accountability Office (GAO) report, optimal mechanisms and standards for assessing system characteristics, the characteristics of the participating students, and the quality of online material and delivery method are yet to be set. In addition, there are regulatory requirements for monitoring online education stewardship for the provision of U.S. government funding, such as federal student aid funds (GAO, 2011).

The terms *distance education*, *online education*, *e-learning*, and *web-based delivered learning* have been used interchangeably to describe the nontraditional delivery of instruction, where students and teachers use some type of digital Internet-based medium other than physical face-to-face teaching and learning; this definition includes blended learning (Rice, 2006). Online education will be the term used in this study. Schlosser and Simonson (2015) offered a helpful definition of online education as "institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (p. 6).

To provide a better understanding of the online education field, in this study, I focused on the effect of early exposure to technology (EET) prior to college and the effectiveness of that online learning experience on student satisfaction with-online education in college. Online education has been growing due to the changing needs of

21st-century learners. Today's learners enjoy the opportunity of flexible learning schedules and the opportunity to access valuable learning resources from wherever they are located (Rice, 2006). Due to this flexibility and other factors, the number of students enrolled in online education in postsecondary institutions in the United States almost doubled between 2001 and 2013, according to the National Center for Education Statistics (NCES; 2004, 2016) of the U.S. Department of Education. The actual number of online students went from 2.8 million students enrolled in online courses in the 2000–2001 academic year to 5.5 million students by Fall 2013 (NCES, 2004, 2016).

The first part of Chapter 1 contains an overview of the study, which includes the background of the study, the problem and purpose statements, the research questions and theoretical foundation, and the nature of the study. The second part of the chapter contains supporting content, such as the definitions of terms used in the study and the assumptions, delimitations, and limitations of the study. In the last part of Chapter 1, I consider the study's significance and implications for social change.

Background of the Study

According to Rice (2006), the effectiveness of distance education appears to have more to do with who is teaching, who is learning, and how that learning is accomplished than with the medium of delivery. Rice attributed conflicting reports about the effectiveness of distance education to a lack of studies and the complex nature of the field. A similar argument was raised by Vrasidas, Zembylas, and Chamberlain (2003), which only added more confusion to the understanding of online education. In addition, Saba (2005) noted that the lack of a theoretical rationale for most of the distance

education research and the lack of appropriate training for new researchers in the field of distance education contribute to the confusion and limited availability of literature.

In 2011, the GAO released the seminal report, *Use of New Data Could Help Improve Oversight of Distance Education* (GAO, 2011). Authors of this report determined the following:

- the characteristics of distance education today,
- the characteristics of students participating in distance education,
- how the quality of online education is being assessed, and
- how the U.S. Department of Education monitors online education in its stewardship of federal student aid funds (GAO, 2011).

The GAO (2011) recommendation was

> to improve its oversight and monitoring of federal student aid funds, Education should develop a plan on how it could best use the new online education data NCES is collecting and provide input to NCES on future data collections. (p. 2)

As reported in the GAO report, some of the national and regional accreditors require specific thresholds for student satisfaction, which is one of the outcome metrics that online education institutions must provide data on in order for their online programs and courses to remain accredited (GAO, 2011). An example of the standards used for NCES certification process was *Quality Matters*. Quality Matters is a process that is faculty-centered and peer review-oriented, which is designed to provide a certification of the quality of online courses and online components and indicate where adherence to certain principles of design quality for online and blended courses is required (GAO, 2011).

These principles include (a) specific standards for learning objectives, (b) technology, (c) faculty–student interaction, (d) student supports, and (e) assessment (GAO, 2011). In the GAO report, there was no mention of whether students enrolled in online education have had adequate exposure to technology in their early school years prior to college and whether such EET had any effect on those quality standards.

Student satisfaction is an important indicator of whether online students will remain enrolled in online courses or ultimately drop out (Levy, 2007). While researchers studying the effectiveness of online education have reported mixed results (Bawa, 2016; Machado-Da-Silva, Meirelles, Filenga, & Filho, 2014), they have not examined whether student satisfaction is affected by EET, according to my review of the literature. According to Levy (2007), student satisfaction with online education is a predictor of student persistence. Similar findings were reported by Abdous and Yen (2010), Varre, Irvin, Jordan, Hannum and Farmer (2014), and others (Calli, Balcikanli, Calli, Cebeci, & Seymen, 2013; Kuo, Walker, Schroder, & Belland, 2014; Machado-Da-Silva, Meirelles, Filenga, & Filho, 2014). Similarly, Eom, Wen, and Ashill (2006) found that student satisfaction with online education is associated with a positive experience with online learning and is also likely to be a significant predictor of learning outcomes in online courses.

Problem Statement

The delivery of education in the form of online classes is growing rapidly, especially in the higher education sector. Students often experience problems related to information technology when taking online classes (Maldonado, Khan, Moon, & Rho,

2011). There has been rapid growth in the number of students taking online classes in the U.S. higher education sector with students' enrollment doubling between 2001 and 2013 from 2.8 million to 5.5 million students (NCES, 2004, 2016). In spite of this increase in student enrollment, colleges and universities in the United States have faced a general management problem of sustaining this growth and retaining students until they complete their programs. The specific management problem was the need to understand the driver behind students' satisfaction, which often leads to higher student retention (Calli et al., 2013; James et al., 2016).

For online students, many aspects may play a role in driving student satisfaction since most of their interaction is conducted online using information and communication technologies (ICT). To address the specific management problem, I conducted a quantitative nonexperimental study to examine the relationship between the early exposure to ICT throughout the school years prior to college and its effect on student satisfaction with collegiate online education. Findings from this study may be important to both college administrators and faculty as well as business managers because people who are satisfied with studying and working online may likely work better in global virtual teams. Alternatively, findings may indicate that early exposure does not affect satisfaction with online technology at all. Either way, findings should be of value to educators in designing new curricula and to employers in filling business positions that require working in virtual teams. Furthermore, this study may contribute to positive social change by helping inform policy makers at all levels, so they may take proactive steps necessary to prepare all students and workers for a technology-driven education and

workplace that puts them at a competitive advantage regardless of their socioeconomic status.

Purpose of the Study

The purpose of this quantitative nonexperimental study was to examine the relationship between students' EET before college and their satisfaction with online education in college. The early exposure to information technology in school prior to college is defined as any form of in-classroom computer usage prior to college that is related to instructional technology or is designed to further the students' understanding of a concept using the available online resources (Wang et al., 2010). Student satisfaction in this study was measured only for those students who completed at least one course within their first semester or quarter at college during their freshman year. I also used demographic attributes to examine the relationship between EET and student satisfaction with online education. The examination of these variables and their relationships may provide important information to policy makers and to stakeholders of schools providing institution-based education prior to college. Using study findings, leaders of online colleges may be able to work together to increase student satisfaction and improve technology acceptance in the ever-changing educational environment. Findings from this study may also encourage online colleges to become proactive in ensuring that all freshman students enrolling in online courses are ready for online learning. For example, university enrollment advisors could ask the same questions used in the EET questionnaire used in this study to identify students with little or no EET and offer them intensive training sessions in information technology prior to starting their online classes.

Research Questions and Hypotheses

The purpose of this quantitative nonexperimental study was to examine the relationship between students' early exposure to technology (EET) before college and their satisfaction with online education in college. While many variables might contribute to the acceptance of ICT and the satisfaction of online college students based on the unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, Davis, & Davis, 2003) theory, in this study, I focused on understanding the effect that exposure to ICT at an early age has on the satisfaction of freshman students with their online education. My research questions and hypotheses were, as follows:

RQ1: What is the relationship between EET and satisfaction with the online education of college students?

$H_0$1. There is no relationship between students' EET and their satisfaction with online education in college.

H_a1. There is a positive relationship between students' EET and their satisfaction with online education in college.

RQ2: What is the effect of students' demographics on the relationship between EET and satisfaction with online education in college?

$H_0$2. The students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college.

H_a2. The students' demographic factors (age and gender) predict the degree of satisfaction with online education at the college.

RQ3: What is the effect of EET in the ICT environment on the relationship between performance expectancy (PE), effort expectancy (EE), and students' use behavior (UB) of ICT in online education?

$H_{a0}3$. The students' EET in the ICT environment has no effect on the relationship between the students' PE, EE, and UB of ICT in online education.

$H_{b0}3$*:* There will be no relationship among PE, EE, and UB.

$H_{a1}3$. The students' EET in the ICT environment affects the relationships among the students' PE, EE, and UB of ICT in online education.

$H_{b1}3$*:* There will be a positive relationship among PE, EE, and UB.

RQ4: What is the relationship between the students' UB of ICT and their satisfaction with online education?

$H_0 4$. There is no relationship between the students' UB of ICT and their satisfaction with online education in college.

$H_a 4$. There is a positive relationship between the students' UB of ICT and their satisfaction with online education in college.

Theoretical Foundation

The theoretical foundation for this study was based mainly on two major theories: (a) UTAUT (Venkatesh et al., 2003), and (b) skills acquisition theory (SAT; Dekeyser, 1998, 2007). I also referenced in this study, the diffusion of innovations theory (IDT; Rogers, 1983) and the technology acceptance model (TAM) that are part of the UTAUT. The latter has been a widely-used approach for outlining how the perceived usefulness

and the perceived ease of use of technology predict users' attitudes and their behavioral intention toward the use of technology (Ma & Liu, 2004).

Venkatesh et al. (2003) introduced the UTAUT, which addresses how individuals adopt new technologies. The authors also examined potential boundary conditions, such as behavioral intentions and the organizational facilitating conditions (Venkatesh et al., 2003). In developing the UTAUT model, Venkatesh et al. consolidated eight previous theories that addressed technology. The eight theories from which the UTAUT model was derived were

- theory of reasoned action (TRA),
- TAM,
- motivational model (MM),
- theory of planned behavior (TPB),
- combined TAM and TPB (C-TAM-TPB),
- model of personal computer utilization (MPCU),
- IDT, and
- social cognitive theory (SCT; Venkatesh et al., 2003).

While it is important to make reference to what the UTAUT draws its model from, it is worth noting that the context of this study focuses on issues not covered by the UTAUT model. For example, the UTAUT already explained about 70% of the variance in the user's intention of technology usage and technology acceptance (Venkatesh et al., 2003). Although not able to add to this impressive theoretical model, I might have helped shed light on some issues not covered in this theory by its authors.

The main tenets of UTAUT theory can be summarized as five major direct determinants, of which three are related to behavioral intention to use technology (PE, EE, and social influence) and two are related to technology use (behavioral intention and facilitating conditions; Venkatesh et al., 2003). In addition, the UTAUT model includes four contingencies (gender, age, experience, and voluntariness) that may alter the effect of the determinants on intention to use a technology and behaviors to technology use (Venkatesh & Xiaojun, 2010; see Figure 1). I used some of the determinants that relate to the user's level of comfort with the technology available in online education to guide the study. One of the determinants is the PE, which was defined as the degree of the user's belief that using the online education system will help him or her better attain a rewarding career. Another determinant that aligns with the direction of this study is EE, which is defined as how easy it is to use the system and which can be used to gauge whether the students find it easy to use the online education delivery system. While the effect of EE on behavioral intention varies across gender and age, in this context, the focus is put on the effect of EET on all users rather than focusing on a gender or age group (Venkatesh et al., 2003). Other determinants covered by the UTAUT model are important but were not explored in this study. For example, social influence relates to the perception of the individual about the importance that others see that the user should use the new system.

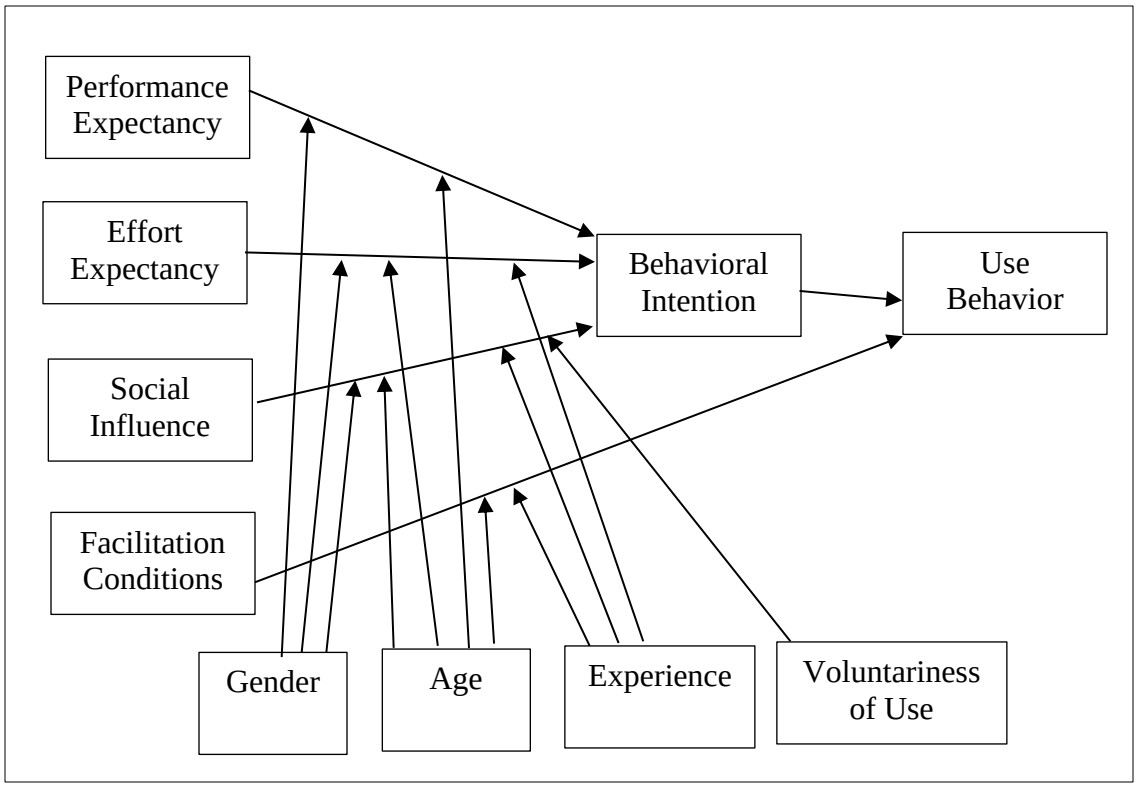

Figure 1. The UTAUT model. Adapted from "User Acceptance of Information Technology: Toward a Unified View" by V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, 2003, *MIS Quarterly, 27*(3), p. 447. Retrieved from http://www.misq.org/ Copyright © 2003, Regents of the University of Minnesota. Used with permission.

The IDT by Rogers (1983) is part of the UTAUT, and therefore it will be referenced in the theoretical framework to validate the student satisfaction as one of the important components by which the degree of relative advantage is measured. The relative advantage in Rogers' theory is described as the degree to which innovation is perceived as better than the idea it supersedes. In addition, Rogers' theory puts the information in a context relevant to the direction of this study by which Rogers argued that the diffusion of innovation is a two-way communication process. In that process,

innovation is communicated through certain channels over time in a social setup implying that the process permits new ideas to flow between individuals to bring them toward each other or apart. Moreover, the diffusion is also presented by Rogers as a type of communication where the exchanged information revolves around new ideas that fit the context of online education, particularly with freshman college students pursuing online degrees for the first time. Rogers described the elementary-based form of the diffusion process as

- innovation,
- an individual or another unit of adoption that has knowledge of, or experience with using, the innovation,
- another individual or other unit that does not yet have knowledge of the innovation, and
- a communication channel connecting the two units.

The diffusion of innovation theory fits greatly as a theoretical framework, and it will guide the study through the role played by technology in the online teaching and learning process, which in turn might inform about the effect on student satisfaction in the online education experience. Although the IDT is part of the UTAUT, the emphasis will be on the relative advantage, which is one of the characteristics of the innovation element of IDT that is measured by satisfaction. In making this connection, the student satisfaction with ICT in online education can be tested through the PE construct of the UTAUT because PE is rooted in the relative advantage construct from IDT.

The UTAUT is the main theoretical framework that will predict whether EET will affect student satisfaction with online education through a reduced UTAUT (r-UTAUT) model or not. In addition, EET will be explained from a developmental standpoint through the skill acquisition theory (SAT) (Dekeyser, 1998, 2007). Dekeyser (2007) theorized that learning a skill requires at least three stages: declarative knowledge, proceduralization of knowledge, and automatizing of knowledge. Those three stages of SAT will be used to operationalize EET and help determine the level that the student is at regarding ICT skill or any ICT competency because of exposure to technology prior to college. The SAT, a theory in cognitive psychology stating that learning a skill requires at least three stages, fits well as a theoretical framework that can guide the discussion on how EET is defined in the context of this study. The three stages of SAT are defined as:

1. Declarative knowledge (DK)—this stage is when the person acquires factual knowledge (e.g., knowing that a computer needs to be turned on using the power button or any basic rule of how an ICT-related task is executed).
2. Proceduralization of knowledge (PK)—at this stage, the encoding of the behavior of this knowledge starts by engaging in the targeted behavior while relying on DK (e.g., paying attention to how a task is performed while practicing that knowledge such as opening a software application and saving a file).
3. Automatizing of knowledge (AK)—at this stage, the person who went through the procedural knowledge of a skill would start using that knowledge without thinking about how to do the task related to the learned skill. By strengthening and refining the procedural knowledge through practice, it will lead to

automatizing. Typically, at this stage, the person might not need to refer to the DK anymore.

Both UTAUT and SAT theoretical frameworks guided the discussion on how EET may affect student satisfaction with online education.

Nature of the Study

This study was a quantitative nonexperimental study in which surveys were used to collect data that provided answers to the research questions and test hypotheses. The plan was to examine the relationship between EET and student satisfaction with online education among freshmen students taking online classes. More specifically, regular exposure to technology during school years prior to college was compared with a little exposure or no exposure to determine the degree to which each of those variables predicts higher or lower satisfaction with online education at college.

Based on this plan of research, a convenience sample was drawn from the population of students from accredited U.S. online universities. They were surveyed to collect the data about the relationship between their EET and their satisfaction with online education in their freshman year and beyond. The plan was to survey students from universities (such as online college BCO and online university WUO) as a convenience sample, which is where I believed that I could gain access to their online students. Surveys sent to students from WUO online college were used to test the survey at a small scale. The survey to collect data for the study was delivered to students from online universities. A comparison was conducted between BCO online college and WUO online university and the rest of the colleges and universities throughout the U.S. to show

that the populations are not different regarding demographic data and prior education experience among all students at those colleges and universities.

The sample frame included the college students who completed at least one course within their first semester or quarter. The sampling was a single stage, with each online student accessed directly. As the data will be collected using surveys only, the reliability of the variables' measures is critical.

In this study, EET was measured using many attributes and characteristics related to the level of exposure to technology that students had during early education. For example, the number of computer sessions a week, the length of those computer interaction sessions, type of information technology activities in the classroom or at home, among others. In addition, EET was also measured by the percentage of integration of education assignments that require the use of information technology in-class and outside of class.

Definitions

The operational definitions provided below are to clarify some of the terms that are important in this study.

Early exposure to technology (EET): EET is the exposure to any form of use of technology tools such as a computer or any learning material delivered using electronically enabled devices during the school years prior to college in the U.S. education system (Dekeyser, 1998, 2007).

E-learning: Electronic learning that is an "Institution-based, formal education where the learning group is separated, and where interactive telecommunications systems

are used to connect learners, resources, and instructors" (Schlosser & Simonson, 2015, p. 6).

ICT: The information and communications technology—or technologies is a term referring to any communication device or application, including but not limited to radio, television, cellular phones, computer and network hardware and software, satellite systems, as well as the various services and applications (DaCosta, Nasah, Kinsell, & Seok, 2011).

Satisfaction with online education: Throughout this study, the satisfaction with online education is defined as the feeling of fulfillment because of the use of the technology by which the learning process was delivered after completion of the first year in college (Dziuban, Moskal, Kramer, & Thompson, 2012; Kauffman, 2015; Liaw & Huang, 2013).

Assumptions

Assumptions are the clarification of aspects within this study that are assumed by the researcher to be true but cannot be verified. The assumptions listed below are necessary to the context of this study:

1. Students responding to EET survey would possess sufficient recall of information related to their exposure to ICT in education prior to college.
2. Schools that provide institution-based education to students prior to college where students have access to an internet-accessible computer.

Scope and Delimitations

The delimitations discussed here refer to the scope of this study and to what extent its potential findings could be generalized. Among the delimitations in this study were:

1. The sample frame will only include the college freshman students who completed at least one online course during their first semester or quarter at one of the two U.S. universities.
2. The students that will be included in the survey were enrolled in institution-based precollege education in the U.S. school system.

Limitations

The limitations of a study are described as the weaknesses in the design, or the methodology that will be used to conduct the study and that might influence the findings. The limitations that were to be considered are the following:

1. To overcome the generalizability issue, an extensive range of characteristics of the two samples will be compared to show that they are not different.
2. The study will be conducted using a sample of convenience as opposed to random sampling and might lack reliability and representativeness of the population of freshmen students in those two U.S. universities. An explanation in Chapter 3 about how major characteristics of freshman students attending most of the U.S. online colleges and universities (U.S. Department of Education, 2014) are very similar to those two U.S. universities being studied will be provided.

3. Because college freshman students come from different school districts and/or attended their early education prior to college at different timeframes, students might have different interpretations about their exposure to ICT. To overcome this limitation, the term *exposure to ICT* must be well defined prior to freshman students taking the survey.
4. This survey-based study has a weakness of being cross-sectional, which is typical for this type of study because it will be a single survey at one point in time. Once the questions are asked through the online questionnaire, it would be impossible to ask any follow-up questions or to clarify the meaning of questions to the respondent. To overcome this limitation, more time and pretesting will be spent on formulating the questions so that they are very clear and concise.
5. Another weakness of a survey-based study like this one is the lack of validity because, in the surveys, only general questions that can be understood by a broad range of people can be asked. The questions will be carefully formulated to be a little specific yet easy to understand to overcome this limitation. In addition, I will conduct a pilot test of the survey because the survey instrument is new, and as such has not been validated and the psychometric properties are unknown.
6. Some limitations would be nonresponses to some questions because some participants might not respond to a question, which will lead to some biases in that question.

7. Some limitations of the survey would be some instances where participants might not recall some facts due to confusion in the wording of a question, which might lead to answers that are not fully thoughtful.
8. Memory recall limitation is also a factor because students are asked to recall some exposure to ICT from 15 to 20 years ago or more, and this limitation might yield arbitrary answers that might not reflect their accurate EET.
9. Some questions in the survey might lead to collecting unclear data because of the misinterpretation of the questions from one respondent to another.

Significance of the Study

Significance to Theory

In this study, a gap in the literature about online education where very little is known about the effect of prior exposure to technology in early grades on the student satisfaction with online education was addressed. Rice (2006), Saba (2005), and others pointed to the lack of studies in this field and the lack of appropriate training for new researchers in the field of distance education. Such a gap puts this study at the forefront to bring a contribution to the body of knowledge in this particular area guided by empirical theories such as the UTAUT. Moreover, researchers outside the United States of America can use the same methodology and variables to replicate this study in their respective countries or regions that share similar education systems by exploring the relationship of EET and student's satisfaction in online education for students attending their respective colleges and universities.

Significance to Practice

The results of this study may inform scholars and practitioners in the use of technology in online-based learning, where the literature produced mixed results about what influenced the students' attitude toward computers (Yilmz & Alici, 2011). It is important for leaders of higher education institutions embarking on the process of offering online programs to set the right environment for freshman students to succeed in online-based learning. To be proactive in ensuring that all students enrolling in online courses are ready for online learning, universities' enrollment advisors should be asking the same questions used in EET questionnaire to identify students who had less or no EET and put them through intense training sessions in information technology prior to starting their online classes. Therefore, the results of this study may provide much-needed insights into the process of putting in place the necessary success factors for students to have similar or better educational experience compared with an on-ground learning environment.

Because there are more options for online education at higher education institutions, it is important for administrators and faculty at those institutions to identify the learning needs of their students and identify the areas of opportunities to set up an environment that is conducive to learning (Coccoma, Peppers, & Molhoek, 2012). Findings from this study may also be important to managers in the business community because individuals who are satisfied with studying and working online may likely work better in global virtual teams. Alternatively, findings may indicate that early exposure does not affect satisfaction with online technology at all. Either way, findings should be

of value in designing new curricula and in filling business positions requiring working in virtual teams.

Significance to Social Change

In addition, this study may contribute to social change by helping inform policymakers at all levels to take proactive steps to affect positively social changes necessary to prepare students for a technology-driven education that puts them at a competitive advantage. A uniform exposure to technology for students at all institution-based education levels prior to college will build the foundation for subsequent schooling giving socially disadvantaged children the same range of skills and abilities to compete in college with their socially advantaged peers. Furthermore, addressing such needs may payback when students are enrolled in technology-supported learning environments such as online classes.

Summary and Transition

Online education has been the subject of numerous studies that examined different challenges facing this education model where formal education is delivered using interactive telecommunications systems between distant groups and individuals (over the Internet) to connect learners, resources, and instructors. However, the lack of studies representing differing insights in this field, combined with the complex nature of the field, added more confusion to the understanding of distance education. Furthermore, the lack of a theoretical rationale for most of the distance education research and the lack of appropriate training for new researchers in the field of distance education are also part of this on-going confusion and misunderstanding (Rice, 2006; Saba, 2005).

This study is organized into five chapters. Chapter 1 includes an introduction to the main topic of this study about examining the effect of EET on student satisfaction with online education. Chapter 1 also serves as an overview of the organization and the design of this study. Chapter 2 includes the literature review, and Chapter 3 includes the research method. Chapter 4 shows the data analysis and results and finally, results are discussed in Chapter 5 along with conclusion and suggestions for further research.

Chapter 2: Literature Review

The rapid growth in the number of students taking online classes in the U.S. higher education sector--students' enrollment in these courses in the United States doubled between 2001 and 2013 from 2.8 to 5.5 million students (NCES, 2004, 2016)--has posed numerous challenges for students and educators. Most of these difficulties are related to poor acceptance by learners and instructors of the new technology and its features, which is exacerbated by the lack of adequate knowledge for the efficient use of the new resources (Torres-Maldonado et al.,; Zaharias & Pappas, 2016). The problems experienced by online learners in the use of ICT when taking online classes point to the importance of understanding the role of EET in affecting the satisfaction of online learners (Torres-Maldonado et al., 2011). In Chapter 1, I presented the problem overview and the nature of the study.

In this chapter, I reviewed the literature to validate the research gap and to create the basis for the theoretical foundation of the study. This detailed literature review is being preceded by a section on the literature search strategy and the theoretical foundation. The literature review is dedicated to critically examining the existing research in three areas that are central to the study. First, the discussion is focused on the nature and attributes of ICT used in online education. Second, the literature related to exposure to any ICT in institution-based education before college is reviewed. The third area of research covered is the role and determinants of satisfaction with ICT in online education. The chapter concludes with a summary of the major themes in the literature and a

transition that connects the conceptual focus of the study to the methodology and data sources that are described in Chapter 3.

Literature Search Strategy

Most of the literature in this study consists of peer-reviewed journal articles gathered using major multidisciplinary databases such as ProQuest Central and Academic Search Complete EBSCO that were accessed through Walden University Library. Also, I conducted a thorough search using Google Scholar to broaden my search and access articles and books published within the past 5 years. While the focus was on the most recent literature, I also gathered research that was older than 5 years but still relevant to the topic of this study. For instance, articles about online education were not as prevalent as those on other subjects such as education in general. However, researchers documenting the rise of online education have been publishing articles at an increasing rate (Allen & Seaman, 2011; Lack, 2013) since the inception of online education with the first course offered fully online in 1981 (Harasim, 2000).

Some of the keywords used to locate peer-reviewed journal articles during the search process were *online education, distance education, e-learning, student satisfaction, early education, K-12 education, use of technology in education,* and *user's acceptance of the technology*. Many other keywords and combination of keywords (i.e., eLearning, ICT, and satisfaction) I used to locate valuable peer-reviewed journal articles and books. Other relevant government reports such as those by the U.S. GAO (2011) and the U.S. Department of Education (NCES, 2004, 2016) that provide statistical data about the topic of this study were also reviewed and analyzed.

A forward and backward citation search strategy I also used to find valuable peer-reviewed literature relevant to the research topic. While the forward citation search was very helpful in locating research that is more recent, the backward citation search was more valuable in finding the relevant theories for building the theoretical foundation. This method resulted in finding many relevant articles related to the foundation theories used in the reports included in the study. Use of this method also allowed me to access literature I was not able to otherwise access.

Theoretical Foundation

The theoretical foundation for this study was based mainly on two major theories: (a) the UTAUT (Venkatesh et al., 2003), and (b) the SAT (Dekeyser, 1998, 2007). The SAT as a cognitive and a developmental theory was used to conceptualize how to predict EET.

In the next sections, a research-based analysis of how the selected theories have been applied previously in ways similar to this study is provided. The rationale for the choice of the theories in the foundation is provided above. I also describe how the selected theories relate to the topic of the current study.

Unified Theory of Acceptance and Use of Technology (UTAUT)

In crafting UTAUT,Venkatesh et al. (2003) created four primary constructs that are rooted in the following eight theories:

- TRA,
- TAM,
- MM,

- TPB,
- C-TAM-TPB,
- MPCU,
- IDT, and
- SCT.

The UTAUT model and constructs are illustrated in Figure 1. The UTAUT model and the previous theories from which the UTAUT draws its design constitute an important theoretical framework. However, it is worth noting that the context of this study focuses on issues not covered by the UTAUT model (Venkatesh et al., 2003). Although not in a position to add to this theoretical model, I might help shed light on some issues not covered in this theory by its authors. For instance, the direction in this study was to examine whether there is a relationship between early exposure to ICT exhibited in the form of ICT knowledge acquired throughout the years before college and student satisfaction with online education, a scope that is not covered by the UTAUT in its entirety. However, a portion of this magnitude was a partially-adopted UTAUT model that I called a reduced UTAUT (r-UATAUT) model (see Figure 2).

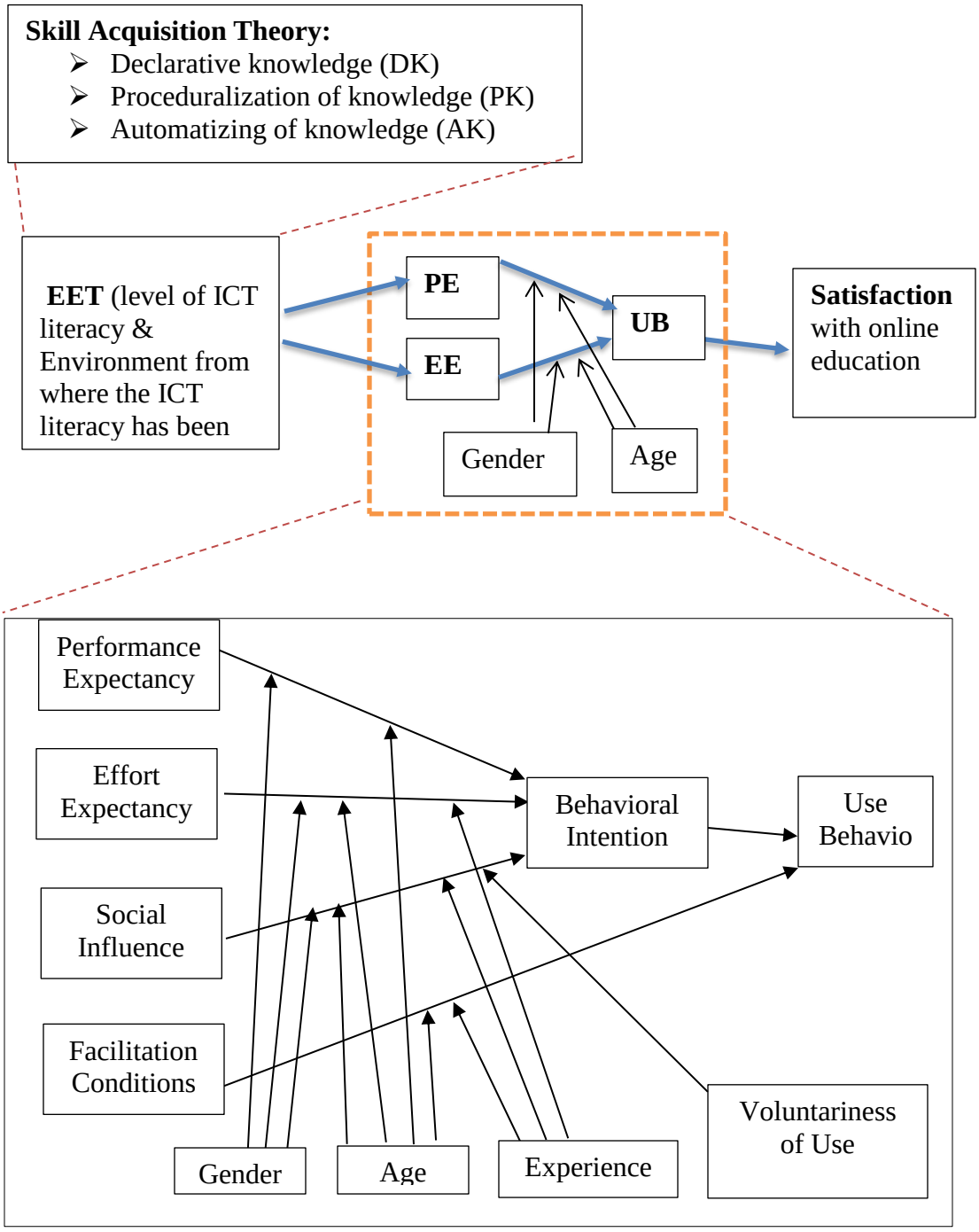

Figure 2. EET-satisfaction conceptual model (EET-S) including UTAUT model and constructs of the skill acquisition theory

The central tenets of UTAUT theory can be summarized as five major direct determinants, of which three are related to behavioral intention to use technology (performance expectancy, effort expectancy, and social influence), and two are related to technology use (behavioral intention and facilitating conditions). Also, the UTAUT model includes four contingencies (gender, age, experience, and voluntariness) that would alter the effect of the determinants on intention to use a technology and behavioral side to technology use (Venkatesh & Xiaojun, 2010) (see Figure 1).

The UTAUT will guide the study using some of the determinants that relate to the user level of comfort using the technology available in online education such as the performance expectancy which is defined as the degree of the user's belief that using the online education system will help him or help her better attain a rewarding career. Another determinant that aligns with the direction of this study is effort expectancy which is defined as how easy it is to use the system and can gauge whether the students find it easy to use the online education delivery system. Other determinants covered by the UTAUT model are considered significant but are not explored. The fact that the scope of this study is focused on the individual student and not on how others influence the student to use ICT in the online education environment, the social impact deals with the perception of the individual about the importance that others see that the user should use the new system is not explored. Similarly, the facilitating conditions as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system are not explored either for the same reasons explained earlier.

The UTAUT constructs that will be included in this study are also rooted in IDT and include:

1. Performance expectancy (PE) is the degree to which an individual believes that using the system will help him or her to attain gains in performance (p. 447), which has root construct in 'relative advantage' from IDT. The relative advantage, which is one of the characteristics of the innovation element of IDT, is measured by satisfaction. Such a connection might inform on the students' satisfaction with ICT in online education and can be tested through the performance expectancy (PE) construct of the UTAUT since PE is rooted in the relative advantage construct from IDT.
2. Effort expectancy (EE), which is the degree of ease associated with the use of the system (p. 450) which has a root construct in the 'ease of use' from IDT.
3. Use behavior (UB), which is the definitive dependent variable in the UTAUT model, and it is strongly influenced by behavioral intention which is directly influenced by PE and EE. However, in this study, student satisfaction with online education is the definitive dependent variable.

Skill Acquisition Theory (SAT). Skill acquisition theory (SAT) is a theory in cognitive psychology that states that learning a skill requires at least three stages (Dekeyser, 1998, 2007):

1. Declarative knowledge (DK) – this stage is when the person acquires a factual knowledge (i.e., knowing that a computer needs to be turned on using the power button)

2. Proceduralization of knowledge (PK) – in the stage the encoding of the behavior of this knowledge start by engaging in the targeted behavior while relying on declarative knowledge (i.e., paying attention to how a task is performed while practicing that knowledge)
3. Automatizing of knowledge (AK) – in this stage, the person who went through the procedural knowledge of a skill would start using that knowledge without thinking about how to do it. By strengthening and fine-tuning procedural knowledge through practice, it will lead to automatizing, and at this stage, the person might not need to refer to the declarative knowledge anymore.

Summary of Theoretical Foundation

An illustration of the theoretical foundation is provided to show how all the theories described above were used together to inform and guide the topic of the current study. Testing of UTAUT as the original theoretical foundation through the reduced UTAUT (r-UTAUT) model combined with SAT as a developmental theory will create a new proposed model EET-S (see Figure 2) to predict how the EET affects student satisfaction with ICT in online education.

EET-S model illustrated in Figure 2, integrates a reduced model of UTAUT in which only PE and EE and how they affect UB along with the demographic moderators (gender and age) are considered. The reduced/partial UTAUT (r-UTAUT) model sits between EET and satisfaction as I am making the argument that EET affects satisfaction through performance expectancy and effort expectancy which in turn affect use behavior while age and gender moderate the relationship. Finally, I am making the claim that EET

is rooted in the SAT. SAT has three levels: (a) declarative knowledge (DK), (b) proceduralization of knowledge (PK) and, (c) automatizing of knowledge that determines the level of which the student regards ICT skill or any ICT competency as a result of exposure. The new model EET-Satisfaction model (EET-S) is illustrated in Figure 2.

Literature Review

The literature reviewed in the following sections sets the scope and context to explore the body of knowledge available in the area online education and how early exposure to technology might predict student satisfaction. The focus in this study was to examine some key variables stemming from early exposure to ICT throughout the years before colleges, studying what level of ICT skills freshman students are at, and which environment (home, school or other settings) contributed to their exposure to ICT literacy. The plan was also to examine other variables such as the student's performance expectancy, effort expectancy, ICT use behavior and student satisfaction with online education. The reviewed literature yielded informative findings of the variables related to this study and included various research methodologies along with the methodologies' strengths and weaknesses which in turn confirmed the relevance of the research methodology I chose in this study.

EET is explored in this section to provide an overall view of any ICT skills or knowledge that students were exposed to throughout the years before enrolling in online programs at the college. Also, to the level of ICT skills or knowledge that the freshman students possess at the time of enrollment, it is important to know which environment (home, school or other settings) contributed the most to their acquired ICT literacy.

Education Trends in the United States

The U.S. Census Bureau has been providing historical trends in education attainment since 1940 when the Bureau started collecting data. The current population survey (CPS) allowed the U.S. Census Bureau to provide a consistent annual tracking of education attainment showing an increase in two levels of education. Those levels include: (a) completing high school or higher (regular high school diploma or GED) and (b) completing a bachelor's degree or higher (Ryan & Bauman, 2016, p. 4). Based on the *2015 Current Population Report*, only 25% of the U.S. population at the age of 25 or older completed high school in 1940, while over 50% reached that level by 1967. The high school graduation trend kept rising to triple the number of graduates by 1986 compared to 1940 and just reached 88% in 2015. The *CPS* report also shows that the percentage of the population with a bachelor's degree or higher has been trending up steadily from 1940 to 2015. For instance, the adult population with a bachelor's degree or higher was only 5% in 1940 and has reached 33% by 2015 (Ryan & Bauman, 2016, pp. 4-5).

Computer and Internet Use in the United States

Since 1984, the U.S. Census Bureau has been collecting data in the Current Population Survey (CPS) by asking questions to assess computer use, and since 1997, the bureau added questions to determine the Internet use as well (Day, Janus, & Davis, 2005, p. 1). When comparing the reports from the U.S. Census Bureau on Computer and Internet Use in the United States between 2003 (Day et al., 2005) and 2013 (File & Ryan, 2014), we find that significant jump in both the computers' ownership and Internet usage.

Based on the CPS report, most of the U.S. households have personal computers and Internet access. For personal computers, the trend has shown a significant jump in ownership going from only 8% of the U.S. households with a personal computer in 1984 to 62% in 2003, then climbing to 83.8% in 2013, almost 10 times compared to 1984. The report also shows that the number of U. S. households with Internet access the percentage had tripled from 18% in 1997 to 55% in 2003 then reaching 74.4% of all households reported Internet use, with 73.4% reporting that their connection is through a high- speed connection. The earlier CPS reports show that the most Internet connections were through a dial-up connection. However, the current CPS report shows that most Internet users now are connecting via cable modem (42.8%), mobile broadband (33.1%), and DSL connections (21.2%). Only 1.0% of all households reported connecting to the Internet using a dial-up connection (File & Ryan, 2014).

We can see that the trend of accessing the Internet outside the home and school picked up tremendously in last decade which explains the need to assess the ICT skill level since the typical Internet access that students used to have through structured exposure do not apply anymore. Therefore, it is essential for anyone looking at the effect of early exposure to ICT to take into consideration all those changes in how ICT is accessed, where it is accessed and how it is accessed. For instance, in a Pew Research survey conducted by Purcell, Heaps, Buchanan, and Friedrich (2013), the authors reported the teachers see some impact on their students regarding the disparity in accessing digital tools in school and at home. While 54% of the surveyed teachers said that their student has adequate access to digital tools at school, on 18% of those teachers

said their student have similar access to those tools at home. These findings are real concerns when we take into consideration, the availability of personal computers at home that was reported by the U.S. Census Bureau in 2013 to be 83.8% of the American households with 73.4% having Internet access (File & Ryan, 2014). Perhaps the availability of personal computers with high-speed Internet access does not necessarily translate to adequate exposure to ICT nor provides the necessary technology that helps students learn in an ever-demanding environment. An environment ranging from using digital learning tools in the classroom to taking fully online classes were that ICT is the main learning framework that the online students interface with to learn new skills.

Types of Multimedia Technology Used in Classrooms

Multimedia technology has been utilized in the classrooms for a variety of reasons. Berk (2009) described 12 techniques and examples on how multimedia tools and devices such as CDs, DVDs, media tapes, Internet-based videos (YouTube, Vimo, and Hulu) can be integrated into the curriculum to enhance or advance the teaching and learning process. According to Beck, among all the multimedia tools available, the scientific evidence shows that video clips in particular used in the classrooms seem to stimulate all parts of the brain. Mayer's (2009) multimedia theory support this claim and showed in his paper about *incorporating motivation into multimedia learning* that multimedia lessons can engage learners in deeper processing during learning without over- loading them or distracting them from the core material (Mayer, 2014, p. 173). In a survey study regarding attitudes of teachers and learners toward e-learning, Liaw, Huang, and Chen (2007) found that multimedia instruction is among the four top factors to affect

students' attitudes toward e-learning as a useful learning tool. While the access to technology has improved, in an analysis of related research, Hew, Brush, Foon, Ae, and Brush (2007) found a total of 123 barriers related integration of technology into K-12 teaching and learning. In their study, they summarized various technology integration barriers by classifying them into six main categories: (a) resources, (b) knowledge and skills, (c) institution, (d) attitudes and beliefs, (e) assessment, and (f) subject culture (p. 226). The resource barrier and knowledge and skills were the most significant accounting for 43% and 23% respectively of the total number of obstacles. While the educational resource barriers are all valid concerns, the lack of specific technology knowledge and skills is one of the common barriers given by teachers for not using technology altogether (Hew et al., 2007, p. 227). The lack of knowledge among teachers on how to integrate ICT in the classroom at the K-12 institutions can only translate to less exposure to technology among learners before their enrollment to college.

Early Exposure to Technology (EET) Before College

Students have been increasingly using information and communication technology (ICT) tools, devices and activities in the classroom and outside the classroom (Blackwell, Lauricella, & Wartella, 2014; Gu, Zhu, & Guo, 2013; Pick, Sarkar, & Johnson, 2015). This adoption of ICT everywhere—at school, at home, in play and socially--has been taken positively by governments, school administrators and business managers as a sign of students' digital readiness for jobs that are more than ever demanding virtual interaction among team members via ICT (Mohammadyari & Singh, 2015). Probably the most notable report that shows the progress of ICT implementation

throughout the world is 2015 Measuring the Information Society report that tracks the ICT Development Index (IDI) in 167 voluntarily participating nations developed in 2008 by the International Telecommunications Union (ITU) (2015) and has been published annually since 2009. IDI is a combination of 11 indicators indexed as one measure that monitors and enables cross-country and longitudinal comparison of developments in ICT. The primary objectives of IDI are to measure:

- the level and evolution over time of ICT developments,
- progress in ICT development,
- differences between countries regarding their levels of ICT development (digital divide),
- the development potential of ICTs, and
- the extent to which countries can make use of ICT to enhance growth and development in the context of available capabilities and skills (International Telecommunications Union (ITU), 2015, p. 39).

Based on 2015 *Measuring the Information Society* report, United States moved slightly in IDI ranking from 16 in 2010 to rank 15 in 2015. This modest improvement in ranking for the United States does not match the significant IDI ranking improvement for some developed countries such as the United Kingdom that advanced from being ranks 10th in 2010 to 4th in 2015, or Switzerland that advanced from 12th in 2010 to 7th place in 2015 (p. 46).

The exposure to ICT for students during the years before college in the United States can be looked at from several perspectives. First, the students are likely to get ICT

exposure at school, where they spend most of their day, through the integration of ICT in the curriculum by their teachers (Hew et al., 2007). Second, students get exposure to ICT at home by doing school-related homework or using ICT for leisure (games, Internet browsing or social media interaction) (Blackwell et al., 2014). Third, students might have ICT exposure in a variety of locations and environments, such as public libraries, exhibitions, gaming events, or just using their mobile devices doing any digital activity such as gaming, Internet browsing, social media activity and more (Jones, Ramanau, Cross, & Healing, 2010). The exposure to ICT in all those environments might seem to be extensive giving the impression that most of the students involved had sufficient ICT exposure to make them ICT literate and savvy to take on advanced ICT activities needed in online education models.Where in reality, this might not be the case (Clark-Ibáñez & Scott, 2008). For instance, Pick et al. (2015) who analyzed factors associated with the availability of ICT and how it is utilized in various states in the United States, found that there is a digital divide significantly related to ICT utilization. They found that this is true especially when social capital, education, societal openness, urbanization, and ethnicities are considered, despite the availability and the even distribution of ICT through the states. This digital divide does not appear to be related to specific geographic attributes but rather related to socio-economic conditions of those individual students. Consequently, those conditions resulted in less adequate exposure to ICT within the environment in which they live (Blackwell et al., 2014; Gu et al., 2013; Litt, 2013; Lokken & Mullins, 2014; Pick et al., 2015; Ritzhaupt, Liu, Dawson, & Barron, 2013).

Many reports that collected data by surveying teachers or academic administrators in the K-12 system in the United States show that the use of digital tools such as computers, tablets and software application (including mobile apps) are part of the day to day instruction activities at schools. However, the report published by the AdvancED research disagrees with those claims (Van Broekhuizen, 2016). The report included data collected by trained and certified classroom observers who conducted classroom observations in person over the course of 3 years and rated three areas related to the use of digital tools and technology in the classroom. The purposes were:

- students use digital tools/technology to gather, evaluate and use information for learning,
- students use digital tools/technology to conduct research, solve problems and create original works for learning, and
- students use digital tools/technology to communicate and cooperate for learning (Van Broekhuizen, 2016).

In this AdvancED study, the data collected through direct classroom observations in K-12 schools located in 39 States across America and schools in 11 other countries. The analysis shows 52.7% of classes with no evidence that students were using digital tools or any technology to gather, evaluate or use information for learning purposes (p. 2). Furthermore, the analysis shows that 63.3% of those observed classrooms had not used any digital tools for researching or solving a problem. Also, 64.7% did not use those digital tools to communicate (e.g., email, SMS, and other messaging applications) or collaborate for learning such as using online or any Internet-based digital tools (p. 3).

Studies collecting data from teachers and academic administrators (Buabeng-Andoh, 2012; Chai et al., 2011; Hew et al., 2007), and data collected by third party classroom observers such as AdvancED certified observers (Van Broekhuizen, 2016) have produced mixed results. Therefore, it seems to be imperative to survey students directly about their actual exposure to digital tools (ICT) in the classrooms, at home and elsewhere throughout their years before college. In addition to inquiring about the students' earlier exposure to ICT, it seems important to understand their ICT skills level and which environment (school, home or elsewhere) contributed the most to it that the students are self-reporting. For instance, DeKeyser's (2007) skill acquisition theory (SAT) accounts for how people progress in the learning process from the following stages:

1. the initial learning (referred to in this study as novice level in ICT),
2. advanced proficiency (referred to in this study as an advanced level in ICT), and
3. anything in between (referred to in this study as an intermediate level of ICT) (p. 94).

The SAT covered cognitive and psychomotor skills that apply to domains such as classroom learning and other domains such as applications in sports and industry. As described in the SAT, the declarative knowledge (DK) is when students acquire knowledge about a particular ICT skill such as learning how to use digital tools available to them to get some information about a study topic. At this stage (novice level of ICT), students might or might not even have used it, but they have seen their teachers (in

school) or their parents or other adults at home or elsewhere demonstrate that particular skill similar to a professional instructor showing to someone how to make a dance move. The next stage of knowledge according to SAT, is when the learner starts acting on the acquired knowledge and turning the DK into procedural knowledge (PK) by trying to use that learned skill. At this stage (intermediate level of ICT), students start practicing ICT activities by following steps learned at DK and by repeating the practice session after session. The DK which was just knowledge about that particular ICT activity become a well-practiced ICT activity that students start gaining knowledge that makes them comfortable using that ICT skill. To use that same example mentioned earlier, the person who was observing the dance move performed by the professional dancer might feel comfortable trying some dance moves through multiple practice sessions. According to SAT, even when the learners acquire the PK, it might take them much practice to decrease the following parameter:

- the time necessary to execute a particular ICT task known as the "reaction time."
- the percentage of errors in doing the ICT task referred to as the "error rate," and
- the amount of attention required to execute the ICT task while managing interferences either with or from other ICT tasks known as “robustness” in performing the skill.

This ongoing practice at the intermediate level or PK stage as defined by SAT will gradually lead to automatization of the knowledge (AK). The AK is a stage in which

students reach the advanced ICT level where no reference to the skill observation knowledge acquired at the novice level is used by rather performing the task naturally with a great sense of robustness in performance, with a low error rate and low reaction time. Students at this level of ICT might focus more on the online course content and less on the ICT skills required to perform a particular assignments or task.

No wonder that most of the studies where ICT skills were accessed (Decman, 2015; Mohammadyari & Singh, 2015; Souza et al., 2016) found that most of the college students self-assessed themselves as a novice or intermediate and not as possessing advanced ICT skills. For instance, Mohammadyari and Singh (2015) who conducted a survey study using an adapted UTAUT model to study the influence of digital literacy on the intention of individuals to continue using e-learning found that the digital learning was a predictor of whether the people continue to use e-learning. Also, they found that those who consider themselves to have a high level of digital literacy might need less effort to use ICT. They might also have higher effort expectancy to use the ICT but end up not having more intention to use the ICT when they realized that their actual digital literacy is much lower than what they claimed it to be. In other words, an intermediate ICT level student might pretend to be at an advanced ICT level where in reality he or she is still at an intermediate ICT level as also found by Katz and Macklin (2007) and Chen et al. (2015).

ICT Skill Levels Acquired Before College

Based on the SAT, learning a skill such as ICT competencies, require at least three stages (Dekeyser, 1998, 2007) to materialize. During the early stage of ICT learning

process, the student acquires a factual knowledge about ICT such as learning about information and communication is accessed and disseminated using a computer system. At this stage, the student gains what Dekeyser defined as declarative knowledge (DK) or in familiar terms *novice* computer skills. The next step in ICT skill acquisition is student's engagement in the proceduralization of knowledge (PK) by engaging in an ICT related task while paying attention to how that task is performed while practicing that knowledge. At the PK stage, the student would rely heavily on the knowledge acquired at DK stage, which put the student at the level of *intermediate* computer skills. Once a student has gone through procedural knowledge of a particular ICT skill, he or she will advance to the stage called the automatizing of knowledge (AK) and start using the acquired knowledge without relying on the basic understanding acquired at the novice stage. At this peak level of education, where the student strengthens and fine-tunes the acquired procedural knowledge through practice, the student moves to the *advanced* computer skills level for that particular ICT task, and he or she will perform it automatically and without relying on previous knowledge.

ICT skill levels have been the subject of many studies that relied on data collected either through self-reporting surveys (Chen et al., 2015) or ICT assessment instruments such as the ICTC-Test introduced by Ahmad, Karim, Din, and Albakri (2013). Chen et al. (2015) conducted a survey study in which subjects from the United States and Mexico provided self-assessment in 13 areas of their computer competency categorized in three primary ICT levels: (a) basic ICT skills, (b) advanced ICT skills, and (c) multimedia skills and attitudes towards ICT. The results showed that most respondents felt

comfortable at the basic ICT skills level at an average score of 4.35 out of 5.0 and somewhat comfortable at the multimedia skills level and attitudes towards ICT. However, the subjects scored relatively lower at advanced computer skills level with only with an average rating of 3.03 out of 5.0. The advanced skills level in which most of the subjects scored lower relatively to the basic ICT level and the multimedia and attitude toward ICT, included Advanced ICT areas such as image processing, use of the database, technological platforms, and web 2.0 tools.

Other studies such as one by Katz and Macklin (2007) indicated that college students often consider themselves ICT literate as a result of their extensive daily use of the Internet. Their Internet usage contributes to their disinterest in gaining new ICT skills needed to effectively use search engines and research databases, skills that are often indispensable at the college. Also, using mobile technology such as the use of smartphones to interact with a friend on social networks might not be the same technology utilized in the classroom to complete an activity that requires ICT competency. Lau and Yuen (2014) introduced their empirically validated perceived ICT literacy scale (PICTLS) to assess information literacy (information), Internet literacy (communication), and computer literacy (technology). They found that the PICTLS showed the importance of a multidimensional view of ICT literacy and recommended that teachers approach ICT literacy from all those areas of literacies (information literacy, Internet literacy, and computer literacy), to determine how those ICT literacies interact in the learning process for their students. Furthermore, Lau and Yen (2014) found that the 826 students randomly surveyed from 36 secondary schools in Hong Kong were in a

sense autonomous and able to determine their learning goals and learning strategies while monitored by teachers and their peers. However, to ensure that the students have the necessary tools to work towards those goals, students should have already acquired those ICT skills, and they are at an ICT literacy level that enables them to do so. However, the minimum ICT skill level that deems to be adequate for those students to achieve those goals successfully in the online learning environment was not specified by the authors. In the absence of specific measurement instrument that can produce what ICT skill level the student is at, researchers of ICT literacy are relying on the primary ICT skill levels such as on what Dekeyser (2007) theorized the skill acquisition theory. The three stages of knowledge were: (a) declarative knowledge, (b) proceduralization of knowledge, and (c) automatizing of knowledge. In this study, we will be using the terms novice, intermediate and advanced ICT skill level as the ICT skill level acquired by those students as they report as part of their EET or early exposure to technology (of ICT to be specific).

Online Education and ICT Models

Online education, also referred to as distance education in most government reports (Lee, 2003; NCES, 2016; Snyder, de Brey, & Dillow, 2016). Online education is also described as any non-traditional delivery of instruction, and assessment where students and teachers use a digital Internet-based medium other than physical face-to-face teaching and learning (Rice, 2006). Similarly, Schlosser and Simonson (2015) defined it as a formal education provided by institutions through interactive telecommunication systems connecting ICT users (learners and instructors) and learning resources.

The online education sector has been steadily growing since its inception with the first 100% online course offered in 1981 (Harasim, 2000). Not surprisingly, educational institutions kept responding to the growing demand for online courses and programs by traditional and non-traditional students taking advantage of the online modality throughout the last 30 years (Brey, Mann, & Velez, 2016; Lingenfelter et al., 2012). However, the last decade marked a significant surge in online education offerings at the at post-secondary institutions. The number of students enrolled in online courses almost doubled from 2.8 million in 2000-2001 academic years to 5.5 million students by Fall 2013 according to the government report by the National Center for Education Statistics (NCES) of the U.S. Department of Education (NCES, 2004; NCES, 2016).

Many institution-based education models have been adopted at the postsecondary level because of students gaining access to the Internet at school, at home and elsewhere (e.g., work, coffee shops, libraries, and other places). The online models varied from:

(a) An entirely online program, in which 100% of the course is delivered through an LMS and no on-ground face-to-face contact is made between students and instructors.

(b) A blended format, where a percentage of the class is held on-ground in a face-to-face format, and the remaining proportion of the course content is delivered through some learning. Learning management systems (LMS) like Blackboard or eCollege LMSs.

(c) A hybrid model, in which students take some of the courses 100% on-ground in a face-to-face format and some courses 100% online though and LMS (Allen, Survey, & Seaman, 2015; Garrison & Kanuka, 2004; Porter, Graham, Spring, & Welch, 2014). While the *blended* format is the most common referred to when delivering online

asynchronous course content through an LMS in parallel to bringing together face-to-face teachers and learners, the *hybrid* is also used to describe this type of education delivery modality (Allen & Seaman, 2011; Lack, 2013).

Learning Management Systems (LMS) as Delivery Platforms

Learning management systems (LMS) also known under many different terms such as Course Management Systems (CMS) and Virtual Learning Environments (VLE) have been the primary vehicle for delivering and managing online learning or e-learning at educational institutions whether they are schools providing education before college or at colleges and universities around the world. Also, LMS are also used to deliver e-learning courses or training by businesses government and vocational learning institutions since the mid-nineties (Zaharias & Pappas, 2016). In a study conducted by Falvo and Johnson (2007), found that the most popular LMS used at colleges and universities in the United States was Blackboard. The second most used system was WebCT before Blackboard acquired WebCT in 2007. The combined company was then controlling about 51% of the LMS market. However, the LMS market continues to see more consolidation among the major LMS platforms providers and the emergence of newcomers and the disappearance of many smaller ones (Lokken & Mullins, 2014). Blackboard has been acquiring LMS platforms, which over-shadowed the learning management system market and somehow contributed to its stabilizations. For instance, Lokken and Mullins (2014) reported that between 2004 and 2012, 44% of instructional technology counsel (ITC) survey respondents indicated they wanted to switch their LMS platform compared to only 27% of the respondents in 2013 who wanted to do so. While

some LMS platforms such as Desire2Learn has not been losing market share from 15% in 2012 to 11% in 2013, others such as Moodle and Instructure Canvas have been gaining more market shares from 9% to 12.5% for Canvas and from 14% to 17% for Moodle between 2012 and 2013. However, the most notable gain in market shares for LMS platforms is Blackboard that has seen a significant uptick in market share for the same period going from 35% to 58% (p. 15).

However, the ongoing added technological features to the LMSs have been contributing factors to the increasing complexity of LMS platforms making them difficult to navigate and adapt to the teaching and learning needs. For instance, Zaharias and Pappas (2016) who studied the user experience in regards to LMSs platforms found that four factors representing user experience parameters of LMS to be (a) pragmatic quality, (b) motivation, and engagement, (c) authentic learning, and (d) autonomy and relatedness. The pragmatic quality of an LMS is related the usability of the LMS platform regarding its effectiveness, efficiency when users are completing a task, and usability satisfaction. Authentic learning attribute is the element that creates a reference to the real world. The autonomy and relatedness attributes are the elements that enable online learners to take charge of their learning by self-directing themselves in the learning process. The motivation and engagement characteristic of an LMS platform which seems to be the most important attribute according to the findings is what gives energy and direction to users' behavior to persist using the LMS to achieve specific learning goals (Zaharias & Pappas, 2016).

Based on the EDUCAUSE Center for Analysis and Research (ECAR) Study of Undergraduate Students and Information Technology survey, Dahlstrom and Bichsel (2014) found that although technology is ever-present in students' lives (at school, home and elsewhere), putting that technology to engage students is still work in progress. From the past student studies of the longitudinal data collected by ECAR, students still struggle in their complicated relationship with technology, and while they recognize its value, they seem to have a need for guidance using technology to engage academically in the learning process. The data from ECAR also show the underutilization of LMS as only 47% of all respondents said that LMS is part of their daily routine. While 58% of faculty reported using LMS to push out information to students (e.g., syllabi, course material, etc.), only 41% reported using it to create an interaction outside the classroom in the form of homework (Dahlstrom, Brooks, & Bichsel, 2014, p. 10). Data from ECAR also show that institutions lack behind in measuring LMS satisfaction with (39%) compared to their measurement of LMS usage that is about 68%. This lack of collection of valuable data on satisfaction with LMS indicates a significant missed opportunity for educators, university administrators and business managers to evaluate what needs to be improved in the existing LMSs and how to bridge the gap between learners, teachers and the platforms that are necessary to deliver and service learning and teaching. When authors asked students and teachers and asked IT leaders, the students and educators self-reported much lower satisfaction rate compared to IT leaders. When they examined satisfaction with LMS features, they found that the LMS satisfaction as self-reported by students and teachers was higher for basic features and lower when it comes to advanced LMS

features (Dahlstrom et al., 2014, p. 11). These findings are a clear indication that students' ICT skill level from experience might not rise to the advance ICT level but rather will likely be at novice or intermediate ICT skill level when starting at an online college where an LMS is a primary vehicle for delivery of the learning material.

Variables of the Reduced UTAUT Model (r-UTAUT)

As mentioned earlier in this chapter, I will by utilizing a reduced UTAUT model (r-UTAUT) that will include a subset of constructs adapted from the original UTAUT that are (a) performance expectancy (PE), (b) effort expectancy (EE), and, (c) use behavior (UB). Also, the PE and EE will be moderated by gender and age. Those adapted constructs and their moderating variables fit very well in the proposed *EET→r-UTAUT→Student Satisfaction* conceptual model as illustrated in Figure 2. The focus of this study is about the individual students and their individual exposure to ICT (EET) before college. Consequently, the integration of performance expectancy and effort expectancy that determine the ICT use behavior (through behavioral intention as shown in the UTAUT model) would serve this study by providing the connection between the students EET and their satisfaction with online education. The integration of a partial UTAUT model will provide the needed information about student's performance expectancy, a degree to which that student believes that using the ICT available in the learning management system (LMS) will help him or help her attain some level of performance. Likewise, this integration will provide information about the student's effort expectancy, which is the ease of use of the LMS as expected by the student when he or she was enrolled in the online program. The UTAUT as a complete model explained

about 70% of the variance in the user's intention of technology usage and technology acceptance (Venkatesh et al., 2003). This model was also tested in many studies (Oye, A.Iahad, & Ab.Rahim, 2014; Thomas, Singh, & Gaffar, 2013; Tosuntaş, Karadağ, & Orhan, 2015; Venkatesh & Zhang, 2010; Williams et al., 2011). However, other researchers who wanted to benefit from this well tested the unified theory of acceptance, and use of technology (UTAUT) model have used subsets for the constructs and moderating variables of the UTAUT model (Williams et al., 2011). Also, they adopted the UTAUT constructs to their studies to go along with their constructs (Decman, 2015; Mohammadyari & Singh, 2015). For instance, Williams et al. (2011) reviewed 450 empirical studies that cited the UTAUT and found that only 43 studies fully utilized the theory and its constructs. They also found that 16 empirical studies utilized the complete theory but used independent constructs of UTAUT as per the originating theory, and 12 empirical studies of the reviewed 450 studies, utilized partially the UTAUT where subsets of the constructs such as the effort expectancy and performance expectancy were used to support their conceptual models.

Students' Performance Expectancy (PE) in Online Education

Performance expectancy (PE) is the degree to which an individual believes that using the system will help him or her to attain gains in performance (Venkatesh, Morris, Davis, & Davis, 2003, p. 447). PE has a root construct in 'relative advantage' from Rogers' (1983) innovation diffusion theory (IDT), a theory that is part of the UTAUT. The relative advantage, which is one of the characteristics of the innovation element of IDT, is measured by satisfaction. Such a connection might inform on the student

satisfaction with ICT in online education and can be tested through the performance expectancy (PE) construct of the UTAUT since PE is rooted in the relative advantage construct from IDT. In an empirical study that assessed and evaluated the appropriateness of UTAUT within a particular e-learning environment in a higher education setting, (Decman, 2015) found the performance expectancy to be to most important construct along with social influence on the intention to use to technology. The results of the study also indicated young students, in particular, are ready to use technology if they expect their performance will be increased by using the new system. Similar findings were reported by Chiu and Wang (2008), who studied the success of web-based learning and how it depends on learner loyalty and continuous usage of ICT and found that performance expectancy and effort expectancy to be reliable predictors of student intention to use of technology. In another study conducted in China, (Gu et al., 2013) found that the use of technology among students and teachers depends on how they perceive technology to be (hence, ICT performance expectancy).

Venkatesh et al., (2003) formulated UTAUT by consolidating constructs and moderating variables from eight theories related to technology acceptance and technology use:

- TRA,
- TAM,
- MM,
- TPB,
- C-TAM-TPB,

- MPCU,
- IDT, and
- SCT.

They defined the performance expectancy out of five constructs consolidated from previous models that revolve around the individual believe that using a system such as an LMS platform in an online education setting, will help him or her to attain gains in performance such as making substantial progress in an online class. The five constructs were: (a) perceived usefulness (TAM, TAM2 and C-TAM-TPB), (b) extrinsic motivation (MM), (c) job-fit (MPCU), (d) the relative advantage (IDT) and, (e) outcome expectancy (SCT). Those constructs have many similarities regarding enabling the individual to perform better at a task just by using the system. Each construct within each model is a strong predictor of intention and use of technology in both voluntary uses of technology such as self-paced learning environment and mandatory use of technology setting such where the use of ICT is required to complete assignment and assessment in an LMS for example. As expected in the formulation of the UTAUT, Venkatesh et al. (2003) found that performance expectancy was moderated by gender and age and their results suggested that the effect on intention to use technology was more salient to younger individuals and particularly more with men than women. However, the authors indicated that previous studies demonstrated the gender effect is role-related rather than related to a biological aspect. They argued that women, for example, take on more responsibilities as they get older picking up tasks related to raising children and managing their household affairs leaving them with insufficient time to get exposed to ICT at home or elsewhere. In

comparison, younger women sometimes self-reported better engagement in more learning activities using ICT at home than men self-reported (Lau & Yuen, 2014; Tsai & Tsai, 2010).

Students' Effort Expectancy (EE) in Online Education

Effort expectancy (EE) is the degree of ease of use of the system (Venkatesh et al., 2003, p. 450). Based on the UTAUT findings, age, and gender as moderators to effort expectancy were salient especially for women and more for older women. The results also suggest that the effort expectancy was more significant among individuals with limited exposure to technology and that the effect decreases as the individual gain more experience. The effort expectancy, which draws from perceived ease of use (TAM and TAM2), complexity (MPCU) and ease of use (IDT), seems to be significant for technology usage but only during the first time that individual uses a system such as an LMS in the online education. After that, it becomes nonsignificant over time especially after a substantial usage of the system as the case would be for a student who will be using the LMS in their second year after an extensive use of the LMS during the student's freshman year at an online college. That is why it is important to test the relationship of EET on effort expectancy during the freshman at the online college to determine if effort expectancy that in turn determines the ICT use behavior has any effect on satisfaction with online education. While the effort expectancy seems salient to women than men, other studies such the one conducted by Lau and Yuen (2014) in Hong Kong found that female students perceived that they are more computer and the Internet literate than their male counterparts. The authors suggested that the female students' perception is due to

their engagement in more learning activities using ICT at home than did male students. Tsai and Tsai (2010) reported similar finding in their study conducted in Taiwan where their results show that the efficacy of online communication reported by female students was higher than their male counterparts. Perhaps the effort expectancy, which draws from previous exposure to technology is not moderated by gender all the time, and maybe it is tied to the time available to each gender to use ICT at school, at home and elsewhere. Mohammadyari and Singh (2015) in their study of digital literacy on the intention of individuals to continue using e-learning and their performance found that self-efficacy significantly affects effort expectancy. They suggested that digital literacy, which is part of the existing knowledge affects perceived ease of use (a construct in from TAM, TAM2, and IDT that the EE was drawn from) of technology (Lippert & Forman, 2005). The perceived ease of use may also enable students to manipulate and access an LMS easily compared to those students with insufficient ICT knowledge (or EET) who may only receive limited benefits because of their lack of content type knowledge they need to acquire to achieve performance improvement.

ICT Use Behavior (UB) in Online Education

Use behavior (UB), which is the definitive dependent variable in the UTAUT model, and it is strongly influenced by behavioral intention which is directly influenced by PE and EE (Venkatesh et al., 2003). However, in this study, student satisfaction with online education is the definitive dependent variable. In this study, the UTAUT has been significantly modified to bypass the behavior intention construct (BI) shown in the original UTAUT model, in which PE and EE among other constructs determine BI and

that in turn, the BI is a direct determinant of UB. Similarly, other studies have modified the UTAUT model to benefit from the robustness of the UTAUT model even in instances where the design has been completely changed (Decman, 2015; Mohammadyari & Singh, 2015; Wu, Tao, & Yang, 2007). Perhaps a good example of how PE and EE relationship with UB can be measured without going through the IB construct (as shown in the original UTAUT model) is the study of use behavior of 3G mobile telecommunication services in Taiwan conducted by Wu et al. (2007). The authors introduced a modified UTAUT model showing that the non-assumed relationships from performance expectancy and effort expectancy to significantly and directly influence the use behavior of the 3G mobile telecommunication services for individuals.

Since the proposed r-UTAUT model that I am introducing in this study includes a direct relationship between PE and UB and between EE and UB, I am also suggesting that gender and age would be moderating variables for those connections (as shown in Figure 1). The empirical findings from the UTAUT model indicate that the gender role has a profound impact on the intention-behavior when using technology. However, they suggested that gender role is tied to gender responsibilities rather than tied to biological gender aspects (Venkatesh et al., 2003, p. 469). In other words, the gender responsibilities change over time by age where individuals pick up more chores and tasks diminishing their time availability that they would have used otherwise to interact with ICT at home and elsewhere.

In their study about the utilization of an LMS, Raman and Don (2013) reported a similar finding by other researchers who investigated the application of the UTAUT

model in the higher education setting when LMS is utilized. Their findings confirmed the performance expectancy and effort expectancy influence on behavioral intention to use the LMS, which in turn predicts the LMS usage behavior. Students' retention is the major focus in online education. The goal to enable students to complete their academic programs and ultimately earn the degree or diploma in the field of their studies (Bawa, 2016; Calli et al., 2013; Ice, 2012; James, Swan, & Daston, 2016; Levy, 2007). Equally important is the student satisfaction which is a key factor in the continuous use of ICT available in LMS. For instance, Calli et al. (2013) who investigated the effects of several variables on the learning processes of 930 students enrolled in an online learning program, found that satisfaction was significantly affected by perceived ease of use, a construct that precedes the effort expectancy (EE). The presence of ICT determines the use behavior (UB) in the context of this study.

Satisfaction and Retention

All academic institutions seek the student satisfaction. It is one of the key metrics that measure whether an educational program is producing what it was supposed to (James et al., 2016), as often student satisfaction leads to higher student retention and leads to the intended learning outcomes (Calli et al., 2013). However, it seems that most of the time student satisfaction is measured at the end of the course through satisfaction survey using the Likert scale from highly satisfied to highly dissatisfied (Carbone, Wong, & Ceddia, 2011). In many studies, researchers reported a positive correlation between computer skills and student satisfaction. Contrary to those findings, Abdous and Yen (2010) who studied self-perceived learner-to-teacher interaction, self-rated computer

skill, prior distance learning experience, and learners' satisfaction and outcomes in three delivery modes found that computer skills correlate negatively with student satisfaction. These findings seem to be strange and perhaps the fact that the students were either enrolled in face-to-face, satellite broadcasting and live video-streaming. Theses delivery models do not mimic the current online delivery model that the utilize an LMS similar to Blackboard where the students use their ICT skills as opposed to skills required to achieve learning outcome on those three delivery models.

Student satisfaction is also referred to as good user experience when students interact with ICT on LMS in an education setting (Goyal & Purohit, 2011; Liaw et al., 2007; Zaharias & Pappas, 2016). While the satisfaction with online education goes beyond the user experience with ICT on an LMS in an online class, for example, Zaharias and Pappas (2016) surveyed 446 professionals, and they found that nearly 50% of respondents indicated that user experience issues were the primary reasons they sought to change their existing LMS. Likewise, Liaw et al. (2007) found that students who show good experience in ICT related skills such as computer skills, Internet skills, and computer applications skills (e.g., Microsoft Word, Excel, and PowerPoint) have positive attitudes toward an LMS environments in a learning setting. It seems that ICT skills need to match the ICT available in the LMS of online class to provide the students with a good user experience, which result in better student satisfaction. In fact, Goyal and Purohit (2011) studied the students' perception of expectations and satisfaction with the use of ICT with and without an LMS usage and found that satisfaction with ICT was significantly higher after using a well-defined LMS. This delivery model probably mimic

what students use in their daily interaction with ICT (e.g., blogs, wiki, and discussion board threads, etc.). Perhaps, those results are an indication that administrators from online colleges need not only to make a good selection of which LMS platforms they are selecting for their students but also to assess their new students regarding ICT skill levels. Furthermore, they need to find out what kind of ICT exposure they had before enrolling in online college to keep them satisfied and ultimately turn them into continuing students. This analogy seems to be supported by findings in a study conducted by Li, Marsh, Rienties, and Whitelock (2016) where they found that learning experience and satisfaction is substantially different for new students compared to continuing students.

The postsecondary education institutions have always been tracking students retention, considering it one of the leading metrics by which they measure their performance (Ice, 2012). While all modalities of education delivery at the postsecondary education institutions are suffering from attrition, Bawa (2016) reported that schools with students taking online classes recorded a retention rate of up to 20% lower than those of that have taken traditional on-ground classes (p. 1). However, this retention trend is not consistent with the findings by James, Swan, and Daston (2016) who analyzed the data from several postsecondary institutions (i.e., including community colleges, on-ground universities, and online universities). The authors reported that while the retention was lower for those who took only online classes while they were enrolled in an on-ground program at community colleges than those who did not, they found no difference in retention rates between different modalities of delivery at on-ground universities. However, at online institutions, students in blended courses had better odds of retention

than their counterparts at those schools who were either online only or on-ground only (James et al., 2016). These mixed findings possibly indicate that there is insufficient understanding of the reasons and processes behind students' withdrawals from online courses and programs.

As the retention at postsecondary education institutions continues to be vital to the survival of those institutions and for those offering online classes and programs, in particular, the focus of research has shifted to the causes that make those online students drop from their programs or continue into their programs and eventually graduate. Weber and Farmer (2012) found that satisfaction with online delivery had a causal effect on student's withdrawing from online classes and argued that computer literacy is one of the skill sets required for students to succeed in online classes. If the ICT literacy is a major factor in the creating the motivation and eventually leading to student satisfaction with online education, then the question becomes: what level, depth and breadth of knowledge make the student coming into online program sufficiently ICT literate? Bawa (2016) found that institutions offering online classes often assumed that if the student enrolling in online classes claims that he or she is tech-savvy and uses mobile and social media, he or she is a good fit for online classes. However, Clark-Ibáñez and Scott (2008) from California State University disagree with this assumption based on their years of experience in the field of online education.

It seems that postsecondary institutions offering online programs and classes are not doing enough regarding managing the prospective students' readiness for their online programs or classes (Machado-Da-Silva et al., 2014). Those facts are somewhat

surprising as there are relevant research findings that could offer useful remedies. For instance, Bradford (2011) found a significant correlation between student satisfaction and the cognitive load in their educational program. The cognitive load is defined by Mayer (2005) as the information imposed on the working memory for processing at a given time. Such pressure in a multimedia environment, coupled with a low level of ICT literacy might produce a cognitive overload on the working memory for the online learner and would lead to an adverse effect on the student satisfaction (Clark, 1999).

Summary and Conclusions

In Chapter 2, I presented the theoretical framework set to guide the topic of the study and to predict the constructs and the variables introduced in this study. I also gave an in-depth literature reverie related to the research problem and purpose. The goal of this study was to conduct an empirical study and analysis of (a) exposure to any ICT in institution-based education before college, (b) the nature and attributes of ICT used in online education, and (c) the role and determinants of satisfaction with ICT in online education. I conducted a thorough search on the Google Scholar website to broaden my search, looking for articles and books published within the last 5 years. I also gathered literature that was older than 5 years but still relevant to the topic of this study, but the focus was always on the most recent research because this is a fast-growing field and it evolves from year-to-year.

The theoretical framework I used in this study was very instrumental and of invaluable guidance to the specific elements where the work of theories and scholars who incorporated their theories and models within their own theories pointed me in the

appropriate direction and provided me the scholarly approach to investigate the constructs and variables related to my study. First of all, the valuable unified theory of acceptance and use of technology (UTAUT) of Venkatesh et al. (2003) provided me with the based model investigate the nature and attributes of ICT used in online education. Also, UTAUT provided me with how I might explain how exposure to any ICT in institution-based education prior to college would play a role and probably determines the student satisfaction with ICT in online education. On the other hand, work of Dekeyser (2007) through the skills acquisition theory (SAT), was instrumental in supporting the claim that EET is rooted in the skill acquisition theory (SAT). The SAT theory includes the three levels of acquired skills: (a) declarative knowledge (DK), (b) proceduralization of knowledge (PK), and (c) automatizing of knowledge that I am suggesting will determine the level at which the student is in terms of ICT skill or any ICT particular competency as a result of exposure. This theoretical framework, helped me design a conceptual model (*EET→r-UTAUT→Student Satisfaction)*. As a result, a reduced UTAUT model (r-UTAUT) including a subset of constructs adapted from the original UTAUT (a) performance expectancy (PE), (b) effort expectancy (EE), and (c) use behavior (UB) will be utilized. The conceptual model then shows how EET is hypothesized to determine PE and EE, which in turn will determine UB then UB is then hypothesized to determine the student satisfaction with ICT in online education.

A comprehensive literature review was presented showing the work of scholars related to the topic of this study. The prior studies indicated the education trends in the United States and demonstrated how those trends evolved between 1940 and 2015. U.S.

Census Bureau has been collecting data about computer usage since 1984 and collecting data about Internet usage since 1997. The data collection reports from U.S. Census Bureau were reviewed and presented to give an insight about how computer usage and Internet usage might have affected EET for students before college. A comprehensive literature review was presented including:

- types of multimedia technology used in classrooms,
- student's exposure to ICT before college,
- ICT skill levels acquired before college
- Online education and ICT models (e) learning management systems (LMS) as delivery platforms.

Also, variables of the reduced UTAUT model (r-UTAUT) that are (a) performance expectancy (PE), (b) effort expectancy (EE), and (c) use behavior (UB) were reviewed in the context of the online setting. Finally, a comprehensive review of literature related to satisfaction and retention in online education was presented.

A gap in the literature still exists when considering that most of the literature reviewed concentrated on the overall user acceptance and use of technology considering facilitation techniques or models of satisfaction with the LMS platforms. However, none of the researchers investigated the role early exposure to ICT before college and its probable effect on the student satisfaction with online education that is a strong determinant of student's retention (a key metric for the success of online education programs and successful implementation of the online model at colleges and universities).

The literature review included references to many existing models in the online education arena (full online course delivery model, blended and hybrid model) and addressed the concerns raised by academic administrators and managers who make academic and operational decisions about online education programs and platforms required to deliver them. Chapter 3 includes the methodology and data sources for the quantitative nonexperimental study to conduct the study and to address the effect of early exposure to ICT on student satisfaction with online education.

Chapter 3: Research Method

The purpose of this quantitative nonexperimental study was to examine the relationship between students' EET before college and their satisfaction with online education in college. Early exposure to ICT in school years before college includes all forms of computer usage (in-school, at home, or elsewhere) that is related to instructional technology or that is meant to further the students' understanding of a concept using available online resources (Wang, Kinzie, McGuire, & Pan, 2010). Student satisfaction in this study was measured only for those students who completed at least one course within their first semester or quarter at college. I explored these variables and their relationships in order to provide valuable information to policy makers and stakeholders of institution-based schools so that they may work together to increase student satisfaction and improve technology acceptance in the ever-changing educational environment. Findings from this study may also encourage leaders of online colleges to become proactive in ensuring that all freshman students enrolling in online courses are ready for online learning.

The sections of Chapter 3 include a description of the research approach and the data collection process that was based on the quantitative research nonexperimental methodology. In the first section, the research design and rationale are described followed by the methodology section in which the following topics are discussed:

- the target population,
- the sampling strategy and sampling procedures,
- the procedures for recruitment of participants and the data collection plan for the primary study and the pilot study, and

- the research instrument and operationalization of constructs.

In the third major section, I describe the data analysis plan. This content is followed by a section where threats to validity and my ethical approach are discussed. The chapter concludes with a summary of key points.

Research Design and Rationale

The research design was a quantitative nonexperimental study. I used surveys to collect data in order to answer the research questions and test the hypotheses. My plan was to examine the relationship between early exposure to ICT and subsequent student satisfaction with online education among students taking online classes. More specifically, EET during the years before college was examined as an independent variable to determine the effect of ICT level (novice, intermediate or advanced) on student satisfaction. I set EET as an independent variable for the following dependent variables:PE, EE, and UB. UB, in turn, was tested to predict a higher or a lower satisfaction with online education at the college. In this approach, the survey design seemed well fit for this study, as many variables were needed to determine whether EET as reported by students had any effect on their satisfaction with online education within an ICT environment.

The central research question being an inquiry about the students' past exposure to ICT and its possible effect on the student satisfaction with online education. For this type of inquiry, it was not possible for me to conduct the study in a different design. My reason for selecting a quantitative nonexperimental study was based on my plan to examine whether the students' PE and EE were shaped by the students' EET and, then, in

turn, affected the students' decision to use ICT, which I expected to affect student satisfaction. Similar studies used this quantitative approach to measuring student satisfaction based on perceived expectation, EE, and UB (Avci & Askar, 2012; Chan et al., 2010; Ong, Day, & Hsu, 2009; Thomas et al., 2013).

The reliability of the EET variable might have been reduced or challenged due to recall issues. The variable was intended to measure events that occurred a long time ago (e.g., when the responding students are asked about their early exposure to ICT). Regarding the remaining variables of the model used in the study, such as PE, EE, UB and satisfaction, the design choice was consistent with the research plans needed to advance knowledge in the field of management of information systems. The design choice aligned with similar studies whose authors have used UTAUT as a theoretical framework. In reviewing the literature, I found that investigators used a quantitative survey approach to better understand the participant's acceptance and use of technology instead of using a qualitative or mixed method (see Chan et al., 2010; Decman, 2015; Mohammadyari & Singh, 2015; Thomas, Singh, & Gaffar, 2013). Although a quantitative survey approach was widely used in these types of studies, a qualitative approach integrating the UTAUT as a theoretical framework was also used in some studies (Van Biljon & Renaud, 2008). In reviewing more than 450 studies in which the original UTAUT article (Venkatesh et al., 2003) was cited, Williams, Rana, Dwivedi and Lal (2011) found that a qualitative approach was used in only 16 studies, however. The authors attributed the use of qualitative instead of a quantitative approach to the

perception that the sample size being too small to perform a quantitative analysis that meets the purpose of their studies (Williams et al., 2011).

Methodology

The research methodology section includes the population that was studied and the tests that were conducted to determine the number of participants needed to achieve statistical significance for data analysis in this study. In subsequent sections, I describe the procedures used to recruit participants and the demographic information that were collected. I also discuss why I needed to conduct a pilot study to gather feedback about the questions in the survey instrument. I also provide information on my research methodology including a detailed description of the survey instrument and the operationalization of variables and constructs.

Population

According to the U.S. Department of Education (2014), the number of students enrolled exclusively in distance education courses in the United States at the undergraduate degree/certificate-seeking in Fall 2012 was 1,807,860. The enrollment increased to 2.1 million for the same category in Fall 2014 (Grace et al., 2016). If one-fourth represents the population of freshmen students, the population targeted by this study would have been around 525,000 students.

However, the resources needed to carry out such a study with a random sample as discussed above were beyond the resources that were available for conducting a dissertation research. The plan chosen was a convenience sample in which I studied the population of students from U.S. online universities using Survey Monkey Audience

(SurveyMonkey.com, n.d.), and from an WUO using its school participant pool. The participant pool at WUO is an online bulletin board where researchers can post their studies on the site so that interested participants can see if there are any studies in which they would like to participate (WUO, n.d.). An a priori power analysis was conducted with G*Power 3.0.10 software (Mayr, Erdfelder, Buchner, & Faul, 2007) to compute the required sample size for F tests - multiple regression. The a priori test was completed using the following parameters: Effect size $f^2 = 0.10$, α err prob = 0.05, power (1-β err prob) = 0.80 and number of predictors = 4. The software returned a required sample size of 81 with an actual power of 0.802325. While the expectations were that a simple size of 81 students might have been reached using the WUO participants pool, a contingency plan was put as an alternative solution to use Survey Monkey Audience. While the plan was to use another accredited U.S. online university (BCO) to conduct a pilot study with the goal to test the survey instrument for reliability and then use WUO for the main study survey, the plan ended up using the participant pool from WUO for the pilot study and the Survey Monkey Audience for main study survey. As the data were to be collected using surveys only, it was important to do reliability testing on the survey instrument and to conduct an extensive analysis to report on how data were collected for this study.

Many similarities exist between students attending most of the U.S. online colleges and universities (U.S. Department of Education, 2014) regarding demographic data and characteristics. For instance, the 2015 annual report about the total number of the undergraduate student population and their demographics (WUO, 2015) shows the

university enrolled 8,187 students from which 76.9% were female, and 23.1% were male ethnically distributed as shown in Table 1.

Similarly, BCO reported that the population of undergraduate students in the academic year of 2013/2014 was 33, 082 (Heaton & Katrinic, 2014) of which 10,434 males and 22,648 females where freshman students count was 6,803 out of the total number of undergraduate students. The numbers of freshman students by gender were 2,177 males (32%) and 4,626 females (68%).

Table 1

Demographic Comparison of Undergraduate Students in Online Degree Programs at WUO, BCO, and U.S. Universities

Demographic categories	U.S. universities (2012-2013)	WUO (2015)	BCO (2013-2014)
Gender			
Male	38.89%	23.1%	32%
Female	61.11%	76.9%	68%
Race/Ethnicity			
White	18.28%*	41.2%*	Missing
Black	24.46%	31.9%	Missing
Hispanic	11.56%	13.4%	Missing
Asian/Pacific Islander	16.13%	1.8%	Missing
Others	29.56%*	12.1%*	Missing
Age groups			
23 or younger	13.22%	12%	Missing
24-29	33.06%	20.3%	Missing
30 or older	53.72%	67.7%	Missing

Note. Data for the table were obtained from NCES (2014).
*The double-digit difference is probably due to how students self-reported their race/ethnicity between the categories of White and Others.

Sampling and Sampling Procedures

The sampling strategy was to select a sample of the available online students with the goal to generalize the results to the population targeted in this study. The sample frame included the college students who completed at least one course online within their first semester or quarter at WUO or at any other U.S. university or college. The sources used to calculate the sample size was a relevant subset of the population of students at online universities across the United States and that the sample size was relevant to independent variables especially EET.

Similarly, a convenience sample with sufficient participants from WUO was selected before the primary study to conduct the pilot study with the goal to test for survey instrument reliability. Once the data was collected and analyzed, the plan was that an adjustment or revision to be made to the subset of the survey to bring more validity to the developed survey instrument. However, no need for adjustment was necessary.

While the convenience sample is generaly the weakest because of the lack of representativeness (De Vaus, 2002), the plan was to select a reasonable sample size that would reflect a similar distribution of gender and age seen in the main reports that studies online population in the U.S. universities. For instance, demographic data are shown in Table 1 illustrate lot similarities between data reported by WUO, BCO and the data of U.S. Universities as indicated by the National Center for Education Statistics (Snyder, de Brey, & Dillow, 2016, p. 485) see Table 1 for more details.

Procedures for Recruitment, Participation, and Data Collection (Primary Data)

The process for the recruitment of students was to follow the traditional procedures for similar studies. The plan was to contact the participant pool at WUO after obtaining the Walden University Institutional Review Board (IRB) permission to collect data, and post the pilot followed by the main study for students who are enrolled in online classes during the quarter or the semester. There was no need to collect names as the surveys were completely anonymous. Once I obtained the permission to use the participant pool at WUO, I posted a letter of consent with survey link on the participant pool at WUO.

For the primary study, I followed similar recruitment procedures after obtaining IRB permission. However, the plan for the main study changed, and Survey Monkey Audience was used to survey students. Since Survey Monkey comes with a set of functions such as (a) electronic presentation of questions, (b) automated reminders, and (c) the ability to export collected responses in the International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) format (SurveyMonkey.com, n.d.) that seemed to be an optimal choice for the main study survey. Once the data were collected, they were uploaded to the IBM SPSS application to conduct the statistical analysis.

Pilot Study

The pilot study was intended for testing the survey instrument for internal validity before conducting the main study. The pilot study was conducted as a pre-test a sub-set of the 39 questions developed for the survey questionnaire (Appendix A) related to EET construct (questions 3-23 in Part 2). In order to conduct the pilot study, approval from the

IRB was acquired. A reasonable sample of convenience from the population of online students available in participant pool at WUO was needed to take the pilot study survey. As stated in the population section, WUO students' population has similar characteristics as the population of online students from Survey Monkey Audience who participated in the main study. As the estimated sample size for this study was in the range of 132 and 81 students with a power of 0.80 to 0.60, 10% would range from 13 to 8 students. The plan was to set the pilot sample size to 10 drawn from available online students from participant pool at WUO. The 20 questions (Part 2) related to EET construct will be split into two sets of questionnaires using the split-half method creating 10 questions with the odd numbers and 10 questions with the even numbers to achieve a higher level of reliability measure. Once the two sets were administered, the plan was that the results were to be correlated with the correlation coefficient for reliability. The detailed pilot study plan was as follows:

1. Acquire the IRB approval to conduct the pilot study,
2. review of the 20 questions (3-22 from Part 2 of the primary survey),
3. split the 20 questions using split-half method into two sets of questionnaires (questions with odd numbers in one set and the questions with even numbers in the other set),
4. upload the two sets of surveys into Survey Monkey website,
5. send an invitation to take the survey to the available BCO online students,
6. collect the survey results and correlate them using the correlation coefficient to determine the reliability, and

7. apply any changes to the primary instrument based on the pilot study findings.

Instrumentation and Operationalization of Constructs

EET-S model. My EET-satisfaction conceptual model (EET-S) included UTAUT model and constructs of the skill acquisition theory. Table 2 shows relationships between the various variables listed in the proposed model along with the constructs, research questions, and hypotheses.

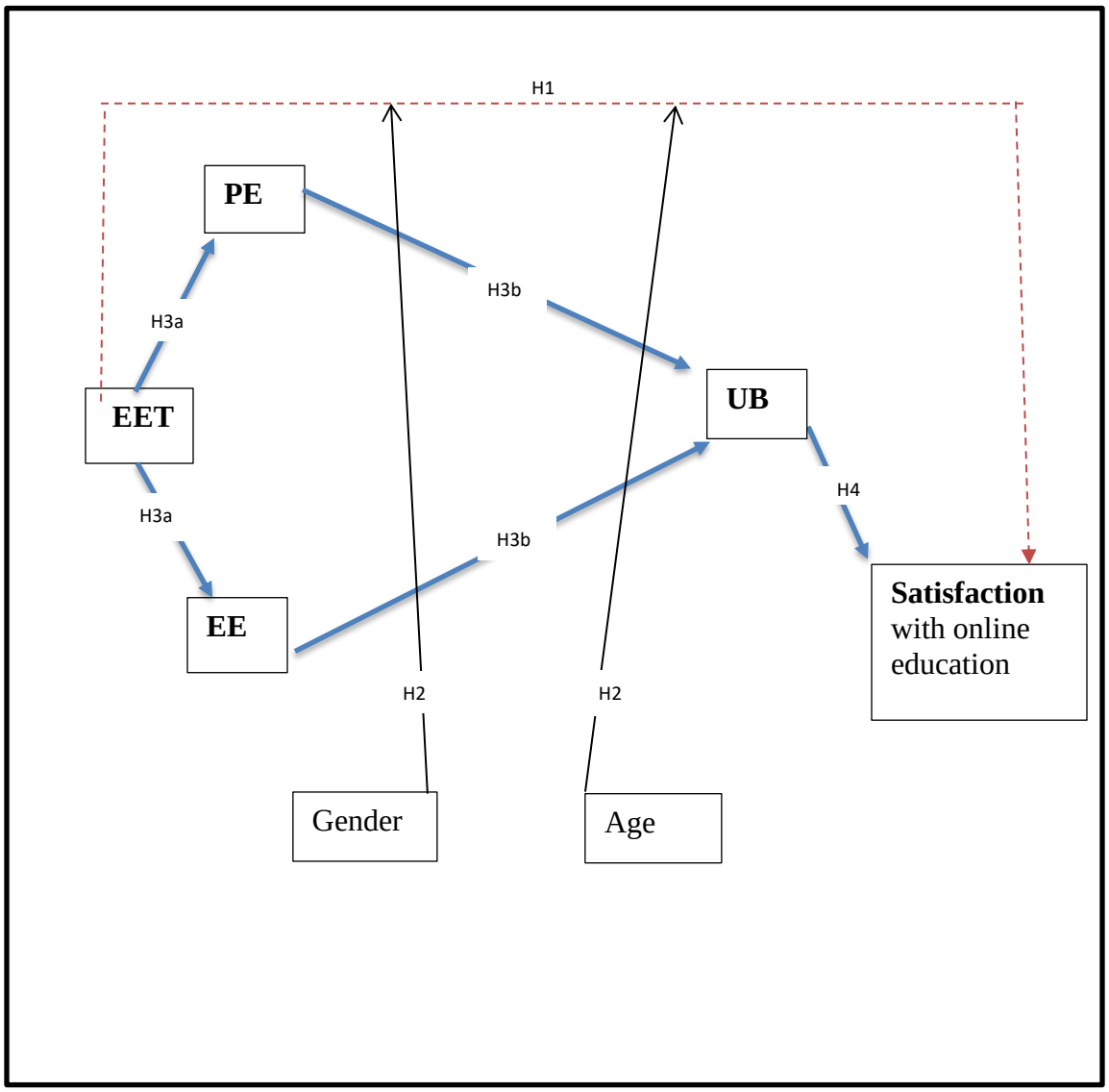

Figure 3. EET-satisfaction conceptual model (EET-S) with hypotheses.

Table 2

Relationships Between the Research Questions, Hypotheses, and Variables

Variable	Related to IV or DV	Related to RQ	Related to hypothesis	Independent or dependent variable
Early exposure to technology (EET)	PE and EE	1, 3	H1, H3a	IV
Performance expectancy (PE)	UB	3	H3b	DV and IV
Effort expectancy (EE)	UB	3	H3b	DV and IV
Use behavior (UB)	S	4	H4	DV and IV
Satisfaction (S) with online education	NA	4	H4	DV
Gender	Moderating variable	2	H2	IV
Age	Moderating variable	2	H2	IV

Survey instrument. The survey instrument was a valuable tool to conduct this study, and as the data was collected using surveys only, the reliability of the variables' measures is critical. Consequently, the section of a reliable survey instrument that is well-established and well-tested for reliability such as the Questionnaire of User Interface Satisfaction (QUIS) that measures user satisfaction with the human-computer interface (Chin et al., 1988) is critical. However, the absence of such an existing and well-established survey like QUIS to test 10 hypotheses, warranted the development of my survey instrument *Early Exposure to ICT and Satisfaction Survey* (EEICTSS; see Appendix A). Most of the questions for my survey were pulled from the following existing instruments and modified to fit the objectives of this study:

1. Questions 3-23 were formulated based on the guidance on ICT skills assessment provided by the iSkill assessment content website (Educational Testing Service, 2016),
2. Questions 24-33 from the modified UTAUT instrument (Mohammadyari & Singh, 2015; see Appendix B), and
3. Questions 34-39 from the Student Satisfaction and Learning Outcomes instrument (Eom et al., 2006; see Appendix C).

The EEICTSS has four parts:

- Part 1 of the survey is related to student demographic data,
- Part 2 of the survey is related to students' early exposure to ICT (see Table 4),
- Part 3 of the survey is related to students' expectations and their willingness to continue using the ICT in online classes, and
- Part 4 of the survey is related to student satisfaction with online education and use of ICT in an online environment.

The survey instrument consisted of four parts and included 39 questions (see Table 3) of which most of the questions are 5-point Likert scale items (Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree). Part 1 of the survey questions collected students' demographic data of age and gender. Part 2 of the survey collected the data about the students' ICT level in the range between novice, intermediate and advanced, and the environment in which the student had the exposure to ICT throughout the years before college. In Part 3 of the survey, data were collected on

- the student's PE as the degree to which the students believe that using ICT in online education environment will help them to attain gains in performance;
- the student's EE which is the degree of ease of use of the ICT in an online education environment;
- the student usage of ICT in an online education environment. Lastly, part four of the survey addresses student satisfaction with ICT in the online education environment.

I developed the survey from multiple sources to assess EET for students as this construct encompasses student exposure to ICT in various environmental contexts and over many years before college. Specifically, survey questions for EET were formulated based on guidance from the iSkills Assessment Content published on ETS website (Educational Testing Service, 2016). The iSkills assessment was developed by ETS, a not-for-profit organization comprised of education experts, researchers and assessment developers. The iSkills assessment was previously named ICT literacy assessment (Ahmad et al., 2013) that has been widely used in secondary and post-secondary institutions and later renamed iCritical Thinking (Covello, 2010; Pinto, 2010). The iSkills measures a variety of ICT literacy skills related to students' ability to define, access, evaluate, manage, integrate, create and communicate in a digital environment (see Table 3) and has been field tested for several years. Katz and Wynne (2012) who are respectively the ETS Senior Research Scientist, and ETS Higher Education Assessment Specialist, provided a well detailed presentation on what the iSkills assessment is, also some definitions about the components of ICT literacy that I summarized in Table 3.

Table 3

Components of ICT Literacy

Proficiency	Definition
Define	Using digital tools to identify and represent an information need
Access	Collecting and retrieving information in digital environments
Manage	Using digital tools to apply an existing organizational or classification scheme for information
Integrate	Interpreting and representing information, such as by using digital tools to synthesize, summarize, compare, and contrast information from multiple sources
Evaluate	Judging the degree to which digital information satisfies the needs of an information problem, including determining authority, bias, and timeliness of materials
Create	Adapting, applying, designing, or constructing information in digital environments
Communicate	Disseminating information relevant to a particular audience in an effective digital format

Note. The definitions of the ICT literacy components were summarized from presentation on "What the is iSkills assessment" webinar by Katz and Wynne (2012).

Technology topics covered by the iSkills assessment are related to the major areas of the ICT found in online education environment (Educational Testing Service, 2016). Those ICT areas include:

1. Web Use: Email, instant messaging, bulletin board postings, browser use, and search engines
2. Database Management: Data searches and file management
3. Software: Word processing, spreadsheet, presentations, and graphics

Table 4

Relationships of the Survey Questions, Research Questions, and Hypotheses

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
Part 1: Demographic data				
1. What is your age group? (groups provided)	Age	2	H2	MV
2. What is your gender? (male or female)	Gender	2	H2	MV
Part 2: EET levels and environment				
3. What is your college status? (Freshman, Sophomore, Junior or Senior)	EET	1 and 3	H1 & H3a	IV
4. I have had extensive access to a computer at home, prior to college.	EET	1 and 3	H1 & H3a	IV
5. I have had extensive access to a computer at school, before college.	EET	1 and 3	H1 & H3a	IV
6. I have had extensive access to a computer at other places other than home and school, before college.	EET	1 and 3	H1 & H3a	IV
7. At what age were you comfortable using computer technology	EET	1 and 3	H1 & H3a	IV

(*table continues*)

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
(such as email, word processing, spreadsheets) for academic use throughout the years prior to college?				
8. How often you used to access a computer to carry out an ICT task during the years before college? (daily, few times a week, once a week, rarely)	EET	1 and 3	H1 & H3a	IV
9. I can define the necessary steps to conduct effective preliminary information searches to help formulate a research statement.	EET	1 and 3	H1 & H3a	IV
10. I can generate and combine search terms (keywords) to satisfy the requirements of a research task on the Internet.	EET	1 and 3	H1 & H3a	IV
11. I can efficiently browse one or more resources to locate the needed information to carry out an ICT task.	EET	1 and 3	H1 & H3a	IV
12. I can easily determine what types of resources might yield the most useful information for an Internet search need.	EET	1 and 3	H1 & H3a	IV

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
13. I can easily determine the extent of which a collection of resources sufficiently covers a research area.	EET	1 and 3	H1 & H3a	IV
14. I know how to categorize emails into appropriate folders based on the email content.	EET	1 and 3	H1 & H3a	IV
15. I know how to organize and sort files, emails in folders of related information.	EET	1 and 3	H1 & H3a	IV
16. I know how to upload, download and attached files to an email or an online discussion board or an assignment.	EET	1 and 3	H1 & H3a	IV
17. I know how to interpret and represent information using digital tools to synthesize, summarize, compare and contrast information from multiple sources.	EET	1 and 3	H1 & H3a	IV
18. I know how to incorporate information from different sources to conduct a scientific experiment and report the results.	EET	1 and 3	H1 & H3a	IV
19. I know how to edit and format a document	EET	1 and 3	H1 & H3a	IV

(*table continues*)

(*table continues*)

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
according to using a set of editing tools such as in Microsoft Word processor.				
20. I know how to create presentation slides to present a topic using presentation applications such as Microsoft PowerPoint.	EET	1 and 3	H1 & H3a	IV
21. I can create a data display in a spreadsheet such as Microsoft Excel to show data sets in a table format or data charts.	EET	1 and 3	H1 & H3a	IV
22. I can format a document for communication purposes to make it more useful to a group or topic.	EET	1 and 3	H1 & H3a	IV
23. I can design a flyer to advertise to a distinct group of users or event or a topic.	EET	1 and 3	H1 & H3a	IV
Part 3: PE, EE and UB				
24. I expect to find ICT useful for my online education.	PE	3	H3b	DV
25. Using ICT will enable me to accomplish tasks for my online education more quickly.	PE	3	H3b	DV
26. Using ICT will increase my productivity in	PE	3	H3b	DV

(*table continues*)

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
carrying out my online education.				
27. My interaction ICT will be clear and understandable.	EE	3	H3b	DV
28. It will be easy for me to become skillful at using ICT.	EE	3	H3b	DV
29. I will find ICT easy to use.	EE	3	H3b	DV
30. Learning to use ICT will be easy for me.	EE	3	H3b	DV
31. I intend to continue using ICT for my online education, rather than discontinue their use.	UB	3	H3b	DV
32. My intentions are to continue using ICT for my online education then use any alternative means (e.g., traditional learning).	UB	3	H3b	DV
33. If I could, I would like to discontinue my online education.	UB	3	H3b	DV
Part 4: Satisfaction				
34. The academic quality using ICT in online education was equivalent to face-to-face courses I have taken before.	S	1 & 4	H1 & H4	DV
35. I would recommend this course to other students in this online format.	S	1 & 4	H1 & H4	DV
36. I would take an online course again in the future.	S	1 & 4	H1 & H4	DV

Survey questions	Variable	Related RQ	Related hypothesis	Independent or dependent variable
37. I feel that I learned as much from this online course as I might have from a face-to-face version of the course.	S	1 & 4	H1 & H4	DV
38. I feel that I learn more in online courses than in face-to-face courses.	S	1 & 4	H1 & H4	DV
39. The quality of the learning experience in online courses is better than in face-to-face courses.	S	1 & 4	H1 & H4	DV

(*table continues*)

EET operationalization. Rooted in the skills acquisition theory (SAT), EET at various stages of the student's life before college in all environment setups (school, home or other locations) results in some level ICT skills acquisition. The level ICT skills can be categorized as a novice, intermediate or expert level corresponding to the declarative knowledge, proceduralization of knowledge and automatizing of knowledge in the SAT (Dekeyser, 2007). While many instruments have been developed throughout the years by various researchers (Lau & Yuen, 2014; Litt, 2013; Oliver & Towers, 2000) to provide an assessment of acquired ICT skills, no instrument provided a comprehensive measurement to inform the research community about the ICT literacy. Perhaps some of the reasons behind that are the change in technology and the variety of ICT literacy that would categorize students as ICT novice, intermediate or expert (Litt, 2013).

Reduced UTAUT (r-UTAUT) model operationalization. While the UTAUT model is a comprehensive model that has been tested, and predicts 70% in the variance of

use behavior, the UTAUT model does not precisely predict satisfaction with the use of ICT because of use behavior. Other studies made the connection between application behavior and student's retention and also a link between student satisfaction and student's retention (Bawa, 2016; Ice, 2012; James et al., 2016; Levy, 2007). I made an argument that the positive use behavior of ICT in the online education correlates with the positive student satisfaction with online education. Previous studies have adopted the partial UTAUT model to fit objectives of their studies (Decman, 2015). A reduced UTAUT (r-UTAUT) model was adopted in this study using the effort expectancy (EE) and performance expectancy (PE) predicting use behavior (UB) with gender and age as moderators of the relationship between EE and UB and PE and UB. The r-UTAUT will sit between EET and satisfaction with online education creating the proposed EET-S conceptual model that was the based model as guided by the theoretical framework. The goal was to test EET and how it affects student satisfaction with online education.

The constructs adopted from the UTAUT were tested in the 100% online education delivery modality and therefore performance expectancy was defined as the degree to which using online modality will benefit online students. Effort expectancy was defined as the amount of effort that students were expected to devote while using ICT in the online modality. The behavioral intention variable (included in the original UTAUT model) that was influenced by PE and EE and then affects the UB. In my r-UTAUT conceptual model, it has been intentionally omitted for the simple reason that there was no need to test if the online students have the intention to use the ICT as they already made a move to enroll in a 100% online education delivery program. However, once the

online students are taking online classes using ICT as the only medium to interact with the teacher and the course material, it was important to test if the students were using ICT (hence UB) because of their PE and EE.

Data Analysis Plan

The data analysis plan consisted of conducting the statistical analysis after collecting survey responses from the Survey Monkey website and uploading the raw data into the SPSS software package. As the names of the participants were irrelevant to this study that identifiable personal data was omitted from collection and download, which resulted in an anonymous data permitting for unbiased analysis of the collected data. After the upload of the data into the SPSS package, the data were analyzed using descriptive analysis of student's characteristics, their EET and PE, EE and UB. Also, all variables were presented as percentages and frequencies, and as means, medians, mode, standard deviations, skewness, and other common statistical analysis presentation to determine any relationship between variables.

For the pilot study, 20 questions (from Part 2, see Appendix A) related to EET construct were split into two sets of questionnaires using the split-half method creating 10 questions with odd numbers and 10 questions with even numbers to achieve a higher level of reliability measure. Once the two sets were administered, the results were correlated with the correlation coefficient for reliability using the Spearman-Brown formula.

Both descriptive and inferential analyses were undertaken once the data was collected. Descriptive statistics were carried out on the sample and on data collected

using the survey instrument. The data analysis plan was to include reporting on frequencies, means, and standard deviations. The data analysis plan was also to include reporting on inferential statistics that was conducted on the data from the survey after the data were coded and processed the SPSS statistical software. Surveys questions from participants that were returned without any responses were to be omitted from the data analysis.

Once the data was mapped to corresponding variables such as EET, PE, EE, UB and SS, the plan was to begin testing for reliability and factor analyses. Then the next step in the plan was to start conducting a multivariate regression analysis to test the ten hypotheses that were based on the following research questions:

Research Questions and Hypotheses

RQ1: What is the relationship between EET and satisfaction with the online education of college students?

$H_0$1. There is no relationship between students' EET and their satisfaction with online education in college.

H_a1. There is a positive relationship between students' EET and their satisfaction with online education in college.

RQ2: What is the effect of students' demographics on the relationship between EET and satisfaction with online education in college?

$H_0$2. The students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college.

H_a2. The students' demographic factors (age and gender) predict the degree of satisfaction with online education at the college.

RQ3: What is the effect of EET in the ICT environment on the relationship between performance expectancy (PE), effort expectancy (EE), and students' use behavior (UB) of ICT in online education?

$H_{a0}3$. The students' EET in the ICT environment has no effect on the relationship between the students' PE, EE, and UB of ICT in online education.

$H_{b0}3$*:* There will be no relationship among PE, EE, and UB.

$H_{a1}3$. The students' EET in the ICT environment affects the relationships among the students' PE, EE, and UB of ICT in online education.

$H_{b1}3$*:* There will be a positive relationship among PE, EE, and UB.

RQ4: What is the relationship between the students' UB of ICT and their satisfaction with online education?

$H_0 4$. There is no relationship between the students' UB of ICT and their satisfaction with online education in college.

$H_a 4$. There is a positive relationship between the students' UB of ICT and their satisfaction with online education in college.

Using SPSS to conduct a multivariate regression analysis is an effective method (Liu, Kuang, Gong, & Hou, 2003). Besides enabling the researcher to identify the collinearity for each independent variable, but also show how two or more predicting variables correlate. Also, the computation procedures are completed in SPSS package

which greatly reduces the manual computation, simplifying and speeding the process of statistical analysis.

Threats to Validity

External Validity

The threats to external validity address the issues related to threat occurring when the researcher is attempting to make generalization toward a different population outside the intended group within the study sample. In this study, the goal was to find out about the effect of early exposure to ICT on the satisfaction with online education among freshman students in the United States. However, the fact the sample appropriate for this study was a convenience sample, additional studies will be needed to replicate this study using other online colleges and universities to make that generalization.

Internal Validity

The internal validity is the process by which the researcher ensures that the developed measure will be in fact measure what is intended to measure (De Vaus, 2002; Frankfort-Nachmias & Nachmias, 2008). The factors that might affect the internal validity of a research design are intrinsic (history, maturation, instrumentation, testing and others) or extrinsic (biases and selection of control groups). Also, the threat to internal validity takes many forms including (a) threat to procedures for selecting participants resulting in systematic differences across, (b) threat of instrument validity related to measuring changes over time, just to name few (Shadish, W., Cook, T., Campbell, 2005). To overcome the threat to internal validity based on intrinsic factors, Frankfort-Nachmias and Nachmias (2008) suggested using the control group (p. 110).

However, the research design in this study did not permit to use the control group and therefore the reliance was to ensure that the instrument is measuring what it is intended to measure. To achieve that, the plan was to (a) seek feedback on the content of survey questions from colleagues to ensure questions are well asked to extract the intended information, (b) conduct a pilot study to validate the survey instrument.

Construct Validity

The construct validity is the degree to which a test conducted by a researcher measures well what the researcher is claiming to measure. In addition, the measure conforms with the theoretical expectations for a particular construct within the theoretical framework (De Vaus, 2002). Because the constructs used to develop the EET-S conceptual model were developed and validated in the UTAUT theoretical framework, and the skills acquisition theory (SAT), the constructs within this study seem to align with those of the UTAUT and the SAT theoretical frameworks. While there is no better way to determine the validity of a measure (De Vaus, 2002, p. 54), Frankfort-Nachmias and Nachmias (2008) stated that "researchers establish construct validity by relating a measuring instrument to general theoretical framework within which they conduct their studies in order to determine whether the instrument is logically and empirically tied to the concept and the theoretical assumptions they are employing" (p. 152).

Ethical Procedures

The plan was to conduct a study that follows the IRB guidelines on the selection of survey participants and ensuring that they fully consent to take the survey. These includes ensuring participants' full anonymity. The main survey posted to participant

pool and Survey Monkey Audience, clearly stating that taking the survey was entirely voluntary and participants had the option to exit at any time during the survey. No monetary incentive was offered to participants to avoid creating any unnecessary bias by the participants.

The process for the recruitment of students followed the traditional procedures for similar studies. The plan was to contact the participant pool at WUO after obtaining the Walden University Institutional Review Board (IRB) permission to collect data, and post the pilot followed by the main study for students who are enrolled in online classes during the quarter or the semester. The Walden University IRB approval number for this study is 08-07-17-0286986 and it expires on August 6th, 2018. Once I obtained the permission to use the participant pool at WUO, I posted a letter of consent with survey link on the participant pool at WUO. For the primary study, I followed similar recruitment procedures after obtaining IRB permission and posted letter of consent with the survey questions on Survey Monkey Audience website.

Summary

In Chapter 3, the research approach and the plans to conduct the data collection process based on the quantitative research nonexperimental methodology were discussed. The first section includes a description of the research design and rationale followed by the methodology section including the target population, the sampling strategy and sampling procedures, the procedures for recruitment of participants and data collection plan for the main study and the pilot study, and the research instrument and operationalization of constructs. Lastly, the data analysis plan section includes a

description of how the collected data were analyzed and how the threats to validity were handled and the ethical approach that was taken to ensure the IRB guidelines were followed. Chapter 4 includes the process and content of the data collection and analysis. In addition to the results from the main study, the results of the pilot study that helped validate the main instrument were analyzed and discussed.

Chapter 4: Results

The purpose of this quantitative nonexperimental study was to examine the relationship between students' EET before college and their satisfaction with online education in college. Early exposure to ICT before college includes all forms of computer usage in-school, at home, or elsewhere or any aspect of instructional technology meant to further the students understating using the available online resources (Dekeyser, 1998, 2007). Student satisfaction was measured only for those students who completed at least one course online at college. To examine the relationships between EET and student satisfaction, I used the following variables: EET, PE, EE, UB, and SS with online education. Gender and age served as moderating variables.

The data analyses phase included an investigation of whether early exposure to ICT had any effect on student satisfaction with online education. The research questions and hypotheses were, as follows:

RQ1: What is the relationship between EET and satisfaction with the online education of college students?

$H_0$1. There is no relationship between students' EET and their satisfaction with online education in college.

H_a1. There is a positive relationship between students' EET and their satisfaction with online education in college.

RQ2: What is the effect of students' demographics on the relationship between EET and satisfaction with online education in college?

$H_0$2. The students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college.

H_a2. The students' demographic factors (age and gender) predict the degree of satisfaction with online education at the college.

RQ3: What is the effect of EET in the ICT environment on the relationship between performance expectancy (PE), effort expectancy (EE), and students' use behavior (UB) of ICT in online education?

H_{a0}3. The students' EET in the ICT environment has no effect on the relationship between the students' PE, EE, and UB of ICT in online education.

H_{b0}3*:* There will be no relationship among PE, EE, and UB.

H_{a1}3. The students' EET in the ICT environment affects the relationships among the students' PE, EE, and UB of ICT in online education.

H_{b1}3*:* There will be a positive relationship among PE, EE, and UB.

RQ4: What is the relationship between the students' UB of ICT and their satisfaction with online education?

$H_0$4. There is no relationship between the students' UB of ICT and their satisfaction with online education in college.

H_a4. There is a positive relationship between the students' UB of ICT and their satisfaction with online education in college.

This chapter is organized into four major sections including (a) the pilot study, (b) the data collection for the main study, (c) the results from the data analysis, and (d) a summary and conclusion. The section on the pilot study includes reliability and validity

analyses of Part 2 of the main study instrument. The data collection section includes a description of the data sampling strategy, data collection methods, and data sources. The data analysis section includes a detailed description of the data coding procedures and statistical tests conducted, along with reporting of the results. Finally, the summary section includes an overview of all the activities conducted including data collection, data analysis, and statistical results reporting. In addition, the summary section includes a transition to Chapter 5.

Pilot Study

After obtaining IRB approval for the pilot study and the main study in August 2017, I uploaded my pilot survey questionnaire, which contained 20 questions related to the early exposure to ICT, to the WUO participant pool platform. The purpose of the pilot questionnaire was to conduct a reliability test for Questions 3 to 23 included in Part 2 of the main study survey (see Appendix A). The main reason for conducting this pilot study was that Part 2 of the survey instrument included a set of questions that I added to the main instrument to measure EET and which had not been validated. The psychometric properties were, thus, unknown.

The 20 questions of the pilot study were divided into four main categories:

- Category A, with Questions 1-5 covering EET exposure in years prior to college and environment where the ICT skills were acquired;
- Category B, with Questions 6-10 covering Internet literacy (INL);
- Category C, with Questions 11-15 covering information literacy (IFL); and
- Category D, with Questions 16-20 covering computer literacy (CPL).

In Categories B, C, and D, the intent was to measure the level of ICT skills ranging from novice to intermediate and up to expert level using a Likert scale with options ranging from Strongly Agree to Strongly Disagree. After seeking feedback from professors and classmates, I added a not applicable (N/A) category to capture answers from those who did not select any of the Likert scale categories.

Because my IRB approval came at the end of the summer quarter, I opted for my study to be available in the WUO participant pool for 4 weeks. This period was selected to give students the opportunity to take my pilot survey between the end of the summer quarter and the beginning of fall quarter with the hope of receiving between 8 to 10 participants. Unfortunately, by the deadline I set for my pilot survey, only three participants had completed the instrument. After a discussion with my chair, I decided to extend the deadline for my survey until I reached eight to 10 participants, so that I could conduct my reliability analysis and report my findings from the pilot study. Four weeks later, I had received survey answers from nine participants, and I was able to close my pilot survey in the WUO participant pool. Because of my difficulty in collecting answers using the participant pool, I submitted a request to the IRB asking for approval to use Survey Monkey Audience (SurveyMonkey.com, n.d.), a paid service, for my main study, which was granted on September 27, 2017. I downloaded the nine participants' answers from the WUO participant pool in a Microsoft Excel format and prepared the data for SPSS upload by coding the answer weight according to Table 5.

Table 5

Pilot: Likert Scale Rating and Weight for Questions PQ1-PQ3 and PQ6-PQ20

Rating scale	Value
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1
N/A	0

The nominal questions PQ4 and PQ5 were respectively coded from 5 to 0, starting with 5 for *Prior to age* 10 (when using ICT) to 0 for *N/A* for PQ4 and starting with 5 for *Daily* (accessing a computer) to 0 for *N/A* for PQ5.

After uploading my coded data to SPSS, I conducted a scale analysis of the survey items Q6 through Q20. The analysis resulted in a Cronbach alpha coefficient of $a = .747$, $N = 15$.

While the Cronbach alpha reliability test resulted in an acceptable coefficient of .747, the split-half method is more common in testing scales for reliability using the Spearman-Brown coefficient in which the questions as split into two parts (e.g., odd questions in Part 1 and even questions in Part 2) then conduct the split-half reliability test.

The questions: PQ6, PQ8, PQ10, PQ12, PQ14, PQ16, PQ18, and PQ20 (Part 1); PQ7, PQ9, PQ11, PQ13, PQ15, PQ17, and PQ19 (Part 2) were loaded in the scale reliability split-half test and yielded a Spearman-Brown coefficient of .93 (see Table 6).

Based on both reliability test coefficients (a) Cronbach's Alpha of .747, and (b) Spearman-Brown's coefficient of .931, I determined that the tested scale regarding the early exposure to ICT is reliable and no need to change any questions for the main study survey. Given those results, I assumed an internal consistency between the item tested in this reliability test especially when considering the high (.931) Spearman-Brown's coefficient. It was also safe to assume that the integration of questions PQ6 – PQ20 to be part of the main survey questionnaire would result in an overall reliable instrument since Part 3 of the main instrument was adopted from a well-tested UTAUT instrument, and Part 4 was also adopted from a satisfaction instrument previously tested as well.

Table 6

Pilot Study: Spearman-Brown Split-Half Coefficient

Reliability Statistics			
Cronbach's Alpha	Part 1	Value	.671
		N of Items	8
	Part 2	Value	.213
		N of Items	7
	Total N of Items		15
Correlation Between Forms			.872
Spearman-Brown Coefficient	Equal Length		.931
	Unequal Length		.932
Guttman Split-Half Coefficient			.908

Data Collection

Data Collection Timeframe

The initial plan as described in Chapter 3, was to use the WUO participant pool to post the main survey and collect data for this study. However, because of the hardship that I encountered in collecting answers for my pilot study using the participant pool, I had to change my data collection plan for the main study. Thus, I submitted a request to the IRB asking for an approval to use the paid Survey Monkey Audience for my main study, which was granted on September 27, 2017.

After receiving the data collection change approval from the IRB, I uploaded my survey questions on Survey Monkey platform. I tested my survey through the preview option then I sent my survey to the Survey Monkey Audience participants on October 3, 2017 with the following characteristics:

- U.S. population
- 18 years of age or older
- School status: Undergraduate and graduate students attending colleges and universities

In the absence of *Online Student* criteria for the Survey Monkey Audience participants, I had to put a statement specifying the following: *This survey is intended for college students who are 18 years, or older enrolled in online classes*. After 2 days into the data collection phase, I received an email from Survey Monkey that my survey was paused due to low completion rate, and only 20 valid responses out of 26 were collected. The Survey Monkey representative suggested that I add a disqualifying question at the beginning of my survey, which will serve as criteria to disqualify anyone who has not taken any online class before. After adding the disqualifying question stating: *Are you enrolled in an undergraduate or graduate program and have completed at least one course in an online setting?* with yes or no as a response option, I resent my survey into the Survey Monkey Audience participants on October 12^{t}, 2017. Four days later, I received a notification from Survey Monkey that my survey project was completed and there were 83 valid responses out of 135 from all respondents who qualified based on my disqualifying question.

The sample comprised of 89 participants who represent the population of college students enrolled in online education in the United States. A convenience sample from the student's population of online students was selected for this study. The response to a question asked by Survey Monkey about the U.S Region where the participants reside, yielded well-distributed percentages among the region (see Table 7).

Table 7

Sample: U.S. Regions Representation

US Region	26 Participants	135 Participants	All Participants	Percentage
New England	1	10	11	6.83%
Middle Atlantic	3	14	17	10.56%
East North Central	3	15	18	11.18%
West North Central	1	9	10	6.21%
South Atlantic	0	28	28	17.39%
East South Central	0	8	8	4.97%
West South Central	2	17	19	11.80%
Mountain	4	10	14	8.70%
Pacific	6	22	28	17.39%
Did Not Specify	6	2	8	4.97%
Total Participants	26	135	161	100.00%

Data Coding and Uploading to SPSS

After downloading the collected responses from the two instances in which I collected 26 responses (with the online statement only) the first time I sent my survey and 135 responses (with the disqualifying question) the second time around, I screened the two datasets to see how many valid responses I received for each question. The dataset with 26 responses yielded 20 valid responses (with no missing data) at 77%, and 135 responses yielded 83 valid responses (with no missing data) at 61%. Since 83 valid responses were less than my target sample size of, I opted to combine both valid responses (20 and 83) into one dataset then run an independent t-test to see if there were any differences between groups (of the datasets). At first, I compared the descriptive statistics between the two groups, and then I ran independent t-tests to compare the value of the EET, PE, EE, and UB as well as satisfaction between the two groups.

Before combining the two datasets (20 and 83 responses) into one dataset of 103 valid responses, the raw files were downloaded from Survey Monkey into Microsoft Excel files and sorted to ensure only valid responses (with no missing data) are uploaded to IBM SPSS Statistics software. The Respondent ID column was replaced by the column named Participants with values ranging from STU1 to STU83 for 83 responses dataset, and values ranging from STU84 to STU103 for 20 responses dataset. In addition to the participants column, the survey question number 1 (*What is your age group?*) through question number 39 (*The quality of the learning experience in online courses is better than in face-to-face courses*) were uploaded (for both datasets) to the IBM SPSS

Statistics (Version 24) software package. SPSS was used to run all the statistical tests that are described in more details in the study results section of this chapter.

Groups Comparison Between the Two Datasets

This section includes the comparison between the first dataset of 20 valid responses and the second dataset of 83 valid responses. After uploading the two datasets into SPSS and opening both files, all the rows from the first dataset (20 responses) were copied and appended after the last row (number 83) of the second dataset (83 responses) then the SPSS file was saved as a combined dataset of 103 responses.

Before running any statistical test including the t-tests to compare the two datasets, a new column was added in the dataview of SPSS of the combined dataset file to identify group 1 as the 20 responses and group 2 as 83 responses. The added column to distinguish between the two groups was named *SurveySets*, and it was given a value 1 for the group of 20 responses and the value of 2 for the group of 83 responses. While the labels of the 39 questions were reflecting the exact wording of the survey questions, the item name of the questions in SPSS were given abbreviated names to match what the questions measure (i.e., EETUSAGE was given to the question asking: How often you used to access a computer to carry out an information and communication technology (ICT) task during the years prior to college?). Most of the questions used a Likert scale from Strongly Agree (value = 5) to Strongly Disagree (value = 1), and I added N/A (value = 0) for those who are not able to select one of those choices. The N/A data field was coded as missing data. Then, the 39 survey questions were named and coded according to the values shown in Table 8.

Table 8

SPSS: Survey Questions and Item Values and Types

Survey Questions	Name	Measuring	Type
Q1	Age	Age group	Ordinal
Q2	Gender	Gender (Male and Female)	Nominal
Q3	CollStat	College Enrollment Status	Ordinal
Q4-Q6	EETL1-EETL3	Early Exposure to Technology Location (home, school, elsewhere)	Nominal
Q7	EETAGE	Early Exposure to Technology Age (before age 10 – 18 or later)	Ordinal
Q8	EETUSAGE	Early Exposure to Technology Usage (Daily – Rarely…)	Ordinal
Q9-Q13	INL1-INL5	ICT: Internet Literacy	Ordinal
Q14-Q18	IFL1-IFL5	ICT: Information Literacy	Ordinal
Q19-Q23	CPL1-CPL5	ICT: Computer Literacy	Ordinal
Q24-Q26	PE1-PE3	Performance Expectation	Ordinal
Q27-Q30	EE1-EE4	Effort Expectation	Ordinal
Q31-Q33	UB1-UB3	Use Behavior	Ordinal
Q34-Q39	SS1-SS6	Student Satisfaction with online education	Ordinal

EET was constructed to measure the early exposure to technology (or ICT), and it was operationalized using a sum of four parameters outlined below:

- Early Exposure to Technology Age: Q7
- Early Exposure to Technology Location: Q4-Q6
- Early Exposure to Technology Usage: Q8
- ICT skill's levels*: Q9-Q23

*Self-assessed ICT skill's levels (ICTSL) in three areas of literacy (Internet, Information, and computer) measured as (a) Novice, (b) Intermediate, and (c) Expert.

- Internet Literacy: Q9-Q13
- Information Literacy: Q14-Q18
- Computer Literacy: Q19-Q23

Table 9

EET Variable Measurement

EET variable measurement	Low	Medium	High	EET
EETAGE	1-2	3-4	5	1-5
EETUSAGE	1-2	3-4	5	1-5
EETL	1-2	3-4	5	1-5
ICTSL	1-2	3-4	5	1-5
EET cumulative Score				4-20

The following steps were taken to prepare the dataset for analysis in SPSS:

1. Reverse coding of question number 34 (UB3 question) from 5, 4 ,3, 2, 1, 0 to 1, 2, 3, 4, 5, 0. The reverse coding was necessary to align UB3 item with items UB1 and UB2 that measure the user's positive behavior to accept the use of ICT in the online environment)
2. Compute the ICT items before creating EET variable:
    a. Create EETL item by computing the mean of EETL1, EETL2, and EETL3
    b. Create the INL item by computing the mean of INL1 through INL5
    c. Create the IFL item by computing the mean of IFL1 through IFL5
    d. Create the CPL item by computing the mean of CPL1 through CPL5
    e. Create the ICTSL item by computing the mean of INL, IFL, and CPL
3. Create EET variable by computing the SUM of items EETAGE, EETUSAGE, EETL, and ICTSL
4. Create PE variable by computing the mean of PE1, PE2, and PE3
5. Create EE variable by computing the mean of EE1, EE2, EE3, and EE4
6. Create UB variable by computing the mean of UB1, UB2, and UB3
7. Create SS variable by computing the mean of SS1 through SS6

After computing the study variables (Age, Gender, EET, PE, EE, UB, and SS) in SPSS, as outlined above, seven independent t-tests were conducted. The tests were conducted to verify the inferential assumption that there is no difference between to two groups of responses collected (20 and 83 responses) and combined them as one dataset of 103 responses. Tables 11 and 12 show the results of those independents t-tests.

Table 10

Age and Gender: Group Statistics for First and Second Survey Monkey (SM) Datasets

	First or Second SM Survey	N	Mean	Std. Deviation	Std. Error Mean
What is your age group?	Second 83 SM responses	82	2.50	1.74	.19
	First 20 SM responses	20	2.60	1.79	.40
What is your Gender?	Second 83 SM responses	80	1.44	.50	.06
	First 20 SM responses	20	1.40	.50	.11

An independent-samples t-test was conducted to determine if there were differences in age and gender between the first 20 Survey Monkey (SM) responses and the second 83 SM responses. The mean for age for the first 20 SM responses was (M = 2.60, SD = 1.79) compared to the second 83 SM responses (M = 2.50, SD = 1.74), and the mean for gender for the first 20 SM responses was (M = 1.40, SD = .50) compared to the second 83 SM responses (M = 1.44, SD = .50).

The independent-samples t-test on age, no statistically significant difference was found between the two groups for age, M = -.13, 95% CI [-0.99, 0.74], $t(101)$ = -.297, p = .767. Similarly, for gender, the Levene's test for equality of variances was assumed at F = 1.630, p = .205.As to the independent-samples t-test, no statistically significant difference was found between the two groups for gender, M = 2.37, 95% CI [-4.337, 9.08], $t(101)$ = -.701, p = .485.

An independent-samples t-test was conducted to determine if there were differences in the variables EET, PE, EE, UB and SS between the first 20 Survey Monkey (SM) responses and the second 83 SM responses. The comparison between the first group and the second group for those variables are shown in detail in Table 11.

The results of the independent-samples t-test for the variables EET, PE, EE, UB and SS show that no statistically significant difference was found between the two groups for the following variables:

- EET: *Mean Difference* = 1.29, $t(101) = 1.783$, $p = .078$
- PE: *Mean Difference* = .20, $t(101) = .917$, $p = .361$
- EE: *Mean Difference* = .19, $t(101) = .860$, $p = .392$
- UB: *Mean Difference* = .05, $t(101) = .216$, $p = .830$
- SS: *Mean Difference* = -.58, $t(100) = -2.426$, $p = .017$

Finding no statistically significant difference between the first 20 Survey Monkey (SM) responses and the second 83 SM responses except for student satisfaction ($p = .017$) that might have been due to one of the cases with "N/A" that was coded as missing. The two datasets were combined resulting in 103 valid responses. The new combined dataset was used to run all the statistical tests in SPSS to test the hypotheses and to conduct descriptive statistics for the main study. More details can be found in the study results section of this chapter.

Table 11

EET, PE, EE, UB, and SS: Group Statistics for First and Second Survey Monkey (SM) Datasets

	First or Second SM Survey	N	Mean	Std. Deviation	Std. Error Mean	P-Value
Early Exposure to Technology (EET)	Second 83 SM responses	83	15.31	2.80	.31	.078
	First 20 SM responses	20	14.02	3.33	.74	
Performance Expectancy (PE)	Second 83 SM responses	83	4.39	.81	.09	.361
	First 20 SM responses	20	4.18	1.15	.26	
Effort Expectancy (EE)	Second 83 SM responses	83	4.22	.83	.09	.392
	First 20 SM responses	20	4.03	1.19	.27	
Use Behavior (UB)	Second 83 SM responses	83	3.85	.85	.09	.830
	First 20 SM responses	20	3.80	1.02	.23	
Student Satisfaction (SS)	Second 83 SM responses	83	2.98	.96	.11	.017
	First 20 SM responses	19	3.56	.84	.19	

In addition to the results section, a section dedicated to summarizing answers to research questions and providing transitional material from the findings and introducing some prescriptive material can be found in Chapter 5.

Study Results

This section includes reports about the descriptive statistics that appropriately characterize the sample and an evaluation of the statistical assumption. Then, the statistical analysis findings after conducting the statistical tests organized by research questions and hypotheses will be reported. In addition to the reporting the findings, the tables, and figures will be included to illustrate results.

Descriptive Statistics

In this section, the demographic profile of the respondents is displayed in tables followed by narrative discussing the frequency and percentages related to gender, age groups and the college enrollment status for the 103 students who responded to the survey questions. In addition, a descriptive analysis of the study variables will illustrate the frequency and the corresponding percentages for those variables based on the five-point Likert scale (from Strongly Agree to Strongly Disagree).

Profile of the survey participants. The demographic profile of the respondents is shown in Tables 12 through 14. Out of the 103 survey respondents, 57 (55.3%) were female, and 43 (41.7%) were male (3 participants did not identify their gender). As to the age groups, most of the participants were under the age of 30 (64.1%). Out of 103 participants, 41 (39.8%) of the respondents were between the age of 18 and 23 years old, 25 (24.3%) were between the age of 24 and 29 years old; 8 (7.8%) were between the age of 30 and 39 years old; 9 (8.7%) were between the age of 40 and 49 years old; 8 (7.8%) were between the age of 50 and 59 years old, and 11 (10.7%) were at the age of 60 years of age or older (one participant opting not to reply).

Table 12

Age: Demographic Profile of the Respondents

	Frequency	Percentage
Gender		
Female	57	55.3
Male	43	41.7
Did not specify	3	2.9

Table 13

Age Groups: Demographic Profile of the Respondents

	Frequency	Percentage
18 to 23 years old	41	39.8
24 to 29 years old	25	24.3
30 to 39 years old	8	7.8
40 to 49 years old	9	8.7
50 to 59 years old	8	7.8
60 years or older	11	10.7
I prefer not to answer	1	1.0

For the student's college status question, 7 (6.8%) of the respondents reported that they are freshman (1st year in college); 15 (14.6%) are sophomore (2nd year in college); 16 (15.5%) are junior (3rd year in college); 28 (27.2%) are senior (4th year in college), and 36 (35%) are at the graduate level (with one participant who did not know his or her

college status level).

Table 14

College Status Level: Demographic Profile of the Respondents

	Frequency	Percentage
Freshman (1st year in college)	7	6.8
Sophomore (2nd year in college)	15	14.6
Junior (3rd year in college)	16	15.5
Senior (4th year in college)	28	27.2
Graduate level	36	35.0
I don't know	1	1.0

Descriptive statistics of the EET variable. The early exposure to technology (EET) was measured using areas related to any exposure to ICT before starting college. As shown in Table 10, the EET variable measurement includes: (a) the age at which the student was first exposed to ICT, (b) the ICT frequency usage (daily to rarely or don't remember), (c) the location (home, school, and elsewhere) where the student had access to ICT, and (d) the ICT skill-levels (novice, intermediate, or expert) in the areas of Internet literacy, information literacy and computer literacy.

Age when first introduced to ICT (EETAGE). Table 15 shows that 16% of students had access to ICT in the elementary grade level, 52.5% has access to ICT during the middle and high school years, and only 24.3% did not have access until post-high school. The responses from the 103 respondents show that 17 (16.5%) were first

introduced to ICT before the age of 10, 29 (28.2%) were first introduced to ICT between the age of 11 to 13, 25 (24.3%) were first introduced to ICT between the age of 14 to 17, and 25 (24.3%) were not introduced to ICT until the age of age 18 to later (with 7 respondents who selected "I don't remember" or "N/A").

Table 15

EETAGE: Frequency and Percentages

EETAGE*	Frequency	Percent
Prior to age 10	17	16.5
Since age 11 to 13	29	28.2
Since age 14 to 17	25	24.3
Since age 18 to later age	25	24.3
I do not remember	4	3.9
N/A	3	2.9

Note. * At what age were you comfortable using computer technology (such as email, word processing, spreadsheets) for academic use throughout the years prior to college?

The ICT frequency usage (EETUSAGE). Table 16 shows that most students were using ICT on a daily basis (46.6%), and the other ones were split between those who access ICT few times to once a week (26.2%) and those who rarely access the ICT or don't remember (26.2%). The 103 respondents reported that 48 (46.6%) used the ICT prior college on the daily basis, 21 (20.4%) used the ICT few times a week, 6 (5.8%) used the ICT once a week and 14 (13.6%) rarely used the ICT before college (with 12.6% of respondents who said they don't remember and one N/A).

Table 16

EETUSAGE: Frequency and Percentages

EETUSAGE*	Frequency	Percent
Daily	48	46.6
Few times a week	21	20.4
Once a week	6	5.8
Rarely	14	13.6
I don't remember	13	12.6
N/A	1	1.0

Note. * How often you used to access a computer to carry out an information and communication technology (ICT) task during the years prior to college?

The location where students had access to ICT (EETL). Table 17 shows that 40 (38.9%) had more access to ICT including at home, at school and elsewhere such as at the public library or any other place. Of the 103 participants, 48 (46.6%) reported moderate access to ICT in those combined locations, and 15 (14.6%) reported low access to ICT.

Table 17

EETL: Frequency and Percentages

EETL*	Frequency	Percent
Low	15	14.6
Medium	48	46.6
High	40	38.9

Note. * Early Exposure to ICT Location (at home, at school and elsewhere).

Table 18

INL, IFL, CPL, and ICTSL: Overall Statistics

	N	Mean	Std. Deviation
Internet Literacy	103	4.33	.587
Information Literacy	103	4.27	.639
Computer Literacy	103	4.28	.644
ICT Skill Levels	103	4.29	.555

The ICT skill levels prior to college (ICTSL). The ICTSL measured the ICT skill level in the areas of Internet literacy, information literacy and computer literacy (see Table 18). The data in Table 19 show that 28 (27.18%) reported an ICT skill level of novice in the combined areas of literacies, 64 (62.14%) which is the majority of students, reported an ICT skill level of intermediate, and just 11 (10.68%) reported an ICT skill level of expert in those combined areas of literacies (those are the students who checked "*Strongly Agree*" on all the questions related to the three areas of literacies).

Table 19

ICTSL: Frequency and Percentages

ICTSL*	Frequency	Percent
Novice	28	27.18
Intermediate	64	62.14
Expert	11	10.68

Note. *ICT Skill Levels (Novice, Intermediate, or Expert) in the three areas of literacy (Internet literacy, information literacy, and computer literacy).

The combination of the four indicators (EETAGE, EETUSAGE, EETL and ICTSL) that were set to measure EET as one unit is a scale of 4 to 20 with four as lowest EET, 20 as the highest EET, and a score of below four as not a significant exposure to ICT or no exposure at all. Because a score of 0 to 3 means one or more of the four measures (EETAGE, EETUSAGE, EETL and ICTSL) within the EET scored 0.

Table 20

EETAGE, EETUSAGE, EETL, ICTSL, and EET: Overall Statistics

	N	Mean	Std. Deviation
EETAGE	100	3.30	1.14
EETUSAGE	102	3.75	1.48
EETL	103	3.85	1.00
ICTSL	103	4.29	.56
Early Exposure to Technology (EET)	103	15.06	2.94

The sum of the four indicators in Table 21 showed that 4 (3.88%) of the participants had lower exposure to ICT (scores between 4 and less than 9), 54 (52.43%) which is over half of the participants had moderate exposure to ICT (scores between 9 and 16), and 45 (43.69%) of the participants had higher exposure to ICT (scores between greater than 16 and 20).

The early exposure to ICT (EET) is a combination of the four indicators (EETAGE, EETUSAGE, EETL and ICTSL) and set to measure EET as whole using a scale of 4 to 20 (with 4 as lowest EET, 20 as the highest EET).

Table 21

EET: Frequency and Percentages

EET	Frequency	Percent
Low	4	3.88
Moderate	54	52.43
High	45	43.69

Descriptive statistics of the UTAUT variables (PE, EE, and UB). The unified theory of acceptance and use of technology (UTAUT) variables selected for this study were measured using the UTAUT instrument questionnaire using a 5-point Likert scale (from Strongly Agree to Strongly Disagree). Tables 23-26 show the frequencies and the corresponding percentages for the variables performance expectancy (PE), effort expectancy (EE), use behavior (UB). Table 22 shows the overall descriptive statistics of the UTAUT variables (PE, EE and UB).

Table 22

PE, EE and UB: Overall Descriptive Statistics of UTAUT Variables

	Mean	Median	Mode	Std. Deviation
Performance Expectancy (PE)	4.35	4.33	5.00	.884
Effort Expectancy (EE)	4.18	4.00	5.00	.908
Use Behavior (UB)	3.84	4.00	4.00	.878

The performance expectancy (PE) variable. The descriptive statistics regarding performance expectancy are shown in Table 23. It is suggested that most of the students

have moderate to high performance expectancy using ICT in online education. Out of 103 respondents, about 50% of the students indicated that they have high-performance expectancy in online education, and around 40% of the students indicated that they have moderate performance expectancy, while the remaining students indicated that they have low-performance expectancy.

Table 23

PE: Descriptive Statistics

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
PE1*	0 (0.0%)	1 (1.0%)	5 (4.9%)	40 (38.8%)	54 (52.4%)	4.47	.64
PE2*	0 (0.0%)	1 (1.0%)	7 (6.8%)	41 (39.8%)	52 (50.5%)	4.43	.67
PE3*	1 (1.0%)	0 (0.0%)	7 (6.8%)	38 (36.9%)	55 (53.4%)	4.45	.71

Note. *PE1= I expect to find information and communication technology (ICT) useful for my online education. PE2 = Using information and communication technology (ICT) will enable me to accomplish tasks for my online education more quickly. PE3 = Using information and communication technology (ICT) will increase my productivity in carrying out my online education.

The effort expectancy (EE) variable. The descriptive statistics regarding effort expectancy are shown in Table 24. It is suggested that most of the students have moderate to high effort expectancy using ICT in online education. Out of 103 respondents, around 44% of the students indicated that they have high effort expectancy in online education, and around 45% of the students indicated that they have moderate effort expectancy, while the remaining students indicated that they have low effort expectancy.

Table 24

EE: Descriptive Statistics

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
EE1*	1 (1.0%)	4 (3.9%)	7 (6.8%)	47 (45.6%)	42 (40.8%)	4.24	.83
EE2*	2 (1.9%)	4 (3.9%)	10 (9.7%)	40 (38.8%)	46 44.7	4.22	.92
EE3*	1 (1.0%)	3 (2.9%)	10 (9.7%)	45 (43.7%)	43 (41.7%)	4.24	.82
EE4*	1 (1.0%)	2 (1.9%)	8 (7.8%)	46 (44.7%)	44 (42.7%)	4.29	.78

Note. *EE1= My interaction with information and communication technology (ICT) will be clear and understandable for my online education. EE2 = It will be easy for me to become skillful at using information and communication technology (ICT) for my online education. EE3 = I will find information and communication technology (ICT) easy to use for my online education. EE4 = Learning to use information and communication technology (ICT) will be easy for me in online education.

The use behavior (UB) variable. The descriptive statistics regarding use behavior are shown in Table 25. It is suggested that most of the students have a strong intention continue using ICT in online education. However, their intention to choose between the online education and other alternative models such as traditional learning was more moderate. As to their intention to discontinue their online education or not, most of the students (63.1%) had no intention to discontinue their online education.

Table 25

UB: Descriptive Statistics

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
UB1*	2 (1.9%)	0 (0.0%)	11 (10.7%)	41 (39.8%)	48 (46.6%)	4.30	.82
UB2*	4 (3.9%)	12 (11.7%)	19 (18.4%)	33 (32.0%)	34 (33.0%)	3.79	1.15
UB3*	21 (20.4%)	44 (42.7%)	18 (17.5%)	8 (7.8%)	9 (8.7%)	3.60	1.17

Note. *UB1= I intend to continue using information and communication technology (ICT) for my online education, rather than discontinue their use. UB2 = My intentions are to continue using information and communication technology (ICT) for my online education than using any alternative means (e.g., traditional learning). UB3 (recoded) = If I could, I would like to discontinue my online education.

Descriptive statistics of the student satisfaction variable (SS). The student satisfaction variable was measured using the satisfaction instrument by Eom et al. (2006) and included six questions using a 5-point Likert scale (from Strongly Agree to Strongly Disagree). Table 26 shows the frequencies and the corresponding percentages of the satisfaction variable. Out of the 103 participants, most of the students indicated that they are very likely to take an online again in the future and recommend the online class to others. However, students' satisfaction with the academic quality of online education compared to the face-to-face courses, the students seem to be in more in disagreement or neutral rather than agreeing. Finally, most of the students seem to think that they learned more in the face-to-face courses than they did in online classes.

Table 26

SS: Descriptive Statistics for Student Satisfaction with Online Education

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
SS1*	12 (11.7%)	37 (35.9%)	15 (14.6%)	25 (24.3%)	13 (12.6%)	2.90	1.26
SS2*	2 (1.9%)	14 (13.6%)	22 (21.4%)	39 (37.9%)	25 (24.3%)	3.70	1.05
SS3*	5 (4.9%)	4 (3.9%)	15 (14.6%)	38 (36.9%)	40 38.8	4.02	1.07
SS4*	16 (15.5%)	27 (26.2%)	14 (13.6)	25 (24.3)	20 (19.4%)	3.06	1.39
SS5*	26 (25.2%)	29 (28.2%)	29 (28.2%)	9 (8.7%)	9 (8.7%)	2.47	1.22
SS6*	23 (22.3%)	36 (35.0%)	28 (27.2%)	10 (9.7%)	5 (4.9%)	2.39	1.09

Note. *SS1= The academic quality using information and communication technology (ICT) in online education was equivalent to face-to-face courses I have taken before. SS2 = I would recommend the online course to other students in the online format. SS3 = I would take an online course again in the future. SS4 = I feel that I learned as much from the online course as I might have from a face-to-face version of the course. SS5 = I feel that I learn more in online courses than in face-to-face courses. SS6 = The quality of the learning experience in online courses is better than in face-to-face courses.

Statistical Analysis Findings

In this study, four research questions were examined, and the results of statistical analysis conducted in SPSS are reported in this section. The findings are organized by research question its null hypotheses.

RQ1: What is the relationship between EET and satisfaction with the online education of college students?

$H1_0$.: There is no relationship between students' EET and their satisfaction with online education.

For the first research question (RQ1), a Spearman Rho correlation test was conducted between the early exposure to technology (EET) independent variable and the student satisfaction (SS) dependent variable. The results were that there was not a statistically significant correlation between the early exposure to technology and student satisfaction, r_s = -.081; p = .416. Therefore, the null hypothesis ($H1_0$.) that stated that there is no relationship between students' EET and their satisfaction with online education was not rejected, suggesting that there is no relationship between EET and SS.

RQ2: What is the effect of students' demographics on the relationship between EET and satisfaction with online education in college?

$H2_0$.: The students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college.

To test if there was any effect of the demographic factors that are gender and age groups of the respondents, an ANOVA was conducted including age groups and gender as independent variables and student satisfaction as the dependent variable.

Table 27

ANOVA: Gender and Age Group on Student Satisfaction

Tests of Between-Subjects Effects						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	12.659[a]	11	1.151	1.243	.272	.136
Intercept	575.412	1	575.412	621.349	<.001	.877
Gender	.071	1	.071	.076	.783	.001
Age	5.967	5	1.193	1.289	.276	.069
Gender * Age	4.455	5	.891	.962	.446	.052
Error	80.568	87	.926			
Total	1042.139	99				
Corrected Total	102.881	102				

Note. a. R Squared = .136 (Adjusted R Squared = .027). Dependent Variable: Student Satisfaction.

Table 27 includes an illustration that there was no statistically significant interaction between gender and age groups for Student Satisfaction score, $F(5, 87) = .962$, $p = .446$, partial $\eta^2 = .052$.

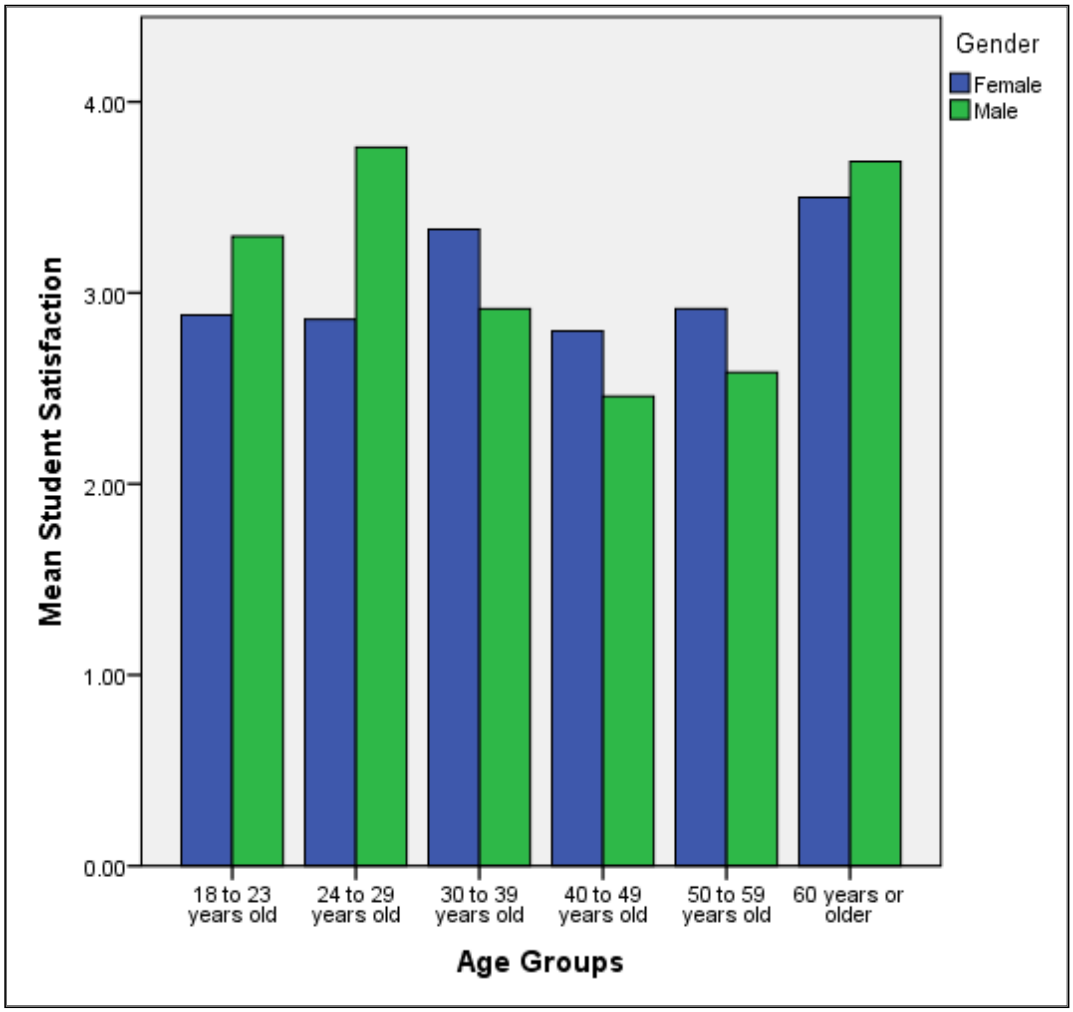

Figure 4: Bar chart for gender by age group and student satisfaction.

As the results shown in Table 27 along with the illustration in *Figure 4* of the age groups by gender on student satisfaction, the null hypothesis ($H2_{0.}$) that states students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college was not rejected.

RQ3: What is the effect of EET in the ICT environment on the relationship between performance expectancy (PE), effort expectancy (EE), and students' use behavior (UB) of ICT in online education?

$H3_{a0}$.: The students' EET in the ICT environment has no effect on the relationship between the students' PE, EE, and students' UB of ICT in online education.

For the third research question (RQ3) three separate Spearman Rho correlation tests were conducted between the early exposure to technology (EET) independent variable and the performance expectancy (PE) variable; then between the EET variable and the effort expectancy (EE) variable; and lastly, between the EET variable and the use behavior (UB) variable.

As a result of the Spearman's rho Coefficient test, no statistically significant correlation between the early exposure to technology (EET) and the performance expectancy (PE) was found, r_s = -.193; p = .051.

However, the Spearman's rho Coefficient test indicated that there was a statistically significant correlation between the early exposure to technology (EET) and the effort expectancy (EE), r_s = .338; p < .0001.

Finally, and similarly to the relationship between EET and PE, a Spearman's rho Coefficient test indicated that there was not a statistically significant correlation between the early exposure to technology (EET) and the use behavior (UB), r_s = -.011; p = .911.

Therefore, the null hypothesis ($H3_{a0}$.) that stated the students' EET in the ICT environment has no effect on the relationship between the students' PE (p = .051) and students' UB (p = .911) of ICT in online education was not rejected. However, a significant relationship was found between EET and EE (p < .0001).

$H3_{b0}$*:* There will be no relationship among PE, EE, and UB.

For the third research question (RQ3) and its second hypothesis ($H3_{b0}$.), a multiple linear regression was conducted to analyze the relationship between the UTAUT variables PE, EE, and UB. The model summary with PE and EE as predictors of UB (see Table 36) found a statistically significant relationship between the two UTAUT constructs (PE and EE) and the UB construct, R = .773; F = 74.125; p < .0001. Therefore, the null hypothesis ($H3_{b0}$) that stated there will be no relationship among PE, EE, and UB was rejected.

Table 28

UTAUT Constructs: Multiple Linear Regression between PE, EE, and UB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.960	2	23.480	74.125	.000[b]
	Residual	31.676	100	.317		
	Total	78.636	102			

Note. a. Dependent Variable: Use Behavior.
b. Predictors: (Constant), Effort Expectancy, Performance Expectancy.

RQ4: What is the relationship between the students' UB of ICT and their satisfaction with online education?

$H4_0$. There is no relationship between the students' UB of ICT and their satisfaction with online education in college.

For the last research question (RQ4) and its hypothesis ($H4_0$.), a Spearman Rho correlation test was conducted between the use behavior (UB) variable and the student

satisfaction (SS) dependent variable. The results indicated that there was a statistically significant correlation between the use behavior (UB) and student satisfaction (SS), r_s = .334; $p < .0001$.

Therefore, the null hypothesis ($H4_0$.) that stated that there is no relationship between the students' UB of ICT and their satisfaction with online education in college was rejected. This test concludes the statistical analysis conducted to test the hypotheses based on the four research questions.

Summary

The purpose of this quantitative nonexperimental study was to examine the relationship between the student's early exposure to technology (EET) before college and student's satisfaction with online education in college. Three UTAUT constructs were also examined to determine the relationship between the early exposure to technology and student's performance expectancy and effort expectancy in order to see if the relationship extends to the student actual use behavior of ICT. Another objective was to examine if the student actual use behavior of ICT has any positive effect on the student's satisfaction with online education. The findings of this study were intended to inform all stakeholders including university administrators and students, government agencies, and professional managers in the information technology fields to take the necessary steps to prepare students and workers alike well. Such preparation will help them before they enter the respective fields where the information technology and ICT are necessary to achieve higher performance in school or at the workplace and attain maximum satisfaction.

Table 29

RQs and Hypotheses: Findings Summary of the Statistical Analysis

	RQ1	RQ2	RQ3				RQ4
Hypothesis[a]	$H1_0$	$H2_0$	$H3_{a0}$			$H3_{b0}$	$H4_0$
Statistical Test	Spearman's rho	ANOVA	Spearman's rho			Multiple linear Regression	Spearman's rho
Independent Variable	EET	Gender and Age	EET	EET	EET	PE and EE	UB
Dependent Variable	SS	SS	PE	EE	UB	UB	SS
Statistical Result	r_s = -.081; p = .416	$F(5, 87)$ = .962, p = .446, partial η^2 = .052	r_s=-193; p= .051.	r_s=.338 p< .0001	r_s=- 011; p= .911	R = .773; F= 74.125; p< .0001	r_s =.334; p < .0001
Null Hypothesis Not-Rejected=V Rejected=X	V	V	V	X	V	X	X

Note. a. $H1_0$.: There is no relationship between students' EET and their satisfaction with online education in college. *$H2_0$.*: The students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college. *$H3_{a0}$.*: The students' EET in the ICT environment has no effect on the relationship between the students' PE, EE, and students' UB of ICT in online education. *$H3_{b0}$:* There will be no relationship among PE, EE, and UB. *$H4_0$.*: There is no relationship between the students' UB of ICT and their satisfaction with online education in college.

The findings summary of the statistical analysis is illustrated in Table 29. Five hypotheses were formulated to answer four research questions. A quantitative nonexperimental research design was applied in which surveys were used to collect data that provided answers to the four research questions and tested those five hypotheses. The survey questionnaire was adopted partially from the UTAUT instrument (Venkatesh et al., 2003) and the student satisfaction and learning outcomes instrument (Eom et al.,

2006). In addition, questions were added to the survey instrument to collect data about the early exposure to technology regarding how early the students were introduced to ICT before college to how often they used ICT. Also, the questions include an inquiry about the location where they used to have access to ICT and the ICT skills level that they feel they are at for the different ICT literacies. The added questions related to early exposure to technology were tested for reliability by conducting a pilot study which resulted in a Spearman-Brown's coefficient of .931 for internal consistency between the item tested in the reliability test.

The first hypothesis was formulated to test the relationship between students' early exposure to technology (exposure to ICT) and their satisfaction with online education in college. A Spearman Rho correlation coefficient test was conducted to test the null hypothesis ($H1_0$), and the results showed that no statistical significance could be found and therefore the null hypothesis could not be rejected.

The second hypothesis was formulated to test if the demographic characteristics being the age and gender have any differences based on those characteristics of student satisfaction. An analysis of variance (ANOVA) test was conducted to test the null hypothesis ($H2_0$), and the results showed that the students' demographic factors (age and gender) do not predict the degree of satisfaction with online education at the college and therefore the null hypothesis was not rejected.

The third and fourth hypotheses were formulated to answer the research question about the relationship between the early exposure to technology with each of the UTAUT constructs (performance expectancy, effort expectancy, and use behavior) and also to test

the relationship among those UTAUT constructs. A separate Spearman Rho correlation coefficient tests were conducted to test the third null hypothesis ($H3_{0a}$) for each of UTAUT variables, and the results showed that no statistical significance could be found between the early exposure to technology and each of performance expectancy or the use behavior. However, the results also showed that there was a statistical significance in the relationship between the early exposure to technology and the student effort expectancy. Therefore, the null hypothesis ($H3_{0a}$) was not rejected for the student performance expectancy and use behavior but rejected for student effort expectancy.

The fourth hypothesis ($H3_{0b}$) was tested using a multiple linear regression analysis tests to determine the relationship among the UTAUT constructs setting the performance expectancy (PE) and the effort expectancy as independent variables (EE), and the use behavior (UB) as the dependent variable. The results showed that there was a statistically significant relationship between the two independent UTAUT constructs (PE and EE) and the dependent variable (UB). Therefore, the null hypothesis was rejected.

Lastly, the fifth hypothesis was formulated to test the relationship between students' use behavior of ICT and their satisfaction with online education in college. A Spearman Rho correlation coefficient test was conducted to test the null hypothesis ($H4_0$), and the results showed that a statistically significant correlation was found between use behavior of ICT and student satisfaction. Therefore, the null hypothesis was rejected.

In Chapter 5, the results from this chapter will also be presented in more detail along with the conclusion of this study, implications of social change, and some recommendations for further research.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative nonexperimental study was to examine the relationship between students' EET before college and their satisfaction with online education in college. In conducting this study, I wanted to address the general management problem for colleges and universities, which is sustaining the growth of online student enrollment and retaining students until they complete their programs (James et al., 2016). I also wanted to address the specific management problem for those institutions – that is, the need to understand the driver behind students' satisfaction, which often leads to higher student retention and the intended learning outcomes (Calli et al., 2013).

The findings were consistent with previous studies whose authors had used the UTAUT theoretical framework (Venkatesh et al., 2003) to examine users' acceptance and use of technology in the field of management of information systems. However, my approach in this study was different in that I used some UTAUT variables such as PE, EE, and UB to examine any relationship between early exposure to ICT (during the years before starting college) and student satisfaction with online education. While no statistically significant relationship was found between early exposure to ICT and student satisfaction, the findings showed that there is a connection between early exposure to ICT and student EE, then between the effort expectancy and use behavior, then finally, between the use behavior and the student satisfaction with online education. The next section includes additional interpretation of these findings.

Interpretation of Findings

This study I conducted, was to provide answers to the four main research questions. The statistical tests on the collected data were conducted using IBM SPSS version 24, with the alpha level < .05.

The Overall Descriptive Analysis of Findings

The overall descriptive analysis of the data from the 103 valid responses collected using the Survey Monkey Audience indicated valuable information about students from online colleges and universities throughout the United States. The participants' ages varied from 18 years old to over 60 years old with 64.1% of them under the age of 30. A little more than a half of the participants were women (55.3%), which is consistent with the national trend for the gender distribution (61.11% women vs. 38.89% men, see Table 1) at colleges and universities across United States (NCES, 2014). As to the educational level of the participants, the majority of the responses (57.3%) came from students who were in their second year (sophomore) to fourth year (senior) of their undergraduate online degree programs. The next largest percentage (35%) was students enrolled in online classes at the graduate level. While I had hoped to have more participants in their first year in college (freshmen), only 6.8% responded to this survey. Perhaps, the lack of participation of freshmen students in this study can be attributed to the lack of exposure to online surveys in general in their years before college.

The profile of the survey participants as revealed by SM at the end of my survey indicated that 43% of the participants were mobile users (using smartphone or tablets) and were spread out over all regions of the United States. As to students' satisfaction, as

shown in Figure 4, the younger female students under the age of 30 seemed more satisfied with online education than male students in that age group. In contrast, older male students between 30 to 60 years of age were more satisfied than female students in that age group. These statistics are similar to previously reported data in studies that suggested that older women are less engaged with ICT tasks than younger women due to the evolving roles and the responsibilities they take on as they get older (Lau & Yuen, 2014; Tsai & Tsai, 2010, Venkatesh et al., 2003).

Research Question 1

The first research question was, what is the relationship between EET and satisfaction with the online education of college students?

The hypothesis H_a1 was, there is a positive relationship between students' EET and their satisfaction with online education in college.

A Spearman Rho correlation test was conducted between the EET independent variable and the SS dependent variable. The results of the data analyses indicated that there was not a statistically significant correlation between EET and SS with online education. Therefore, the hypothesis H_a1 was not supported. It was concluded that EET does not predict the level of satisfaction of college students enrolled in online education.

The results of the study seem to neither show a positive correlation as reported in previous studies (Calli et al., 2013; Carbone et al., 2011; James et al., 2016), nor show negative correlation between computer skills (or early exposure to technology) with student satisfaction as reported by Abdous and Yen (2010). Perhaps, the findings are an indication that EET by itself does not affect student satisfaction when measured

separately from other factors such as learning environment, LMS type, and type of content or curriculum that contribute a good user experience (Goyal & Purohit, 2011; Liaw et al., 2007; Zaharias & Pappas, 2016).

Research Question 2

The second research question was, what is the effect of students' demographics on the relationship between EET and satisfaction with online education in college?

The hypothesis H_a2 was, Demographic factors (age and gender) predict the degree of satisfaction with online education at the college.

An analysis of variance (ANOVA) test between age and gender as predictors and student satisfaction with online education was conducted. The results of the data analyses indicated that there was no statistically significant interaction between gender and age groups for student satisfaction score. Therefore, the hypothesis H_a2 was not supported. In addition, the results, as shown in the bar chart for gender by age group and student satisfaction (see Figure 4), revealed that there were different levels of satisfaction among the different age groups within the same gender as reported by other studies (Lau & Yuen, 2014; Tsai & Tsai, 2010).

The findings seem to concur with what has been reported in previous studies about gender and age when it comes to satisfaction or retention. For instance, findings by James et al. (2016) indicated no difference between genders when it comes to retention.

Research Question 3

The third research question was, what is the effect of EET in the ICT environment on the relationship between PE, EE, and students' UB of ICT in online education?

One of the two hypotheses for Research Question 3 was the hypothesis $H_{a1}3$: The students' EET in the ICT environment affects the relationships among the students' PE, EE, and UB of ICT in online education.

Three separate Spearman Rho correlation tests were conducted between the early exposure to technology (EET) and the performance expectancy (PE), then between the EET and the effort expectancy (EE), and lastly, between the EET variable and the use behavior (UB). The results of the data analysis of the relationship between EET and PE indicated that there was not a statistically significant correlation between the early exposure to technology and performance expectancy. The hypothesis $H3_{a1}$ was not supported for the relationship of EET and PE. Therefore, it was concluded that the early exposure to technology does not predict the degree of performance expectancy (PE). PE is the degree to which an individual believes that using the system will help him or her to attain gains in performance (Venkatesh, Morris, Davis, & Davis, 2003, p. 447).

Similarly, the results of the data analysis of the relationship between EET and UB indicated that there was not a statistically significant correlation between the early exposure to technology and use behavior. The hypothesis $H3_{a1}$ was not supported for the relationship of EET and UB. Therefore, it was concluded that the early exposure to technology does not predict the use behavior (UB), which is how an individual might behave by using the system as a result of strong intention to use it (Venkatesh et al., 2003).

However, the results ($p < .0001$) of the data analysis of the relationship between EET and EE, indicated that there was a statistically significant correlation between the

early exposure to technology and the effort expectancy. The hypothesis $H3_{a1}$ was supported for the relationship between EET and EE. Therefore, it was concluded that the early exposure to technology predicts the effort expectancy (EE), which is the degree of ease of use of the system (Venkatesh et al., 2003, p. 450). The findings seem to agree with what has been reported in previous studies about effort expectancy or the perceived ease of use of technology (Lippert & Forman, 2005), and Mohammadyari and Singh (2015) who found that self-efficacy significantly affects effort expectancy. This is a very interesting finding especially since previous studies like the one conducted by Calli et al. (2013) found that satisfaction was significantly affected by perceived ease of use, a construct that precedes the effort expectancy (EE). Perhaps, this empirical finding is a good sign that the early exposure to technology is an important starting point to ensure that students and workers are well prepared for their respective tasks using ICT systems.

The second hypothesis ($H3_{b1}$) of Research Question 3 was: There will be a positive relationship among PE, EE, and UB.

A multiple linear regression test was conducted to analyze the relationship between the UTAUT variables PE, EE, and UB. The results of the data analyses indicated that there was a statistically significant relationship between the two UTAUT constructs (PE and EE) and the UB construct, and the hypothesis $H3_{b1}$ was supported. These findings seem to agree with findings of many studies that used the UTAUT model (Venkatesh et al., 2003), even in those studies where the UTAUT model has been completely changed (Decman, 2015; Mohammadyari & Singh, 2015; Wu, Tao, & Yang, 2007) or partially changed by measuring PE and EE relationship with without going

through the intention-behavior (IB) construct (as shown in the original UTAUT model) as conducted by Wu et al. (2007).

Research Question 4

The fourth research question was: What is the relationship between the students' UB of ICT and their satisfaction with online education?

The hypothesis $H4_a$ was: There is a relationship between the students' UB of ICT and their satisfaction with online education in college.

A Spearman Rho correlation between the use behavior (UB) and the student satisfaction (SS) was conducted. The results of the data analyses ($p < .0001$), indicated that there was a statistically significant relationship between the use behavior (UB) and student satisfaction, and the hypothesis $H4_a$ was supported. These findings seem to align with previous findings of student satisfaction where they referred to it as good user experience when students interact with ICT on LMS in an education setting (Goyal & Purohit, 2011; Liaw et al., 2007; Zaharias & Pappas, 2016). Similar findings were also reported by Goyal and Purohit (2011) studied the students' perception of expectations and satisfaction with the use of ICT with and without an LMS usage and found that satisfaction with ICT was significantly higher after using a well-defined LMS. However, it is worth mentioning that Li, Marsh, Rienties, and Whitelock (2016) found that learning experience and satisfaction is substantially different for new students compared to continuing students. Perhaps, there is a need to find out what kind of ICT exposure they had before enrolling in online college to keep them satisfied and ultimately turn them into continuing students.

In conclusion, the answers to the research questions supported some hypotheses ($H3_{a1}$ for EET-EE, $H3_{b1}$ for PE&EE-UB, and $H4_a$ for UB-SS) and failed to support some other hypotheses ($H1_a$ for EET-SS, $H2_a$ for age & gender -SS, $H3_{a1}$ for EET-PE and EET-UB). When looking at those findings, it seems that these are mixed results about the effect of early exposure to technology on student satisfaction with online education. However, the statistically significant correlation found between the early exposure to technology and effort expectancy, then between effort expectancy and use behavior and finally between use behavior and student satisfaction confirms that the connection exists through those variables that interact between the early exposure to technology and the student satisfaction with online education.

Limitations of the Study

The limitations of this study are summarized based on how this study was executed regarding generalizability, validity, and reliability. The fact that a convenience sample was used to select 103 participants to represent the population of online college students in the United States as opposed to using random sampling is a major limitation to generalizability. Another limitation was related to the validity of responses since the survey questions were asking the college students to recall some exposure to ICT from 15 to 20 years ago or more, which might have put the respondents in a situation to give arbitrary answers that might hot have reflected the accurate experiences that they were exposed to. Another limitation of this study is the fact that the set of questions related to exposure to technology were not rigorously tested for reliability like the set of questions that were borrowed for the UTAUT instrument. However, the pilot study data analysis

ran before the main study has shown an acceptable reliability result (Spearman-Brown's coefficient of .931 for internal consistency between the item). Another limitation was that the data about student's intention to use ICT in the future (as reported by students) had been collected from a one-time survey rather than surveying students at multiple times where actual usage of ICT would have been measured. Lastly, another limitation was encountered during the data collection from Survey Monkey Audience, which resulted in 58 (36%) responses with missing data. This limitation led to the collection of two datasets then combining them to reach a combined dataset of 103 valid responses with no missing data to conduct the data analyses.

Recommendations

The purpose of this quantitative nonexperimental study was to examine the relationship between the student's early exposure to technology (EET) before college and student's satisfaction with online education in college. This study has some strengths and some limitations, as outlined above. The literature review in Chapter 2 included some guidance to conduct the study and to focus on some variables that are either likely to be affected by the early exposure to technology or likely to affect the student satisfaction. The important findings indicated that the student satisfaction was indirectly affected by the early exposure to technology through the effort expectancy and use behavior worth the call for action to college and university administrators and professional managers alike to consider the following recommendations:

- Develop an EET evaluation test for new students and new workers before starting study or job assignment to assess their level of exposure to ICT. By

doing so, college administrators and professional managers can help those new students or new hires overcome any lack of ICT by more training to improve the degree of ease of use of their system. Such an early intervention might lead to more acceptance and actual use of ICT that will eventually contribute to a better satisfaction and higher retention rate.

- School systems that provide K-12 education to students should review their ICT curriculum and start preparing students for college education and jobs by focusing ICT skills development rather than general access to a computer system or internet access.
- Create a standardized ICT skills test (called EET) that should be used by colleges and universities as an entrance exam similar to SAT (Scholastic Aptitude Test, or Scholastic Assessment Test) and ACT (American College Testing). These tests are taken by students across the United States in order to get admitted to college at postsecondary education institutions.
- Similarly, create a standardized ICT skills test (called EET) that should be used by companies across the world to assess the new hires ICT skills to help them navigate through company's information system so that they can perform better in their respective jobs.
- Provide free training in ICT skills at public libraries and not-for-profit institutions to help people of all ages gain or improve their ICT skills so that they can improve their lives and the lives of the people around them who might not have access to ICT training.

- Raise awareness about the benefits of ICT skills and market them as the new reading and writing skills of the 21st century.

While every effort was exhausted to conduct this study (with limited resources) to reduce the literature gap, there are more ways to improve this study in the future using the following recommendations:

- Study sample: the sample of convenience from which the data were collected was representative enough of the population of college students in the United States based on the participant's profiles as provided by Survey Monkey. However, I would recommend that a random sample is drawn from fully online colleges and universities to ensure a representation that permits some level of generalization.
- Target population: As indicated by Li, Marsh, Rienties, and Whitelock (2016) who found that learning experience and satisfaction is substantially different for new students compared to continuing students. I would recommend that data is collected separately from new students then compared to continuing students to ensure an adequate evaluation of the effect of early exposure to technology on satisfaction with online education.
- Explore other design methods such as qualitative design or mixed method to dig deeper in the area of early exposure to technology to understand what are the most contributing factors among the four indicators. Those indicators are the age of first exposure to ICT, the frequency of ICT usage, location where ICT was accessed, and the ICT skills level before starting college.

- Put the participants through a hands-on ICT assessment activity to evaluate their true ICT level and exposure to technology in addition to taking a survey to collect data about other variables such as intention to use the system or student satisfaction.
- Expand the study to include students from other countries that offer online programs at their colleges and universities.

Implications

The purpose of this quantitative nonexperimental study was to examine the relationship between the student's early exposure to technology (EET) before college and student's satisfaction with online education in college. Also, the intent was not only to contribute to the body of knowledge regarding this gap but also to potentially impact the positive social changes by providing solutions and suggest changes at all levels including individual, family, organizational, and societal or policy-making levels.

From a theoretical perspective, this study addressed a gap in the literature about online education where very little is known about the effect of prior exposure to technology on the student satisfaction with online education (Rice, 2006; Saba, 2005). The lack of specific studies put this study at the forefront bringing a valuable contribution to the body of knowledge in this particular area guided by empirical theories. The main theories used in this study were the unified theory of acceptance and use of technology (UTAUT) theory (Venkatesh et al., 2003), and skill acquisition theory (SAT) (Dekeyser, 1998, 2007). The combination of the two theoretical frameworks (UTAUT and SAT) provided substantial guidance for this study to inform on the ICT skill levels acquired

prior to college and the student's acceptance and wiliness to use ICT in online education and the effect of those variables on the student satisfaction. Moreover, the combination of the two theoretical frameworks might also help researchers outside the United States to use the same methodology and variables to replicate this study in their respective countries or regions that share similar education systems. Perhaps, they can explore if the effect of EET has any relationship with satisfaction in online education for students attending their respective colleges and universities.

From a practical perspective, the results of this study may inform scholars and practitioners to look back and evaluate the early exposure to technology during the years prior to college. Shedding light on the literature that produced mixed results about what influenced the students' attitude toward computers (Yilmz & Alici, 2011) or what drives student satisfaction, the findings for this study provide empirical results showing how the early exposure to technology effects indirectly the student satisfaction through the effort expectancy and use behavior. It is important for the higher education institutions embarking on the process of offering online programs to set the right environment for students to succeed in online-based learning. The universities' enrollment advisors should be asking the same questions used in EET questionnaire to identify students who had less or no EET to ensure that all students enrolling in online courses are ready for online learning. If such luck in ICT skills is identified, they can put them through intense training sessions in information technology prior to starting their online classes. Therefore, the results of this study are providing much-needed insights into the process of

putting in place the necessary success factors for students to have similar or better educational experience compared with an on-ground learning environment.

Because there are more options for online education at higher education institutions, it is important for administrators and faculty at those institutions to identify the learning needs of their students and identify the areas of opportunities to set up an environment that is conducive to learning (Coccoma, Peppers, & Molhoek, 2012). Findings from this study may also be important to managers in the business community because individuals who are satisfied with studying and working online may likely work better in global virtual teams. The findings should be of value in designing new curricula and in filling business positions requiring working in virtual teams.

In addition, this study may contribute to social change by helping inform policymakers at all levels to take proactive steps to affect positive social changes necessary to prepare students for a technology-driven education that puts them at a competitive advantage. A uniform exposure to technology for students at all institution-based education levels prior to college will build the basic foundation for subsequent schooling giving socially disadvantaged children the same range of skills and abilities to compete in college with their socially advantaged peers. Furthermore, addressing such needs may payback when students are enrolled in technology-supported learning environments such as online classes. As stated in the recommendations section, the findings of this study might encourage information technology professionals to give back to their communities by getting involved in ICT skill training provided free of charge to the general public at their local libraries and other public venues.

Conclusions

The purpose of this quantitative nonexperimental study was to examine the relationship between the student's early exposure to technology (EET) before college and the student's satisfaction with online education in college. The findings from the data analyses have shown that there was no statistical significance in the direct relationship between the early exposure to technology and the student's satisfaction with online education. However, the findings have shown that there is an indirect relationship between the early exposure to technology and student satisfaction that goes through the effect of early exposure to technology on the student effort expectancy which in turn affect the student behavior to use ICT that also, in turn, affect the student satisfaction with online education.

These findings seem to indicate that a strong and wide exposure to ICT prior college may translate in a better effort expectancy for the college student or the working professional to build a positive behavior toward the use of ICT or future information systems in the workplace. A strong effort expectancy would result in a better satisfaction and eventually in a higher retention rate.

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Appendix A: Early Exposure to ICT and Satisfaction Survey

This survey is intended for college students who are 18 years or older enrolled in online classes. Participants under 18 years old please exit the survey. Please click on the link of the **consent form** for more details and your completion of the survey will indicate your consent if you choose to participate.

Instruction on how to complete the survey: in most of the questions you are asked about your level of agreement with from *Strongly Agree* to *Strongly Disagree*. Please click on the corresponding choice or click on N/A if the question is *not applicable* to you. Please see an example of who to answer the question:

Online class is much easier than face-to-face class.
□ Strongly Agree √ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A
If you agree click here 

After you complete the survey click Submit. You may click Exit at any time if you wish to exit the survey. The survey has four (4) parts:

- Part 1 of the survey is related to the demographic data
- Part 2 of the survey is related to your early exposure to information and communication technology (ICT)
- Part 3 of the survey is related to expectation and your wiliness to continue using the ICT in online classes
- Part 4 of survey is related to your satisfaction of online education as a result using ICT in online environment

To Begin the Survey, Click on the Next Button

Part 1: Demographic data

1. What is your age group?

□ 18 to 23 years old □ 24 to 29 years old □ 30 to 39 years old

□ 40 to 49 years old □ 50 to 59 years old □ 60 years or older

□ I prefer not to answer

2. What is your gender?

□ Male □ Female □ I prefer not to answer □ Others (free response): _____

Part 2: Early exposure to ICT and the environment where the ICT skill were acquired

3. What is your college status?

□ Freshman (1st year) □ Sophomore (2nd year) □ Junior (3rd year) □ Senior (4th year)

□ I don't know □ N/A

4. I have had extensive access to a computer at home, prior to college.

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

5. I have had extensive access to a computer at school, prior to college.

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

6. I have had extensive access to a computer at other places other than home and school, prior to college

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

7. At what age were you comfortable using computer technology (such as email, word processing, spreadsheets) for academic use throughout the years prior to college?

□ Prior to age 10 □ Since age 11 to 13 □ Since age 14 to 17 □ Since age 18 to later age □ I don't remember □ N/A

8. How often you used to access a computer to carry out an ICT task during the years prior to college?

□ Daily □ Few times a week □ Once a week □ Rarely □ I don't remember □ N/A

9. I can define the necessary steps to conduct an effective preliminary information searches to help formulate a research statement

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

10. I can generate and combine search terms (keywords) to satisfy the requirements of a particular research task on the Internet

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

11. I can efficiently browse one or more resources to locate the needed information to carry out an ICT task

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

12. I can easily determine what types of resources might yield the most useful information for a particular Internet search need

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

13. I can easily determine the extent to which a collection of resources sufficiently covers a research area

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

14. I know how to categorize emails into appropriate folders based on the email content

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

15. I know how to organize and sort files in folders of related information

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

16. I know how to upload, download and attached files to an email or to an online discussion board or an assignment

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

17. I know how to interpret and represent information using digital tools to synthesize, summarize, compare and contrast information from multiple sources.

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

18. I know how to incorporate information from different sources to conduct a scientific experiment and report the results

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

19. I know how to edit and format a document according using a set of editing tools such as in Microsoft Word processor

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

20. I know how to create a presentation slides to present a topic using presentation applications such as Microsoft PowerPoint

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

21. I can create a data display in a spreadsheet such as Microsoft Excel to show datasets in a table format or data charts

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

22. I can format a document for communication purposes to make it more useful to a particular group or particular topic

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

23. I can design a flyer to advertise to a distinct group of users or particular event or a particular topic

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

Part 3: Performance expectancy, effort expectancy and wiliness to use ICT

24. I expect to find ICT useful for my online education

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

25. Using ICT will enable me to accomplish tasks for my online education more quickly

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

26. Using ICT will increase my productivity in carrying out my online education

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

27. My interaction ICT will be clear and understandable

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

28. It will be easy for me to become skillful at using ICT

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

29. I will find ICT easy to use

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

30. Learning to use ICT will be easy for me

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

31. I intend to continue using ICT for my online education, rather than discontinue their use

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

32. My intentions are to continue using ICT for my online education than use any alternative means (e.g. traditional learning)

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

33. If I could, I would like to discontinue my online education

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

Part 4: Student satisfaction with online education

34. The academic quality using ICT in online education was equivalent to face-to-face courses I have taken before

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

35. I would recommend this course to other students in this online format

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

36. I would take an online course again in the future

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

37. I feel that I learned as much from this online course as I might have from a face-to-face version of the course

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

38. I feel that I learn more in online courses than in face-to-face courses

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

39. The quality of the learning experience in online courses is better than in face-to-face courses

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree □ N/A

Appendix B: Permission to Use UTAUT Instrument

MIS Quarterly
Carlson School of Management
University of Minnesota
Suite 4-339 CSOM
321 19th Avenue South
Minneapolis, MN 55455

March 31, 2017

Mohamed Boudalia
Walden University

Permission to use material from
MIS Quarterly in Dissertation Research

Permission is hereby granted for Mohamed Boudalia to use material from "User Acceptance of Information Technology: Toward a Unified View," V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, *MIS Quarterly* (27:3), September 2003, pp. 424-478, specifically Figure 3 (or an adaptation thereof) and additional reference material as needed, in his dissertation being completed at Walden University.

In addition to the citation information for the work, the legend for the material should include

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DN: cn=Janice DeGross, o=MIS Quarterly, ou, email=degro003@umn.edu, c=US
Date: 2017.03.31 11:24:18 -05'00'

Janice I. DeGross
Manager

Appendix C: Permission to Use Student Satisfaction Questionnaire

6/28/2017

RE: Request for permission to use subset of questions from your questionnaire in my study

Eom, Sean B

Tue 4/25/2017 1:37 PM

Archive

To: Mohamed Boudalia

Thanks for contacting me.
You may do so.

Best regards,

Sean Eom

****

Sean Eom
Professor of MIS
Department of Accounting, MS 5815
Southeast Missouri State University
Cape Girardeau, MO 63701

****

From: Mohamed Boudalia
Sent: Monday, April 24, 2017 8:51 AM
To: Eom, Sean B
Subject: Request for permission to use subset of questions from your questionnaire in my study

Dear Sean B. Eom and H. Joseph Wen:

I am a Ph. D. candidate at Walden University in the process of completing my dissertation exploring the effect of early exposure to technology on students' satisfaction with online education. I've come across your survey questionnaire that you developed for your study, which was in part adapted or selected from the commonly administered IDEA (Individual Development & Educational Assessment) student rating systems developed by Kansas State University. I am very interested in the possibility of using an adapted version of your questionnaire in my study related to user satisfaction and learning outcomes sections.

6/28/2017

After exploring many questionnaires related to student's satisfaction with online education, I realized that using a subset of your questionnaire (user satisfaction and learning outcomes sections) in conjunction with a modified subset of the unified theory of acceptance and use of technology (UTAUT) instrument would better guide my study. With your permission, I would like to use a subset of the questionnaire related to user satisfaction and learning outcomes sections along with questions from the UTAUT instrument. I will be adding my own questions related to early exposure to technology (EET), which would better serve the purpose of my study.

I hope you would consider granting me the permission to use questions from your questionnaire as noted above. I look forward to your response.

Sincerely,

Mohamed Boudalia
Ph.D. Candidate in Management of Information System
Walden University