AN INVESTIGATION INTO ENGLISH STUDENT TEACHERS' BEHAVIORAL INTENTION TO USE INFORMATION AND COMMUNICATION TECHNOLOGIES

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Tez yazma sürecinde bilimsel ve etik ilkelere uyduğumu, yararlandığım tüm kaynakları gösterme ilkelerine uygun olarak kaynakçada belirttiğimi ve bu bölümler dışındaki tüm ifadelerin şahsıma ait olduğunu beyan ederim.

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To my beloved family,

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İNGİLİZCE ÖĞRETMENİ ADAYLARININ BİLGİ VE İLETİŞİM TEKNOLOJİLERİNİ KULLANMA NİYETLERİNE İLİŞKİN BİR ARAŞTIRMA

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ÖZ

Bu çalışma, İngilizce öğretmeni adaylarının gelecek sınıflarında bilgi ve iletişim teknolojilerini (BİT) kullanma davranışsal niyetlerinin tahmini için bilgisayar özyeterliği, bilgisayar kaygısı, yapılandırmacı öğretim inançları ve bilgisayara yönelik tutumun katkısını araştıran bir modeli test etmeyi amaçlamaktadır. Çalışmanın örneklemi Türkiye'de eğitim gören son sınıf 861 İngilizce öğretmeni adayından oluşmaktadır. Bilgisayar Teknolojisi Entegrasyon Anketi, Bilgisayar Kaygı Derecelendirme Ölçeği, Yapılandırmacı Öğretim İnanç Ölçeği ve Bilgisayara Yönelik Tutum Ölçeği çalışmada kullanılmıştır. Veri taramasından sonra 844 İngilizce öğretmen adayının verisi modeli test etmek amacıyla analize sokulmuştur. Modeli test etmeden önce dört veri toplama aracının doğrulayıcı faktör analizi yapılmış ve doğrulanmıştır. Öğretmen adaylarının BİT'i kullanma davranışsal niyeti modeli olan I-PredICT yapısal eşitlik modellemesi kullanılarak test edilmiş ve İngilizce öğretmeni adaylarının BİT'i gelecekteki derslerinde kullanmak için davranışsal niyetlerini tahmin etmede varyansın % 77'sini açıkladığı bulunmuştur. I-PredICT modelinde bilgisayar öz-yeterliliği, bilgisayar kaygısı, bilgisayar tutumu ve

yapılandırmacı öğretim inançları sırasıyla anlamlı bulunmuştur. Öğretmen eğitmenlerinin, politika yapıcıların, öğretim programı geliştiricilerinin, öğretmen ve öğretmen adaylarının BİT entegrasyon uygulamalarını geliştirmeleri için bu çalışmanın bulgularını dikkate almaları önerilir.

Anahtar Kelimeler: BİT kullanımında davranışsal niyet, hizmet öncesi öğretmen eğitimi, yapısal eşitlik modellemesi

Sayfa Adedi: 164

Danışman: Prof. Dr. Paşa Tevfik Cephe

AN INVESTIGATION INTO ENGLISH STUDENT TEACHERS' BEHAVIORAL INTENTION TO USE INFORMATION AND COMMUNICATION TECHNOLOGIES

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ABSTRACT

This study aims to test a model investigating the contribution of computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude to predicting English student teachers' behavioral intention to use information and communication technologies (ICT) in their future classes. The sample of the study consists of 861 senior English student teachers at state universities in Turkey. Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs Scale, and Computer Attitude Scale were utilized in order to collect data. After data screening, data from 844 English student teachers were used in order to test the model. Confirmatory factor analyses of four data collection instruments were conducted before testing the model and they were all verified. Behavioral intention to use ICT for student teachers model, I-PredICT, was tested by using structural equation modeling and it was found that it explains 77% of the variance in predicting English student teachers' behavioral intention to use ICT in their future classes. Computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs were respectively found significant in I-PredICT model. Teacher educators, policy makers, curriculum developers, teachers, and pre-service

teachers are recommended to take into consideration the findings of this study in order to develop student teachers' ICT integration practices.

Key Words: Behavioral intention to use ICT, Pre-service teacher education, Structural equation modeling

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LIST OF ABBREVATIONS

AGFI	Adjusted Goodness of Fit Index
CALL	Computer Assisted Language Learning
CFI	Comparative Fit Index
ELT	English Language Teaching
GFI	Goodness of Fit Index
ICT	Information and Communication Technologies
NFI	Normed Fit Index
NNFI	Nonnormed Fit Index
RMSEA	The Root Mean Square Error of Approximation
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual
$\chi 2$/df	Chi-square/degrees of freedom

CHAPTER I

INTRODUCTION

Statement of the Problem

In the last two decades, the developments in the world have strengthened the place of information and communication technologies (ICT) in the world and ICT has long been a question of great interest in a wide range of fields including education. Educators all around the world are encouraged to follow the trends in the changing and technological world of the 21st century. ICT integration into teaching practice is being tempted more than ever. However, the issue of ICT has not received considerable critical attention in education because ICT integration into educational context has not flourished in most classes (Becker, 2000; Cuban, 1986; 2000; Hammond, 2007; Mishra & Koehler, 2006; Oppenheimer, 1997; Peck, Cuban, & Kirkpatrick, 2002; Schoepp, 2004; Stetson & Bagwell, 1999; Tondeur, van Braak, Ertmer, & Ottenbreit-Leftwich, 2016; Vallance, Vallance, & Matsui, 2009; Wang & Reeves, 2003). As a significant facet of ICT integration process, teachers need to equip themselves with competent skills necessary for the 21st century and for sure, teacher training and education are major areas of interest in this process (Alayyar, Fisser, & Voogt, 2012; Balçıkanlı & Cephe, 2012; Jamieson-Proctor, Finger, & Albion, 2010; Koehler, Mishra, & Yahya, 2007; Öz (2015); Mishra & Koehler, 2006; Peters, 2006; Sadaf, Newby, & Ertmer, 2012; Vallance & Towndrow, 2007; Wilson, 2003; Wood, Mueller, Willoughby, Specht, & Deyoung, 2005). However, research indicates that pre-service teachers or student teachers (from now on they will be used interchangeably) in this century may not be well-trained for ICT integration into their

future classes (Aslan & Zhu, 2017; Coutinho, 2008; Gill & Dalgarno, 2008; Hegelheimer, 2006; Lei, 2009). Evidence suggests that most of the learners, who are mainly digital natives (Prensky, 2001), seem to operate finite number of skills in using ICT (Bennett, Maton, & Kervin, 2008; Kennedy, Judd, Churchward, Gray, & Krause, 2006; Kvavik, Caruso, & Morgan, 2004; Maclean & Elwood, 2009; Kvavik, 2005). A primary concern is that born into a digital world is highly different from being born in a traditional world (digital immigrants) and therefore, the education also needs a brand new stance with a regard to ICT integration (Elliot, 2009; Nigmatov & Nugumanova, 2015; Peters, 2006; Prensky, 2001; Raith, 2009; Richardson, 2010; Slaouti & Motteram, 2006; Sturm, Kennell, McBride, & Kelly, 2009).

Though the use of technology in the classes is a fundamental property of 21st century education, a much debated question is whether the demands of 21st century learners are met through traditional teaching methods. The school may not be claimed as very developed in spite of the fact that such fields as culture, society, and economics have notably advanced (Tyack & Cuban, 1995; Tyack & Tobin, 1994). New perspectives ought to be taken into consideration in order to promote conditions in terms of meeting digital age learners' needs and at this exact point in today's developing world, incorporating sociocultural theory and social constructivist learning dimension along with the technology into language learning and teaching contexts is suggested (Dysthe, 2002; Elliot, 2009; Raith, 2009; Sturm et al., 2009; Vallance et al., 2009) because those dimensions have the chance to promote collaboration and social interaction among the learners (Kim, 2001; Lantolf, 2000; Raith, 2009) in addition to constructing new information actively (Jonassen & Land, 1999; Sturm et al., 2009; Vygotsky, 1978). Vygotsky (1978), the originator of sociocultural perspective, sees language as a tool mediating between society and individual by giving importance to the social interaction in this process. According to Vygotsky (1962), the collaborative learning is a highlight of developing the interaction between learner-learner and learner-teacher in order to make the learner see his/her own zone of proximal development (ZPD), that is, the distance between what the learner can accomplish alone and what the learner can accomplish with the help of significant others who are more superior. It is assumed that collaboration can increase the opportunity for bidirectional communication between students-teacher and students-students (Ariza & Hancock, 2003; Pica, 1996). Social constructivism represents constructing meaning

through both cooperation and social-interaction (Cunningham & Duffy, 1996; Jonassen, 1991) and it leads to more learner-centered learning environments (Sturm et al., 2009). Social constructivism favors authentic materials and real-life issues (Park & Son, 2009) for the learners in order to create a learning path for more exploration, reflection and construction in meaning-making process (Cheng & So, 2012; Donovan, Bransford, & Pellegrino, 1999; Lightbown & Spada, 2013). The use of ICT as a contributor is frequently prescribed for this active meaning constructing process (Dixon-Krauss, 1996; Gavelek & Raphael, 1996; Lapp, 2000; Nelson, Christopher, & Mims, 2009; Passerini & Granger, 2000; Sturm et al., 2009; Willis, Stephens, & Matthew, 1996). Additionally, while making use of web 2.0 tools, learners may need guidance in finding, assessing, and analyzing the content (Schmid, 2009). This condition leads to new role qualifications for teachers (Başal, 2015; Zhu & Wang, 2006) and there is the identification of a new role for teachers: facilitators who are the mediators between learning materials and learners (Mishra & Koehler, 2006; Peters, 2006; Sturm et al., 2009).

In an increasingly technological world, the growth of ICT and proliferation of computers have extensively strengthened ICT integration in foreign and second language instruction (Hubbard & Levy, 2006; Murphy-Judy & Youngs, 2006; Peters, 2006). The integration of ICT into the field of foreign language education and computer assisted language learning (CALL) have become an important priority and interesting challenge because most teacher training programs including English Language Teaching (ELT) do not offer much related to technology instruction and education (Hubbard, 2008; Hubbard & Levy, 2006; Kessler, 2006; Koehler et al., 2011; Legutke, Müller-Hartmann, & Ditfurth, 2007; Moursund & Bielefeldt, 1999; Yildirim & Kiraz, 1999). One of the main obstacles could be related to the scant development of procedure about how to incorporate ICT into language teaching and learning contexts (Avriam, 2000; Hutchison, 2012; Selwyn, 1997) because filling the classrooms with computers does not necessarily mean that technology has been adopted by the learners (Vallance et al., 2009). What is more, it is not so difficult to find trainers, mainly digital immigrants (Prensky, 2001), who are not well trained in technology implementation (Maclean & Elwood, 2009; Mouza, 2002). Therefore, there is a high demand for a concrete reasoning regarding ICT incorporation (American Association for the Advancement of Science, 1999; 2001; Issroff & Scanlon, 2002; Maclean & Elwood, 2009; Merc, 2015; Nigmatov & Nugumanova, 2015; Patridge, 2006; Raith, 2009; Selfe,

1990; Selwyn, 1997; Zhao & Tella, 2002), which should lead to the design of the courses offering active participation and practice-based opportunities for the learners (Doering, Hughes, & Huffman, 2003; Saito, 2012; Schmid, 2009).

Recent developments in the field of ICT integration into the classes have led to a renewed interest in the properties of both classes and teachers for ICT integration in the schools. Cuban (1993) puts forward a framework in order to comprehend various types of school change, which are incremental and fundamental, respectively first and second order change. First order changes are identified as "improving the efficiency and effectiveness of existing structures of schooling including classroom teaching" while fundamental changes are about "transforming- altering permanently- those very same structures" (Cuban, 1993, p. 3). Thus, first order changes may include "in-service workshops to teach teachers to use a classroom computer to keep attendance or introducing teachers to various techniques of maintaining classroom discipline" (Cuban, 1993, p. 3). On the other hand, second order changes require a new stance in basic structures as Cuban (1993, p. 4) emphasizes:

> Applied to the classroom, fundamental changes would aim at transforming the teacher's role from that of a central source of power and knowledge to the role of a coach who guides students to their own decisions, who helps them find meaning in their experiences and what they learn from one another and from books. Teaching becomes structuring activities that enable students to learn from subject matter, one another, and the community…Such changes would represent fundamental alterations in the ways teachers think about the nature of knowledge, teaching, and learning, and about their actions in the classroom.

As far as ICT integration into classrooms is concerned, it is expected that there may be some factors hindering ICT incorporation process. Therefore, it is important to bear in mind the first-order (external) and second-order (internal) barriers proposed by Brickner (1995) and Ertmer (1999). According to Ertmer (1999, p. 48), there may be a lot of barriers preventing teachers from technology integration:

> These barriers range from personal fears (What will I do if the technology fails and my lesson can't proceed? How will I gain the confidence I need?) to technical and logistical issues (How does this software package work? Where or when should I use computers?) to organizational and pedagogical concerns (How can I ensure that students obtain adequate computer time without missing other important content? How do I weave computers into current curricular demands?).

While first-order barriers are defined as "being extrinsic to teachers and include lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support", second order barriers are described as being "intrinsic to teachers and include beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change" (Ertmer, 1999, p. 48). Thus,

one can utter that though technical problems can be overcome by "securing additional resources and providing computer-skills training", standing up to "one's belief systems and the institutionalized routines of one's practice" can be demanding (Ertmer, 1999, p. 48). This leads us to the notion that the teachers hold an important position in terms of their beliefs, attitudes, and willingness to use technology in their classes. Teacher's own curiosity towards technology, skills in integrating technology into language learning and teaching with the technological facilities of the institutions may be important factors in their tendency to utilize technology in their courses (Robertson & Al-Zahrani, 2012; Shin & Son, 2007). One can assume that teacher related variables have an influential part in behavioral intentions to integrate ICT into classes because it cannot be denied that the decision whether to integrate ICT or not is up to the teachers (Ertmer, 2005; Teo, 2011). The existing body of research on self-efficacy, teacher beliefs, and perceptions suggests that intrinsic factors manifest an important proportion to successful technology integration (Ertmer, 1999; 2005, Ertmer, Ottenbreit-Leftwich, & York, 2006; Wang, Ertmer, & Newby, 2004). Ertmer et al. (2006) have investigated respective value of internal and external factors among exemplary technology-using teachers. The findings reveal that the teachers marked inner drive and personal beliefs as the most influential and pre-service education as the least influential. The teachers see intrinsic factors more important than extrinsic factors in being a successful technology-using teacher. Thus, internal factors seem to be significant indicators of teachers' endeavors to use technology (Ertmer, 1999, Ertmer et al., 2006; Marcinkiewicz, 1993). Understanding the significance of internal factors composes a crucial part in order to comprehend the behavioral intentions of teachers to use ICT in their classes. Therefore, it seems necessary to draw a theoretical model for pre-service teachers in order to understand the effect of fundamental, second order, teacher-related or internal factors (from now on they will be used interchangeably) on their behavioral intention to use ICT in their future classes.

What is needed is to train teachers about how to use technology in order to make them fit to the 21st century teacher profile because technology integration is a very crucial skill in this century (Darling-Hammond et al. 2005; Ward & Overall, 2013) and "the use of CALL in language programs has become a standard and expected part of a curriculum" (Kessler, 2006, p. 23). Teachers are expected to "evaluate CALL in its many forms, especially language learning websites, CALL tasks, and learning environments involving a variety of

technologies (Hubbard & Levy, 2006, p. 11). It is one thing to know technology but it is another thing to incorporate it into pedagogy (Koehler & Mishra, 2005; Mishra & Koehler, 2006; Tezci, 2011; Zhao & Tella, 2002). Besides, becoming knowledgeable about technology and its implementation seems compulsory for pre-service teachers in foreign language learning and teaching contexts (Barzaq, 2007) on the grounds that it has also been revealed in Lei's study "born around 1989, this generation of digital-native preservice teachers witnessed a dramatic increase in the access to computers and the Internet in schools throughout their K-12 years" (2009, p. 92). Data from several studies suggest that there are such variables contributing to pre-service teachers' behavioral intention to use ICT in their future classes as perceived ease of use, perceived usefulness, social influence, facilitating conditions, computer self-efficacy, computer anxiety, constructivist teaching beliefs and computer attitude (Baydas, 2015; Becit-İşçitürk, 2012; Birch & Irvine, 2009; Sang, Valcke, van Braak, & Tondeur, 2010; Wong, Teo, & Russo, 2013). However, the studies in Turkey are limited by how pre-service teachers make use of ICT and integrate ICT, faculty members' view about ICT related opinions and capabilities, hindering factors to integrate ICT into pre-service teacher education (Akbaba Altun, Kalaycı, & Avcı, 2011; Akçaoglu, 2008; Goktas, Yildirim, & Yildirim, 2008; Gülbahar, 2008; Yildirim & Kiraz, 1999). Some research has been carried out using Technology Acceptance Model, The Theory of Planned Behavior, Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework (Birch & Irvine, 2009; Becit-İşçitürk, 2012; Giallamas & Nikolopoulou, 2010; Ma, Anderson, & Streith, 2005, Sadaf et al., 2012; Teo, 2008; 2009; 2012; Teo, Lee, & Chai, 2008; Teo, Lee, Chai, & Choy, 2009; Teo, Lee, Chai, & Wong, 2009; Teo & Noyes, 2014; Teo, Su Luan, & Sing, 2008; Teo & Ursavas, 2012; Teo, Ursavas, & Bahcekapili, 2011; 2012; Tselios, Daskalakis, & Papadopoulou, 2011; Valtonen, Kukkonen, Konthkanen, Sormunen, Dillo, & Sointu, 2015) in order to establish a model for behavioral intention to use technology. The research indicates that though there are such variables as attitude towards technology and computer self-efficacy affecting ICT integration into classes, there is a paucity of research on investigating the constructivist teaching beliefs (Sang et al., 2010) and computer anxiety along with these variables. Though educational beliefs, computer attitudes and teaching self-efficacy's influence on predicting the intention to integrate ICT have been emphasized, only two studies have attempted to investigate the combined impact of these variables and the complex nature of teacher thinking processes on student teachers' behavioral intention to

use ICT in their classes (Sang et al., 2010; Sang, Valcke, van Braak, Tondeur, & Zhu, 2011). In addition, previous studies have not dealt with including computer anxiety as a teacher-related variable as suggested by Becit-İşçitürk (2012), which sheds new light on understanding the impact of internal factors on student teachers' behavioral intention to integrate ICT into their future classes. Given the preliminary importance of teacher-related variables in the literature, new model suggestions are needed in order to predict the behavioral intentions of student teachers to use ICT in their future classes. Surprisingly, the combined effect of teacher-related variables on predicting student teachers' behavioral intention to use ICT in their future classes has not been closely examined. To the knowledge of the researcher, this dissertation sets out to be the first study pertinent to the effect of internal factors on student teachers' behavioral intention to use ICT in their future classes. The present study fills a gap in the literature by improving a prescient insight for understanding the contribution of teacher-related variables (computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude) to predicting English student teachers' behavioral intention to use ICT in their future classes.

Aim of the Study

This dissertation reviews the evidence for the contribution of teacher-related variables (computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude) to predicting English student teachers' behavioral intention to use ICT in their future classes by testing out I-PredICT model (*I is referring to intention*). This study seeks to obtain data which will help to address these research gaps:

1. To what extent do teacher-related variables predict English student teachers' behavioral intention to use ICT in their future classes?

Research Hypothesis 1. English student teachers' computer self-efficacy is a significant predictor of their behavioral intention to use ICT in their future classes.
Research Hypothesis 2. English student teachers' computer anxiety is a significant predictor of their behavioral intention to use ICT in their future classes.

Research Hypothesis 3. English student teachers' constructivist teaching beliefs are significant predictors of their behavioral intention to use ICT in their future classes.

Research Hypothesis 4. English student teachers' computer attitude is a significant predictor of their behavioral intention to use ICT in their future classes.

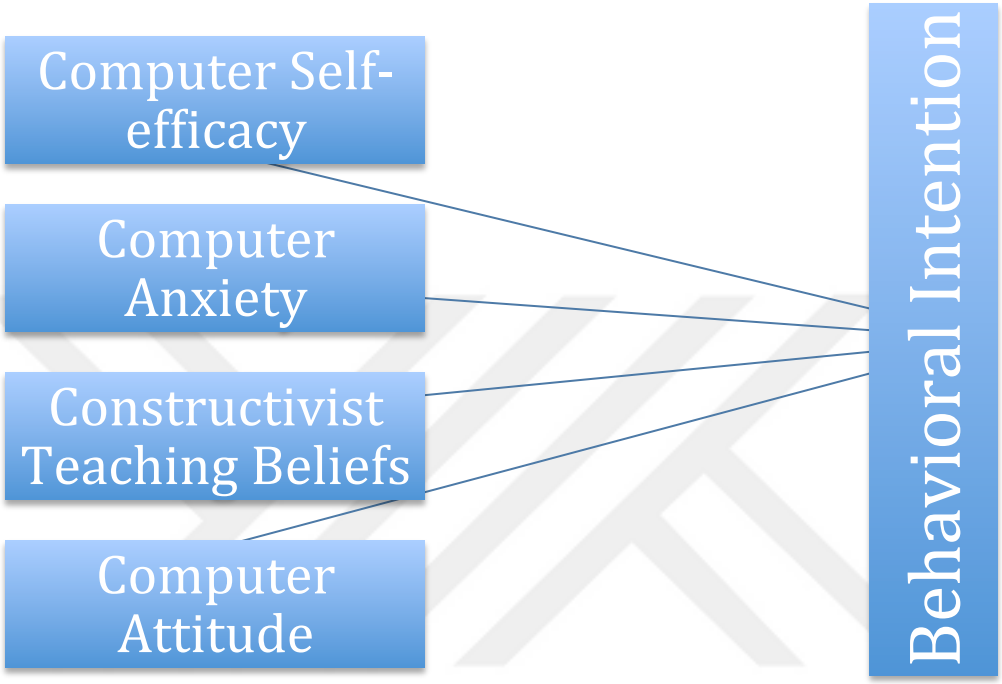


Figure 1. A suggested model: I-PredICT Model

Importance of the Study

It is mandatory that 21st century demand new skills and competences from the teachers. With the developments in ICT, there is a necessity for a different perspective in education. If it comes to talk about language teaching and learning specifically, there should be some redefinitions in terms of how to teach language skills and areas. The activities should be designed based on 4 C's in the 21st century learning, namely creativity/innovation, collaboration, communication, and critical thinking skills. On the other hand, the fact that pre-service teachers are mostly digital natives in today's world does not necessarily mean that they are able to integrate technology into instruction because increased use of technology is not sometimes affected by increased access to technology (Lei, 2009) but teacher beliefs about their capacity to integrate technology, that is their self-efficacy, are seen as important variables in computer use (Albion, 1999; Oliver & Shapiro, 1993) since

making use of technological tools in the classes is not only affected by technology-related factors (Arntzen & Krug 2011; Ertmer 2005; Kimmons, Miller, Amador, Desjardins, & Hall, 2015; Tondeur, Hermans, Valcke, & van Braak, 2008a).

It should be kept in mind that it is hard to keep up with today's rapidly ICT developments in education. Therefore, educators seem to be facing the difficulties of training pre-service teachers who are intended to be adept users of technology in their future classes in today's digital world. This research fills this need by producing data beneficial for teacher educators searching for the factors affecting the behavioral intention to use ICT. The present research investigates, for the first time, the contribution of teacher related variables to predicting behavioral intention to use ICT in English student teachers' future classes. Additionally, the findings should make an important contribution to the field of teacher education because teacher educators can make use of the model to decide from where they need to start to ICT integration trainings. Although providing necessary equipment seems a very big step in achieving technology integration, the effect of teaching beliefs, computer attitude, computer self-efficacy and computer anxiety cannot be denied. Therefore, before providing pre-service teachers with adequate equipment, teacher educators need to transform their pedagogical beliefs, increase their positive attitudes, develop their self-efficacy and lower their computer anxiety. Furthermore, by checking which variable predicts intention to use technology the most, the teacher educators can focus on specific strategies to improve that variable.

Studies in the field of technology integration indicate that there is little study directly concerned with the joined impact of internal factors on predicting student teachers' behavioral intention to use ICT. What is more, this sets out to be the first study conducted in the field of English Language Teaching as being the only subject unique theoretical model regarding internal factors in terms of finding out the prediction of behavioral intention to use ICT in student teachers' future classes.

Assumptions

The participants are assumed to take part in the study and fill in the questionnaires voluntarily. More importantly, student teachers are supposed to understand the need for ICT integration in foreign language teaching. It is assumed that the participants will answer

the questionnaire items frankly, which will represent their computer self-efficacy, computer attitude, constructivist teaching beliefs, and computer anxiety levels. Another assumption is that the questionnaires are suitable for collecting data and lastly, the SEM is appropriate for evaluating I-PredICT model for predicting English student teachers' behavioral intention to use ICT in their future classes.

Limitations

As every research has, this dissertation includes some limitations, too. The study is limited to fifteen English Language Teaching Departments in Turkey. Though the sample does not threaten the generalizability of the findings owing to the fact that the researcher reached 60% of the population, it would be good to reach four more regions. Another limitation might be about the nature of the constructs because computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude are measured as a self-report, which may affect the reality because the participants may confuse what they expect and what they really have.

Operational Definitions

This dissertation is about the teacher-related factors and their influence on predicting student teachers' behavioral intention to use ICT in their future classes. The following definitions provide contextual meaning to those who are unfamiliar to terms.

Computer Self-efficacy: Computer self-efficacy is pertinent to "a judgment of one's capability to use a computer" (Compeau & Higgins, 1995, p. 192).

Computer Anxiety: Computer anxiety can be defined as a "situation-specific anxiety, similar to test anxiety and math anxiety" (Antoine, 2011, p. 29).

Computer Attitude: Computer attitude is the evaluative reaction to computers.

Constructivist Teaching Beliefs: Social constructivism was developed by Vygotsky whose collaborative learning promotes construction of meaning via collaboration and interaction (Cunningham & Duffy, 1996; Jonassen, 1991; Vygotsky, 1962).

Behavioral Intention: Ajzen (1991) in his theory of planned behavior asserts intention as an important indicator of performing a given behavior in addition to indicating the extent of the willingness and effort to be put that behavior into practice.

Structural Equation Modeling: SEM is called as a "technique that allows separate relationships for each of a set of dependent variables" (Hair, Black, Babin, & Anderson, 2010, p. 19).

Summary of the Chapter

This chapter informs the readers about the need to design such a research, the statement of the problem and hypotheses, and the research's contribution to the field. It should be highlighted that integrating ICT into education sounds very crucial. However, the factors especially the second- order variables carry an important role in affecting the behavioral intention to integrate ICT into education. The following chapter provides in-depth information about second-order factors in ICT integration practices and theoretical framework of the study.

CHAPTER II

REVIEW OF LITERATURE

This chapter is devoted to pre-service teacher education and competencies framework in teachers and teacher education programs with a specific reference to English Language Teachers in Turkey, teacher education and ICT in ELT programs, and theoretical framework of this dissertation. Additionally, internal factors to ICT integration, namely computer self-efficacy, computer anxiety, constructivist teaching beliefs, behavioral intention to use ICT, and computer attitude will be described. Lastly, the related studies about the factors influencing ICT integration practices will be provided.

Pre-Service Teacher Education & Competencies Framework of Teachers and Teacher Education Programs

National Educational Technology Standards (NETS) published by the International Society for Technology in Education (ISTE) aim to provide standards for a technology rich environment in learning and teaching for both students and teachers in the digital age (ISTE, 2000). ISTE Standards are categorized under two categories: ISTE Standards for Students and ISTE Standards for Teachers. ISTE Standards for Teachers can be seen below:

1. Facilitate and inspire student learning and creativity

2. Design and develop digital age learning experiences and assessments

3. Model digital age work and learning

4. Promote and model digital citizenship and responsibility

5. Engage in professional growth and leadership

Based on the scope of the statements, these standards can be thought as the necessary knowledge and skills for pre-service teachers in order to become technologically competent teachers. In Turkish educational context, there has been continuous effort to identify the teaching competencies by Ministry of National Education (MoNE) based on National Education Basic Law Number 1739 (MoNE, 2008). 'Teaching proficiency" matter has also been designed under 'Support for Basic Education' Project. It was authorized with the agreement between European Union Commission and Turkish Government on February 8, 2000 (MoNE, 2008). Teacher Training and Education General Directorship took the responsibility of the 'Teacher Education' division in the project starting in 2002. After the workshops were conducted, the draft of 'Teaching Profession General Competencies' was shaped as competency fields, sub-competencies, and performance indicators. As a result, General Competencies were determined as six main competencies, thirty-one sub-competencies, and two hundred and thirty three performance indicators. In regard to this, 'Teaching Profession General Competencies', which consists of necessary knowledge, competencies, and attitudes in teaching profession, and 'Special Field Competencies' for primary education teachers were designed so that teachers could determine their own development area and develop in that area (MoNE, 2008). 'Special Field Competencies' was designed field-specific in order to lead the teachers to indicate the development targets. There are four parts in Special Field Competencies:

a. Field of Competency

b. Scope

c. Competencies

d. Performance Indicators

Performance indicators named as A1, A2, and A3 levels were formed for each competency. Primary education programs were taken into consideration in performance indicators.



Figure 2. A1, A2, and A3 level performance indicators. Adapted from "*Teacher competencies teaching profession general and special field competencies,*" by MoNE, 2008, Retrieved October, 31 2015 from https://goo.gl/raXGZV.

A1 Level: This level includes performance indicators the awareness about the practices in syllabus and basic knowledge, competency, and attitudes in teaching profession.

A2 Level: In addition to the knowledge and awareness in A1 level, this level includes performance indicators in which a teacher meets the requirements of the syllabus with the experiences in teaching practices, diversifies teaching practices and takes learner needs into consideration.

A3 Level: This level indicates performance indicators in which a teacher diversifies the teaching practices performed in A2 level in a unique way by taking the different variables of teaching into consideration. The teacher at this level can contribute to the field with the new practices based on a unique way, and continuously cooperate with the colleagues, parents, non-governmental organizations and other organizations.

To summarize, A3 level covers A2 level and A2 level covers A1 level (MoNE, 2008). Though A3 level has been shown as the top performance indicator level, it is not the top boundary in terms of development.

In addition to 'Teaching Profession General Competencies' framework, 'National Qualifications Framework for Higher Education' framework was published in 2011 by The Council of Higher Education. After Ministerial Summit was held within Bologna Process by Bergen, the Council of Higher Education making a decision on the composition of national qualifications frameworks in 2005 started first steps in structuring of National Qualifications Framework (NQF) in Turkey (The Council of Higher Education, 2011a). It is a fact that each level of Turkish Higher Education System has qualifications that can be

described with different learning outcomes. Classification of qualifications groups that diversify in learning outcomes for each higher education levels can be observed in table 1.

Table 1.

Turkish Higher Education System Levels and Qualifications of Different Learning Outcomes for Each Level

HIGHER EDUCATION LEVELS	AWARDED DEGREE/QUALIFICATIONS		
Doctorate QF-EHEA: 3. Level **EQF-LLL : 8. Level**	Doctorate	Proficiency in medicine	Competence in art
Master's QF-EHEA: 2. Level **EQF-LLL : 7. Level**	Master's with thesis	Master's without thesis	
Bachelor's QF-EHEA: 1. Level **EQF-LLL: 6. Level**	Undergraduate (Faculty programmes)	Undergraduate (Higher school and Conservatoire programmes)	
Associate's QF-EHEA: Short cycle **EQF-LLL : 5. Level**	Associate's (Among the bachelor's degree programmes)	Associate's (Vocational higher schools-MYO)	

European Qualifications Framework- Life Long Learning (EQF-LLL), which is in alliance with Qualifications Framework for the European Higher Education Area (QF-EHEA) and is proposed by European Parliament and Council of Europe, can be selected as the main framework that will be utilized to reference 'National Qualifications Framework for Higher Education in Turkey' (NQF-HETR) Levels with European Qualifications Framework Levels (The Council of Higher Education, 2011a). Consequently, the level descriptors to be utilized for NQF-HETR were decided to be in alliance with the level identifiers of EQF-LLL. Based on this, the specific emphasis given to technology in 'NQF-HETR Teacher Training and Educational Sciences Competencies (Academic-based) 6. Level (Bachelor's)' can be seen below:

Table 2.

NQF-HETR Teacher Training and Educational Sciences

NQF-HETR LEVEL	KNOWLEDGE -Theoretical -Conceptual	SKILLS -Cognitive -Practical	COMPETENCES Competence to Work Independently and Take Responsibility	Learning Competence	Communication and Social Competence	Field Specific Competence
6 BACHELOR'S ——— **EQF-LLL:** 6. Level ——— **QF-EHEA:** 1. Cycle					-Use informatics and communication technologies with at least a minimum level of European Computer Driving License Advanced Level software knowledge.	

Note. Adapted from "*National qualifications framework for higher education in Turkey teacher training and educational sciences (academic focused),*" by The Council of Higher Education, 2011b, Retrieved November 2, 2015 from http://tyyc.yok.gov.tr/?pid=48

English Language Teacher Competencies in Turkey

Based on Teaching Profession General Competencies, 'English Language Teacher' Special Field Competencies have been also formed. There are five fields of competency that are Planning and Regulation of English Teaching Procedures, Developing Language Skills, Monitoring and Evaluation of Language Development, Cooperating with the School, Parent, and Society, and Maintaining Professional Development in English Language. The fields of competency with technology focus will be listed below:

a. Field of Competency: Planning and Regulation of English Teaching Procedures

b. Scope: This field consists of planning English language learning-teaching, regulating the environments in accordance with the aims, preparing materials, and using sources.

c. Competency 5: Being able to use technological sources in English language teaching

Table 3.

*Performance Indicator*s

A1 Level	A2 Level	A3 Level
The teacher makes use of technological sources to make the learning more effective.	The teacher keeps up with the softwares and internet sources used in language teaching.	The teacher makes the learners use the technological sources effectively by critically evaluating them.
The teacher encourages the learners to get access to the technological sources.	The teacher prepares the appropriate environments under available conditions so that the learners can make use of technological sources and the teacher makes the learners get access to these sources equally.	

Table 3 indicates that teachers are encouraged to use technological sources in English Language Teaching. English Language Teachers are expected to use ICT to teach more effectively and stimulate their learners to get access to ICT in A1 level. Table 3 indicates that English Language Teachers are supposed to follow recent software and websites used in language teaching. English Language Teachers in A3 level are believed to encourage their learners to use ICT effectively. Deeper information towards the relationship between ICT and teacher education with a specific reference to ELT programs will be presented in the following part.

Teacher Education and ICT in ELT Programs

Prensky's (2001) definition of digital natives for the younger generation has opened a new door for setting apart the younger generation from the old generation. Therefore, it is expected that younger generations would become more capable of making use of ICT and pre-service teachers who are also assumed as digital natives would be using technology in

their classrooms without difficulty (Lei, 2009). On the other hand, there is a growing body of literature that recognizes that knowing about technology and incorporating it into pedagogy are different (Zhao & Tella, 2002; Koehler & Mishra, 2005; Mishra & Koehler, 2006; Tezci, 2011). Despite the proliferation of ICT, previous research has established that student teachers in this century may not be well-trained for ICT integration into their future classes (Aslan & Zhu, 2017; Banerjee, Xu, Jiang, & Waxman, 2017; Coutinho, 2008; Gill & Dalgarno, 2008; Hegelheimer, 2006; Kovalik Kuo, & Karpinski, 2013; Lei, 2009). It is now well established from a variety of studies that most of the learners, who are mainly digital natives (Prensky, 2001), seem to operate limited number of skills in using ICT (Bennett, Maton, & Kervin, 2008; Kennedy, Judd, Churchward, Gray, & Krause, 2006; Maclean & Elwood, 2009; Kvavik, 2005; Kvavik, Caruso, & Morgan, 2004). In Kovalik et al.'s (2013) study, the researchers reached scarce performance indicators of pre-service teachers' ICT skills though they designed an educational technology course in order to promote pre-service teachers' ICT knowledge and skills.

The acceptance of ICT integration has not become as quick as the adoption of ICT itself because teachers do not seem to grasp the prominence of computers in education and somehow they feel apprehensive about the computers' downgrading their profession (Pine-Thomas, 2017). In order to overcome this notion, pre-service teacher education holds crucial importance in terms of training pre-service teachers for ICT integration into their future classes (Akçaoğlu, 2008; Başal, 2015; Kessler, 2006; Peters, 2006; Russell, Bebell, O'Dwyer, & O'Connor, 2003; Sadaf et al., 2012; Sandholtz & Reilly, 2004; Yildirim & Kiraz, 1999; Wilson, 2003). Pre-service teacher education programs should give the opportunity for active participation and involvement in ICT practices to student teachers. In addition, as Russell et al. (2003) underline, pre-service teacher education can influence teacher beliefs by dispensing a wide range of technologies and strategies for instruction. Pre-service teacher education should give emphasis to ICT training so that pre-service teachers can keep up with their learners' needs (Goktas, Yildirim, & Yildirim, 2008). Thompson, Bull, and Willis (2002) present three principles for ICT training in teacher education:

1. Technology should be infused into the entire teacher education program.

2. Technology should be introduced in context.

3. Students should experience innovative technology-supported learning environments in their teacher education program.

As indicated above, stand-alone technology courses do not seem to promote technology skills among student teachers. Rather, ongoing training and preferably in the overall program should be provided in teacher preparation programs (Halttunen, 2002; Kessler, 2006; Northrup & Little, 1996; Peters, 2006). As Egbert (2006, p. 168) asserts, "to help language teachers learn to teach with technology, teacher education programs must help teachers to understand the relationship between academic knowledge about computer use and its application across a variety of contexts". Trainers, who are supposed to "build CALL knowledge and skills in others, rather than just language knowledge and skills" (Hubbard & Levy, 2006, p. 12), should take active roles in assisting student teachers in their adaptation to ICT integration practices. Therefore, teacher educators should be able to efficiently integrate and facilitate ICT use in their classrooms as much as possible in meaningful contexts in order to become a role model for student teachers (Enochson & Rizza, 2009; Funkhouser, 2011; Graziano, Foulger, Schmidt-Crawford, & Slykhuis, 2017; Hammond et al., 2009; Hubbard and Levy, 2006; Jayachandran, 2009; Tondeur et al., 2012). As Reinders (2005, p. 236) explicitly argues, "the challenge for teachers will be more one of helping learners develop the skills to deal successfully with the increased control and independence that technology demands. As teacher educator our job is to help prepare our teachers for this changing role". By becoming exemplary ICT users in the classes, teacher educators can show the ways to overcome problems which originated from ICT integration. It has been set forth that ICT training for student teachers should be accommodated in authentic teaching environments (Tondeur et al., 2012). The courses should present opportunities to student teachers so that they can have active and practice-based experience (Doering et al., 2003; Sadaf et al., 2016; Saito, 2012; Schmid, 2009).

Commenting on teacher education and training, Wallace (1991) names three major professional education models as the craft model, the applied science model, and the reflective model. The craft model appraises the importance of an experienced expert over the inexperienced trainee. Teacher trainer who favors the craft model believes in the importance of imitating techniques and instructions he/she demonstrates (Wallace, 1991). However, it should not be expected that teaching art is just composed of a craft because the teachers may always have the potential to encounter unexpected events and have to

question their actions all the time. With the developments of new disciplines, the applied science model brings to light. Wallace (1991, p. 8) defines the applied science model as "the traditional and probably still the most prevalent model underlying most training or education programmes for the professions". This model basically supports the idea that science should be the reference point for the practitioners in order to achieve particular objectives. The applied science model, affected by the psychological theory of behaviorism, is based on the notion that scientific knowledge is applied by experimentation, findings are delivered to the trainees, and the trainees practice the scientific knowledge and experimentation of the experts (Wallace, 1991). If any problem arises in classroom practice, it is generally attributed to trainees' misunderstanding and misapplication of the findings. The possible problematic side of this model is that the experts and professionals rather than practitioners have the right to speak about the alterations in the practice (Wallace, 1991). One can easily notice that inadequate emphasis given to scientific knowledge and experience subsequently in the craft model and applied science model, Wallace (1991) proposes reflective model which comprises both experience and science. Wallace (1991) suggests that teacher education is composed of two dimensions: received knowledge and experiential knowledge. According to Wallace (1991, p. 17), received knowledge "includes, among other things, the necessary and valuable element of scientific research" and experiential knowledge "relates to the professional's ongoing experience". The reflective model reveals that there should be bidirectional relationship between received knowledge and experiential knowledge "…so that the trainee can reflect on the 'received knowledge' in the light of classroom experience, and so that classroom experience can feed back into the 'received knowledge' sessions" (Wallace, 1991, p. 55). In contrast to the applied science model, "the reflective model deliberately highlights the trainees and what they bring to the training/development process" (Wallace, 1991, p. 50). Originated by Schön (1983) as the reflective practice, the reflective model underlies the fact that the trainees should be examined in the light of conceptual schemata of mental constructs, personal beliefs, attitudes, and behaviors (Wallace, 1991). This notion shows parallelism with 'whole person' by Rogers (1946) who emphasizes the prominence that must be given to self, humanizing psychological perspectives, and an awareness of the person. In accordance with this perspective which values the human and their interactions in human learning, Vygotsky's (1968) social constructivism and holistic approach seems popular in new education trends. As Williams and Burden (1997, p. 43)

note, “we saw how cognitive approaches emphasise the importance of what the learners brings to any learning situation as an active meaning-maker and problem solver”. They draw our attention to the humanistic approaches leading “us to emphasise also the development of the whole person in education settings and to suggest that language teaching/learning can and should be seen in this light”.

In view of all that has been mentioned so far, it should be well explained that “second-language teachers today need to be able to choose, use, and in some cases, refuse technology for their students” (Chapelle, 2006, p. 7). Hubbard and Levy (2006, p. 9) identify five main points in the relationship between teacher education and CALL:

> 1) the need for both technical and pedagogical training in CALL, ideally integrated with one another;
>
> 2) the recognition of the limits of formal teaching because the technology changes so rapidly;
>
> 3) the need to connect CALL education to authentic teaching settings, especially ones where software, hardware, and technical support differ from the ideal;
>
> 4) the idea of using CALL to learn about CALL – experiencing educational applications of technology firsthand as a student to learn how to use technology as a teacher;
>
> 5) the value of having CALL permeate the language teacher education curriculum rather than appear solely in a standalone course.

Hubbard and Levy (2006) draw our attention to the importance of ICT in language teacher education. On the other hand, academic department to which the teaching of CALL as a science has moved “emphasizes the theoretical basis of disciplines and often do not possess the infrastructure and technical support necessary to introduce practical components in their programs” (Debski, 2006, p. 101). Reinders (2005) points out the fact that “education in this area (*referring to technology*) is somewhat different from that in other areas as it involves both a pedagogic as well as a practical component in the sense that teachers need to have the technical skills to use the technology before they can discover how to implement it…The teacher educator is thus in the delicate position of explicitly linking the benefits of the innovation to classroom practice” (p. 230). Hubbard and Levy (2006, p. 16) outline two domains: technical CALL knowledge and skill and pedagogical CALL knowledge and skill:

	Technical	Pedagogical
CALL Knowledge	Systematic and incidental understanding of the computer system, including peripheral devices, in terms of hardware, software, and networking.	Systematic and incidental understanding of ways of effectively using the computer in language teaching.
CALL Skill	Ability to use technical knowledge and experience both for the operation of the computer system and relevant applications and in dealing with various problems.	Ability to use knowledge and experience to determine effective materials, content, and tasks, and to monitor and assess results appropriately.

Figure 3. Technical and pedagogical knowledge and skills for CALL. Adapted from "*Teacher education in CALL*" by P. Hubbard and M. Levy, 2006, p. 16, USA, John Benjamins.

The figure above reveals that it is of high importance to be knowledgeable and competent about not only technical but also pedagogical aspects of CALL. However, it would be awkward to expect that those CALL knowledge and skills can be acquired with traditional teacher education ways. In a changing world, Williams and Burden (1997, p. 44) present that "education is concerned not just with theories of instruction, but with learning to learn, developing skills and strategies to continue to learn, with making learning experiences meaningful and relevant to the individual, with developing and growing as a whole person". One thing that must be considered is the implementation of ICT as a contributor to this active meaning constructing process (Dixon-Krauss, 1996; Gavelek & Raphael, 1996; Lapp, 2000; Nelson, Christopher, & Mims, 2009; Passerini & Granger, 2000; Sturm et al., 2009; Willis, Stephens, & Matthew, 1996) because 21st century demands more than the use of computers but effective and meaningful usage of ICT by promoting collaboration, creativity, communication, and critical thinking skills. Peters (2006, p. 154) establishes that "teachers must themselves become competent in using technology as well as help students make use of technology – not as a superficial or amusing gadget, but as a tool used to develop logical and critical thinking skills". Accordingly, Reinders (2005, p. 230) reminds us the fact that "technology plays an ever-growing role in all aspects of our lives and increasingly impacts what happens in the language classroom". Chapelle (2005, p. 746) supports this view in that "the expanding presence of technology in L2 use, L2 teaching, and L2 teacher education has continually provided impetus for developing pedagogy that takes advantage of technology". In view of all that has been mentioned so far, "technology is changing the jobs of language teachers through the changes it prompts

in the language itself, the opportunities for studying language, and the options available for teaching language" (Chapelle, 2005, p. 745). Reinders (2005) argues that "the field of computer-assisted language learning has been in existence for several decades. The discussion around the place of technology in teacher education, though, is a more recent one, however" (p. 231). One can easily notice that there is no comprehensive approach for CALL education but four trends as below (Hubbard & Levy, 2006, p. 5):

> 1) the production of training and support materials directly oriented toward classroom teachers;
> 2) a small but growing literature in CALL teacher education itself at the levels of both research and practice;
> 3) frameworks that attempt to define CALL practice on the basis of principles derived from particular language teaching approaches, especially those supported by SLA (second language acquisition) research;
> 4) the use of online collaborative learning techniques in CALL teacher education with a growing interest in the quality of the transfer of skills and expertise from formal courses to the language classroom.

The above quotation reveals that a framework is needed in language classrooms in order to ensure CALL education. Therefore, there is a raising demand for a concrete reasoning regarding ICT incorporation (American Association for the Advancement of Science, 1999; 2001; Issroff & Scanlon, 2002; Maclean & Elwood, 2009; Merc, 2015; Nigmatov & Nugumanova, 2015; Partridge, 2006; Raith, 2009; Selfe, 1990; Selwyn, 1997; Zhao & Tella, 2002), which should lead to the design of the courses offering active participation and practice-based opportunities for the learners (Doering, Hughes, & Huffman, 2003; Saito, 2012; Schmid, 2009). Reinders (2005, p. 233) echoes an important point: "…the success of new technologies in the classroom depends in large part on the teacher's ability to apply them meaningfully, especially in the language classroom where the technology supports not only the delivery of content but also the building of skills". Given the importance of drawing a theoretical model to promote ICT integration in the classes, this dissertation suggests I-PredICT model in order to find out the impact of teacher-related variables on predicting English student teachers' behavioral intention to use ICT in their future classes. The teacher factor in terms of ICT integration has been emphasized over and over in the decision to integrate ICT into the classes. In the succeeding part, teacher-related factors affecting the behavioral intention to use ICT in the classes will be outlined.

First and Second Order Changes to Technology Integration

The Origin of First and Second Order Change

Cuban (1993, p. 3) suggested a framework for conceptualizing educational change as "incremental and fundamental changes". As is indicated in the introduction part of this dissertation, Cuban (1993) identifies incremental changes as first-order and fundamental changes as second-order changes. Some hindering factors are expectable while trying to empower those changes. Based on Cuban's (1993) change frameworks, Brickner (1995) divides the barriers to technology integration into two, namely, first-order and second-order barriers in alliance with first order and second order changes. While first-order barriers are described as "extrinsic in nature in that they are external to the teacher", second-order barriers are "intrinsic in nature in that they are 'internal' to the teacher" (p. 6). Second-order barriers are the ones that teachers do not accept their existence easily (Brickner, 1995). The first-order barriers to change consist of "access to computers, software availability and quality, planning time, and technical support" (Brickner, 1995, p. 38). Brickner (1995, p. 38) suggests that first-order barriers are not difficult to admit since the reason of the barrier is allocated to the external factors, which can be solved via "technological fix". On the other hand, second-order barriers can be exemplified as "beliefs about teaching, instructional models, beliefs about technology, and openness to change" (Brickner, 1995, p. 41). Brickner (1995) points out that teacher-perceived barriers to technology integration may not be easy to cope with because of their intrinsic nature. One should bear in mind that these barriers may be perceived by teachers as "character flows" and under "their ownership", which makes handling these barriers even more challenging (Brickner, 1995, p. 41).

Beliefs about teaching include "an understanding of what teachers believe about the field of teaching, what it means to be a teacher, their role and responsibility, and the basic theory behind the development of an individual's belief system" (Brickner, 1995, p. 41). According to Brickner (1995), the belief system is composed of an individual's various beliefs regarding physical and social reality, which is acquired at a very early continuum of childhood. Therefore, if the teachers are expected to integrate technology into their classes, there should be some modifications in their belief systems regarding teaching, learning, and the roles of the teachers and learners. These modifications can be observed "in the

definitions of knowledge and learning with technology" (Brickner, 1995, p. 41). Beliefs about technology ally with the same perceptions as beliefs about teaching (Brickner, 1995). The moment the teachers are introduced with an innovation, they think about whether they are going to use it or not. "Lack of training" (Cox et al., 1988), "frustration in learning how to use a computer" and "fear" (Hannafin & Savenye, 1993) as well as "losing control of center stage" and "looking stupid" (Wiske et al., 1990) can prevent teachers from integrating technology (as cited in Brickner, 1995, p. 47). It can be observed that there are adopter categories in terms of accepting an innovation as Rogers (2003) describes as innovators, early adopters, early majority, late majority, and laggards. Thus, teachers may have the tendency to ask questions about the worth of using the innovation, and its simplicity or complexity (Brickner, 1995). Research reveals that the more the teachers take training related to the use of technology, the more the teachers use the computers. Additionally, the more the teachers use the computers, the less anxious they feel (Becker, 1991).

Although there is a growing consensus on integrating ICT into classes, less is known about the relationship between first-order and second-order barriers (Ertmer, 1999). Though some claim that technology integration will be carried out after coping with first-order barriers (Fisher, Dwyer, & Yocam, 1996), the case may not be so easy to configure. It seems that teachers try to cope with these barriers at all levels of use (Becker, 1994). However, some studies indicate that second-order barriers should be focused before or at worst together with the fulfilment of higher levels of ICT integration (Hannafin & Savenye, 1993; Kerr, 1996). As Ertmer (1999, p. 53) indicates that while beliefs can hinder "meaningful use", first-order barriers may prevent the teachers from "actualization of more facilitative beliefs". Therefore, teachers need to come up with different solutions to handle the barriers to ICT integration because different barriers may occur at different parts of ICT integration practices (Ertmer, 1999).

In line with these solutions, Ertmer (1999) presents some strategies to cope with the barriers. One of them is developing a vision about the ways to use ICT in an educational setting to reach remarkable objectives (Baker, Herman, & Gearhart, 1996; Kerr, 1996; Roblyer, 1993). Modeling, reflection, and collaboration can be exemplified as the ways to promote a vision for integrating ICT (Ertmer, 1999). According to Ertmer (1999, p. 54):

> … teachers need opportunities to observe *models* of the integrated technology use, to *reflect* on and discuss their evolving ideas with mentors and peers, and to *collaborate* with others on meaningful projects as they try out their new ideas about teaching and learning with technology.

Another strategy is identifying curricular opportunities. Although teachers are expected to integrate ICT into their classes, little attention seems to be given to the instructional level activities for teachers (Ertmer, 1999). In the first place, this can be seen as a first-order barrier, yet, it may bring about second-order barriers, namely, beliefs, and values, which may abstain the teachers from integrating ICT due to their unwillingness or incapability to redesign the current practices. Thus, the teachers need to redesign the activities so that they can be suited to fixed elements of the curriculum (Ertmer, 1999). Additionally, it is important for teachers to get adequate access to technical facilities, have enough time, training, and support in terms of overcoming first-order barriers to be able to integrate ICT into their classes without much challenge (Ertmer, 1999).

Considering both first and second order changes to technology integration, this study explores the impact of second order, namely internal, fundamental or teacher-related variables, on pre-service teachers' behavioral intention to use ICT in their future classes. Teacher-related variables have been found as the most predictive indicators of technology integration (Becker, 2000). After all, it is the teacher who eventually draws the line about whether to use ICT or not. Veen (1993) indicates that teacher-related factors dominate first-order factors. Furthermore, the teacher again decides whether to use ICT in a meaningful, cooperative, interactive way or traditionally. Therefore, this study tries to investigate the contribution of computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude to predicting student teachers' behavioral intention to use ICT in their future classes. But, one thing that should be reminded is that ICT use is not a process happening over a night. There are both external and internal factors affecting behavioral intention to use ICT in the classes. The origin of these factors in relation to this dissertation's scope will be discussed in detail below.

Factors Affecting ICT Integration

This part examines teacher-related factors, namely, computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude, in ICT integration process.

Computer Self-Efficacy

'Computer self-efficacy factor' is discussed under such headings as self-efficacy: origin and definition, sources of self-efficacy, dimensions of self-efficacy, computer self-efficacy: origin and definition.

Self-efficacy: Origin and Definition

Self-efficacy theory by Bandura (1977; 1982) as a dimension of social cognitive theory is believed to be important to people's capability to act (Bandura, 1977) and Bandura (1977, p. 80) clarifies the importance of perceived self-efficacy:

> Perceived self-efficacy not only reduces anticipatory fears and inhibitions but, through expectations of eventual success, it affects coping efforts once they are initiated. Efficacy expectations determine how much effort people will expend, and how long they will persist in the face of obstacles and aversive experiences. The stronger the efficacy or mastery expectations becomes, the more active the efforts. Those who persist in performing activities that are subjectively threatening but relatively safe objectively will gain corrective experiences that further reinforce their sense of efficacy thereby eventually eliminating their fears and defensive behavior. Those who give up prematurely will retain their self-debilitating expectations and fears for a long time.

With regard to the above-mentioned statement, self-efficacy beliefs can be perceived as a mediator to take actions. Therefore, self-efficacy beliefs can vary from one situation to another and in accordance with the nature of the tasks (Dellinger, Bobbett, Olivier, & Ellett, 2008, p. 752). Environmental factors, behaviors and cognitive processes seem to have a reciprocal effect on each other. It was acknowledged that cognitive processes carry out an important role "in the acquisition and retention of new behavior patterns" (Bandura, 1977, p. 192). Therefore, people tend to be scared or retain from conditions in which they feel themselves as ineffective and unable to deal with challenges (Bandura, 1977). Therefore, their perceived self-efficacy plays a key role in their behavior choice (Bandura, 1977). Hereby, self-efficacy was found as "a uniformly accurate predictor of performance on tasks varying in difficulty with different threats" (Bandura, 1977, p. 206). Actually, self-efficacy judgments have an impact on activity preference and environmental contexts

(Bandura, 1982). Bandura (1982, p. 122) claims "perceived self-efficacy is concerned with judgments of how well one can execute courses of action required to deal with prospective situations". In addition, it was found that 'perceived self-efficacy was a better predictor of subsequent behavior than was performance attainment in treatment' (Bandura, 1982, p. 125). It should be emphasized that "the stronger the perceived efficacy, the more likely are people to persist in their efforts until they succeed" (Bandura, 1982, pp. 127-128). Bandura (1977, p. 125) clarifies that "self-efficacy was a uniformly accurate predictor of performance on tasks of varying difficulty with different threats". Self-efficacy plays a pivotal role in predicting the actual behavior due to the fact that self-efficacy is both about how much the person feels confident in carrying out that behavior and how much benefit the person sees in achieving that behavior. Thus, efficacy expectations and outcome expectations can differ in that while the latter is about people's thinking about certain outcomes of the actions, the former is about whether they can perform those actions (Bandura, Adams, & Beyer, 1977). Bandura (1977, p. 84) clarifies this point in the examples of outcome expectations:

> Participants simply judge how much they expect to benefit from a given procedure. These global measures reflect a mixture of, among other things, hope, wishful thinking, belief in the potency of the procedures, and faith in the therapist. It comes as no surprise that such measures have little relationship to magnitude of behavioral change.

No matter what forms psychological procedures have, they change expectations of personal efficacy (Bandura, 1977). Bandura (1977, p. 79) defines outcome expectancy "as a person's estimate that a given behavior will lead to certain outcomes" and efficacy expectation as "the conviction that one can successfully execute the behavior required to produce the outcomes". Bandura (1977, p. 79) distinguishes between outcome and efficacy expectations "because individuals can come to believe that a particular course of action will produce certain outcomes, but question whether they can perform those actions". The distinction between outcome and efficacy expectations can be observed in the figure 4:

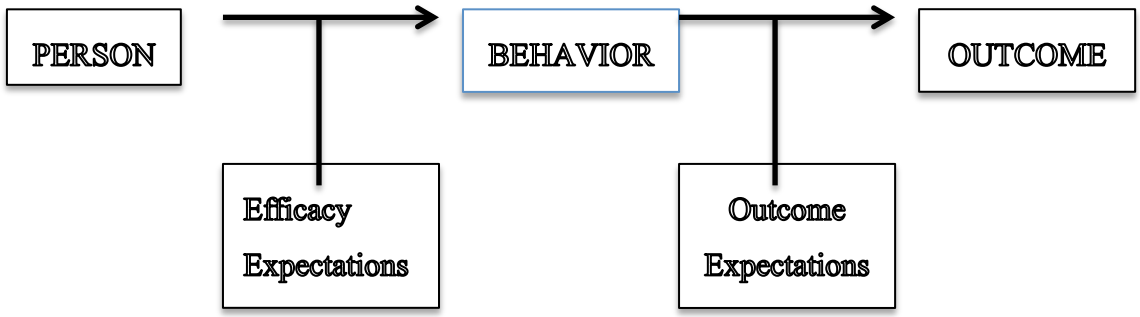


Figure 4. Diagrammatic representation of the difference between efficacy expectations and outcome expectations. Adapted from "*Social learning theory*" by A. Bandura, 1977, p. 79, USA, Prentice Hall.

Sources of Self-efficacy

There are basically four sources of efficacy expectations, namely, performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Sources of efficacy expectations and their mode of inductions are illustrated in figure 5:

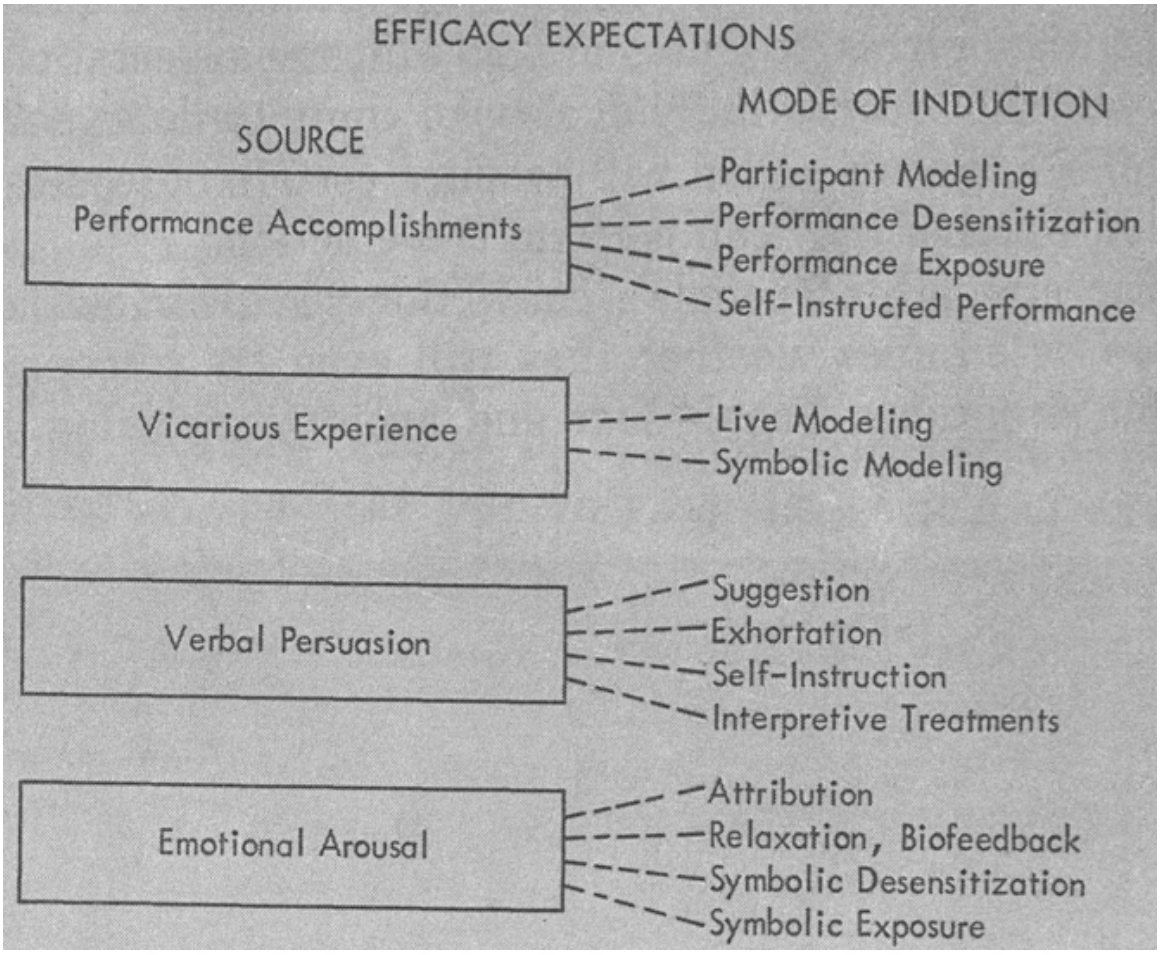


Figure 5. Major sources of efficacy expectations and the sources through which different modes of influence operate. Adapted from "*Social learning theory*" by A. Bandura, 1977, p. 80, USA, Prentice Hall.

According to Bandura (1977), performance accomplishments are responsible for the most reliable source of efficacy expectations since they rely on individuals' own personal experiences. "Successes raise mastery expectations; repeated failures lower them, especially if the mishaps occur early in the course of events. After strong efficacy expectations are developed through repeated success, the ·negative impact of occasional failures is likely to be reduced" (Bandura, 1977, p. 81). Seeing others acting intimidating actions without unfavorable outcomes may result in expectations in individuals that they can ultimately achieve if they hold and insist on their efforts, which is called vicarious experience (Bandura, 1977). People convince themselves that if others can accomplish it, they also can achieve at least some developments in performance. Bandura (1977) thinks that verbal persuasion is extensively used since it is easy and readily available. Though efficacy expectations prompted in this way are not so strong and long lasting, people are

convinced through verbal persuasion that they can perform the activity successfully. Emotional arousal can have an impact on performance under challenging conditions (Bandura, 1977). Individuals often turn to their psychological awaking in assessing their anxiety and sensitiveness to stress. It should be expected that people can hope achievement when they are not bedevil by unpleasant awaking than when they are nervous and trembling since intense awaking generally hinders performance.

Dimensions of Self-efficacy

Bandura (1977) affirms that efficacy expectations differ in some dimensions that have crucial performance consequences. Efficacy expectancies have variance in terms of magnitude, generality, and strength. For magnitude, Bandura (1977, p. 84) argues that "when tasks are ordered according to level of difficulty, the efficacy expectations of different individuals may be limited to the simpler tasks, extend to moderately difficult ones, or include even the most taxing performances". From the aspect of generality, Bandura (1977, pp. 84-85) clarifies that "some kinds of experiences create only limited mastery expectations, while others instill a more generalized sense of efficacy that extends well beyond the specific treatment situation". With a regard to strength, Bandura (1977, p. 85) asserts that "weak expectations are easily extinguishable by disconfirming experiences, whereas individuals who possess strong expectations of personal mastery will persevere in their coping efforts despite dissuading experiences". Therefore, Bandura (1977) suggests that a meaningful expectancy analysis be conducted taking into consideration the elaborated analysis of magnitude, generality, and strength of efficacy expectancies.

Bandura (1977) clarifies that it is necessary for the people to involve in corrective learning experiences for a change to occur. In Bandura's (1977) social learning view, psychological changes originate from a common mechanism no matter what method is utilized to actualize them. The obvious separation between theory and practice is pacified by realizing that the cognitive events are produced and adapted most willingly through the experiences of mastery resulted from successful performance though change is moderated through cognitive processes. It was observed in Bandura et al.'s (1977) study that mastery-based treatment resulted in higher, stronger, and more generalized expectancies of self-efficacy when compared to the treatment with vicarious experiences only.

Computer Self-efficacy: Origin and Definition

Computer self-efficacy is pertinent to "a judgment of one's capability to use a computer" (Compeau & Higgins, 1995, p. 192). The studies indicate that computer self-efficacy has a role in using computers for teaching (Seferoglu, 2007). Computer self-efficacy seems to merit value in understanding people's expectations of the results of using computers, their affective responses to computers, and their actual computer use (Compeau & Higgins, 1995). Computer self-efficacy in this study refers to student teachers' perceived self-efficacy about the integration of ICT into their future classes. Oliver and Shapiro (1993, p. 82) underlie the importance of computer self-efficacy:

> Those who judge themselves to be efficacious in using the computer will anticipate positive and challenging computer experiences. Those who see themselves as inefficacious are likely to expect negative experiences with the computer. The degree of self-efficacy determines how much a person is willing to try, and cope with a situation or task. Therefore, as an individual's efficacy gains strength, his or her willingness to make an effort will increase. Also, the higher one's sense of efficacy, the more efficacious the individual will be in achieving the desired outcome.

Computer self-efficacy is defined as "an individual's perceptions of his or her ability to use computers in the accomplishment of a task (ie., using a software package for data analysis, writing a mail merge letter using a word processor), rather than reflecting simple component skills (ie., formatting diskettes, booting up a computer, using a specific software feature such as 'bolding text' or 'changing margins')" (Compeau & Higgins, 1995, p. 191). Thus, people with high computer self-efficacy may have a tendency to feel more confident in trying out different software and hardware (Compeau & Higgins, 1995). "Preservice teachers with lower self-efficacy scores are more likely to have problems with technology integration when they exit the teacher education program and teach in their own classrooms" (Wall, 2004, p. 7). The research indicates that investigating pre-service teachers' intrapersonal beliefs is fundamental to apprehending their tendency to integrate technology into their classes (Niederhauser & Perkmen, 2008). Additionally, it should be noted that self-efficacy can be a good indicator of behavioral intention to use ICT (Anderson & Maninger, 2007; Chen, 2010; Gialamas & Nikolopoulou, 2010; Teo, 2009).

Antoine (2011) examines the relationship between sources of computer self-efficacy and four motivational factors: self-efficacy, outcome expectations, computer anxiety and behavioral intention with 105 undergraduate students taking introductory computer courses. The findings of the study indicate that there is a significant relationship between mastery experience-verbal persuasion and general computer self-efficacy. There is a

strong relationship between mastery experience-physiological states and computer anxiety. Lastly, it was found that there is a significant relationship between mastery experience-vicarious experience-physiological states and intention to use computers.

Compeau and Higgins (1995) develop a measurement tool for evaluating the effect of self-efficacy on individual responses to computing technology. The participants are composed of 1020 knowledge workers. A 10-item measure of computer self-efficacy is established with a focus on task on the statements. One example statement is like that 'I could complete the job using the software package if there was someone giving me step by step instructions'. The answers are taken with yes and no options with three ranks which are 'not at all confident, moderately confident, totally confident'. The components included in the suggested research model are encouragement by others, others' use, support, computer self-efficacy, affect, anxiety, and usage. The model is found to explain "37 percent of the variance in affect, 25 percent of the variance in anxiety, and 32 percent of the variance in use" (p. 201). As a result, it is figured out that self-efficacy holds a crucial part in forming individuals' feelings and behaviors.

Ertmer, Evenbeck, Cennamo and Lehman (1994) study the impacts of computer experience on self-efficacy ratings of such computer technologies as e-mail and word-processing. The participants are composed of 32 students enrolled in computer applications in a physical education course. The research is designed as repeated measures, pre-test post-test-delayed test, with a control group. The results indicate that self-efficacy for specific computer technologies could be improved by expanding the quantity of time they had working with these technologies.

Giles and Kent (2016) investigate 28 elementary pre-service teachers' self-efficacy beliefs regarding technology integration into instruction. 68% of the pre-service teachers are found to have high self-efficacy for choosing and using technology in teaching. Additionally, 89% of the participants report that they can incorporate technology throughout the curriculum and 80% of them report that they can make use of technology by explaining why, when, and how to integrate technology into teaching.

Inal (2015) searches for 305 Turkish ELT trainees' perception about computer self-efficacy and some variables like frequency of Internet and computer use, grade level, first time computer use, attending a computer course, and computer ownership. Designed as a

descriptive study model, the study involves 305 Turkish EFL trainees attending 1st, 2nd, 3rd, and 4th year classes at the ELT Department. The researcher investigated Turkish EFL trainees' computer self-efficacy perception and its relationship with the variables mentioned above. The findings indicate that trainees' computer self-efficacy level is at a moderate level.

Sam, Othman, and Nordin (2005) measure 148 undergraduates' computer self-efficacy, computer anxiety, attitudes toward the Internet, and reported use of the Internet by using a questionnaire. The participants are observed to have moderate computer anxiety and attitudes toward the Internet while their computer self-efficacy was high. It is suggested in the study that the faculties should provide their undergraduates with "wide range of short-format, hands-on workshops and demonstrations in which undergraduates can be given individual attention" (p. 213).

Seferoglu (2007) investigates the perceptions of 54 students in the faculty of education about self-efficacy for computer use, their field of study, and the computer programs they use. The researcher collects data through a survey questionnaire and "Computer Self Efficacy" scale. According to the "Computer Self Efficacy" scale results, the students have high level of computer self-efficacy.

Wall (2004) conducts a study on 121 pre-service teachers' computer self-efficacy levels. The researcher uses computer self-efficacy scale as a data collection tool. Wall finds out that most of the pre-service teachers have a high and very high level of computer self-efficacy based on the results of the "Computer Self Efficacy" scale.

Wang et al. (2004) examine the effect of vicarious experiences and goal setting on pre-service teachers' self-efficacy for technology integration. Two hundred and eighty participants (elementary education, secondary education, pre-kindergarten education, kindergarten education, and others) taking an introductory educational technology course are allocated to three experimental (no vicarious experiences but with goal setting, no goal setting but with vicarious experiences, vicarious experiences with goal setting) and one control group (no vicarious experiences and no goal setting). The results of the study show that vicarious experiences and goal setting procedure have a positive effect on pre-service teachers' self-efficacy for integrating technology. Additionally, using both vicarious

experiences and goal setting seem to have even greater effects on pre-service teachers' self-efficacy for technology integration.

Computer Attitude

Defining Attitude

Attitude is identified as "an evaluative reaction to some referent or object, inferred on the basis of the individual's beliefs or opinions about the referent" (Gardner, 1985, pp. 91-93). Nolen-Hoeksema, Fredrickson, Loftus, and Wagenaar (2009) list three components of attitudes: "a cognitive component, an affective component, and a behavioral component" (p. 662).

Defining Computer Attitude

There is a large volume of published studies describing the role of attitude in the integration of ICT into classes (Abas, 1995; Beggs, 2000; Blankenship, 1998; Bullock, 2004; Davis, 1989; Francis, Katz, & Jones, 2000; Huang & Liaw, 2005; Isleem, 2003; Kersaint, Hornton, Stohl, & Garofalo, 2003; Mumtaz, 2000; Myers & Halpin, 2002; Scherer, Tondeur, Siddiq, & Baran, 2017; Tondeur, Valcke, & van Braak, 2008b; van Braak, Tondeur, & Valcke, 2004; Woodrow, 1991). If teachers do not hold positive attitudes towards ICT, they may not tend to use ICT in their classes. The studies indicate that it may be important to research computer attitude in order to understand the behavioral intention of student teachers whether they will integrate ICT into their future classes. Computer attitude in this study refers to student teachers' attitudes towards the use of ICT in their future classes.

Alkan and Erdem (2010) investigate the attitudes of student teachers towards educational technology and the impact of teaching applications on attitudes towards educational technology. The participants range from 1st to 5th grade from the departments of Biology, Physics, Chemistry and Mathematics Teaching. The findings reveal that the student teachers hold positive attitudes towards educational technologies. Moreover, it was found

that the attitudes of the student teachers who experienced teaching application were more positive than those who did not.

In an investigation into 98 Turkish EFL pre-service teachers' attitude towards the use of technology in language learning and teaching by using both quantitative and qualitative data, Harmandaoğlu-Baz (2016) reports that pre-service teachers are positive towards the use of technology for language learning and teaching. They think that technology use promotes learner engagement, saves time, and is convenient. On the other hand, they believe that technology can make them and their students addictive and lazy. They seem to worry about the abusement of the technology by the students.

Hismanoglu and Hismanoglu (2011) attempt to evaluate the attitudes of 175 senior English teacher candidates from formal and distance higher education fields towards ICT. The English prospective teachers at the formal higher education are found more positive towards ICT than those at distance higher education. The findings reveal a significant difference between the attitudes towards ICT integration among English teacher candidates at formal and distance higher education. It was suggested that the ELT curriculum should be revised in order to enable for more authentic experiences in terms of ICT. Additionally, there may be an increase in the number of the courses based on ICT use. There should be more chances for EFL teacher candidates in order to promote their self-efficacy and experiences in ICT use for their future teaching.

One study by Kuo (2008) is aimed at finding out one hundred and one Taiwan senior EFL student teachers' perceptions about their self-efficacy, beliefs, and, learning experiences on Internet-assisted language learning and teaching. The results demonstrate that most EFL student teachers have gone through positive experiences and adopt positive attitudes towards the use of Internet-assisted language learning and teaching. They give credence to technology as important for their future teaching. On the other hand, nearly 25% of EFL student teachers are not very confident about if they have the capability and information for technology integration into their future teaching.

Sugar (2002) emphasizes the importance of attitudes in technology integration practices. Sugar emphasizes that teachers may probably eliminate the barriers during technology integration by altering their attitudes towards the use of technology in the classes. The studies related to computer attitude indicate that pre-service teachers hold positive attitudes

toward the use of technology in education (Alkan & Erdem, 2010; Harmandaoğlu-Baz, 2016; Hismanoglu & Hismanoglu, 2011; Kuo, 2008; Yüksel & Kavanoz, 2011)

In a study which sets out to determine the attitudes of 200 prospective teachers registered in a TEFL Certificate program towards technology use in language teaching, Yüksel and Kavanoz (2010) find that the participants pose positive attitudes towards technology use for language teaching. However, some participants are said to be not confident enough to make use of technology to its full capacity.

Computer Anxiety

Defining Anxiety

Bandura (1982) boils down to understanding that human anxiety is taken into consideration from a different perspective in the social learning field. Therefore, human anxiety is assumed as "inefficacy in coping with potentially aversive events that makes them fearsome" (Bandura, 1982, p. 136). In addition, there seems to be not much reason to fear as long as one can manage to block, end, or diminish the intensity of the aversive situations (Bandura, 1982). It was found that "the less efficacious subjects judge themselves to be, the more fear they experience" (Bandura, 1982, p. 138). It should be noted that "people experience anxiety when they perceive themselves ill equipped to manage potentially injurious events" (Bandura, 1982, p. 141).

Bandura (1977) acknowledges that the vigor of individuals' judgments about their own power influences whether they can even attempt to handle with challenging circumstances. Individuals get frightened and stay away from intimidating conditions in which they see themselves incapable of dealing with the challenges. On the other hand, individuals act willingly if they see themselves able to cope with the circumstances.

Defining Computer Anxiety

Computer anxiety can be defined as a "situation-specific anxiety, similar to test anxiety and math anxiety" (Antoine, 2011, p. 29). Computer anxiety can be labeled as one's apprehension towards computers as a situation-specific anxiety. In relation to computer

anxiety, Chua, Chen, and Wong (1999) give a summary of the nature of computer anxiety in their meta-analysis study:

1. "Computer anxiety is a fear for computers when using the computer, or when considering the possibility of computer use.
2. Computer anxiety is a kind of `state anxiety' which can be changed.
3. Computer anxiety is measurable in multiple dimensions.
4. Computer anxiety causes computer use avoidance" (pp. 610-611).

Computer anxiety can be perceived to have an impact on the behavioral intention of pre-service teachers about integrating ICT into their future classes. Computer anxiety corresponds to pre-service teachers' perceived anxiety about integrating ICT into their future classes in this study.

Mcinerney et al. (1990) investigate the impacts of increased computing experience on the computer anxiety of 101 freshman pre-service teacher education students. The data collection instruments, which are Computer Anxiety Rating Scale (CARS), Attitudes Towards Computers Scale (ATCS), and Computer Thoughts Survey (CTS) are gathered from the participants both at the beginning and at the end of a computer training course. There are two groups namely, experimental with a computer training course and control without a computer training course. The training is about the use of a word processor on IBM JX computers in one hour of coursework each week during fourteen weeks. The results reveal that the more computer experience increases, the lower anxiety generally becomes. Computers may induce less anxiety if they become an element of formal instruction.

Constructivist Teaching Beliefs

Social constructivism was developed by Vygotsky whose collaborative learning promotes construction of meaning via collaboration and interaction (Cunningham & Duffy, 1996; Jonassen, 1991; Vygotsky, 1962). Previous research has established that teachers with more constructivist teaching beliefs may have a tendency to use technology more often, effectively, and in an innovative way (Ertmer, 2005; Higgins & Moseley, 2001; Pajares, 1992; Wang, 2002). Funkhouser (2011) discovers that pre-service teachers have traditional and teacher-centered beliefs towards technology use at the entrance to teacher training programs. Pre-service teachers seem to switch to more mixed teacher and student centered beliefs at the end of a six-week course. Additionally, Ritchie and Wiburg (1994) claim that

traditional perceptions related to knowledge, learning, and teaching may be significant determinants of integrating ICT into instruction. One thing that should not be neglected is that once teachers start to integrate ICT, there should be some changes in beliefs in terms of knowledge, learning, and teaching as Kerr (1996, p. 24) indicates:

> a radical shift in both teaching style and the teacher's vision of what classroom life is all about . . . . This new vision is one that changes the teacher's role in basic ways, reducing the importance of 'chalk and talk,' increasing the need for sensitivity to individual students' problems and achievements, shifting how classrooms are laid out, how evaluation is conducted, how teachers relate to their colleagues, and a hundred other particulars of daily life in schools.

In line with these developments, Ertmer (1999) clarifies that the factors hindering teachers' ICT integration seem to be parallel with what Kerr (1996) considers as the factors that need to be shifted because these obstacles above-mentioned are about "teachers' beliefs about teacher-student roles as well as their traditional classroom practices including teaching methods, organizational and management styles, and assessment procedures" (p. 51). Ertmer (1999) claims that even though each first-order barrier is eliminated, it does not mean that teachers would start utilizing ICT with the aim of carrying out meaningful learning. As stated above, this would necessitate a change in the belief systems of the teachers regarding teaching, learning, and knowledge. Additionally, some teachers may not be hindered by second-order barriers in their integration practices (Evans-Andris, 1995; Van Haneghan, & Stofflett, 1995, as cited in Ertmer, 1999). Those who have already reconsidered the beliefs about teacher and learner roles, alternative assessment types, and new learning outcomes may think that ICT is parallel with their current class environment (Ertmer, 1999). What is more, teachers' choice whether to incorporate technology and in which ways they are going to integrate are affected by their beliefs regarding the technology's benefits for students (Ertmer, 2005).

Teacher beliefs serve as a filter for their precedence of how much ICT integration occurs (Pine-Thomas, 2017). Data from several studies suggest that teachers having more tendency towards constructivist beliefs can be more liable to endeavor to integrate technology (Becker, 2001; Becker & Riel, 2000; Ertmer, Ottenbreit-Leftwich, & Tondeur, 2015; Greer, 2017; Higgins & Moseley 2001; Judson, 2006; Tondeur et al., 2008a; Webb & Cox, 2004) and constructivist classroom environments present learners the opportunity to experience authentic, collaborative learning process in alliance with their own interests (Ertmer, Ottenbreit-Leftwich, & York, 2006). In addition, Ertmer et al. (2006) give emphasis to the importance of enablers for technology integration, which is considered an

ignored point. They suggest that the intrinsic factors may be more likely to affect technology integration than extrinsic factors as in the case of barriers. In other words, the provision of support and facility to the teachers do not always naturally bring about the integration of technology meaningfully among teachers.

The study of Chen (2008) investigates 311 EFL teachers' Internet usage in their instruction by using both quantitative and qualitative data. The results indicate that 80.1% of the teachers use the Internet in their language instruction. Teacher training is found to be the most significant variable in determining Internet use. The attitudes of the teachers towards Internet use seem to change after taking training. Furthermore, when the teachers have positive attitudes towards Internet use, their perceptions about their capability of making use of the computer and promoting use of the Internet in language instruction may alter positively. When these EFL teachers' beliefs transform to constructivist teaching beliefs, they may start carrying out constructivist teaching practices, which is likely to influence and escalate their Internet use in their classes. Once they have constructivist based practices, they may see themselves as more qualified for using computers and these kinds of implementations may strengthen their beliefs regarding the use of the Internet in education. The barriers to Internet use in the classroom reported by the teachers in the study were "time, feelings of uncertainty, inadequate institutional support, lack of cooperation or team-work, appropriateness of course content, workshops focused on technology application in language teaching, and lack of planning for technology integration into classroom" (Chen, 2008, pp. 1022-1023).

Hammond et al. (2009) examine some student teachers with good ICT user example and illustrate their use of ICT both in their first year of teaching and at their final placement by utilizing a qualitative design. The student teachers strongly think that pupils are more motivated and active. The student teachers also present the rationale for using ICT: getting the pupils' attention, more active learning, access to up-to-date materials, and assisting pupils about share work. The images of the student teachers about a good lesson seem to ally with their rationale for using ICT. They think that pupils should take part actively, engage, and interact. Hammond et al. (2009, p. 60) see "the pedagogical orientation of the student teachers as a key issue". In other words, the important point for student teachers' determination to make use of ICT is the belief that ICT use would make a change in their lessons and pupils would react to it in a positive way.

Behavioral Intention to Use ICT

Ajzen (1991) in his theory of planned behavior describes intention as an important indicator of performing a given behavior in addition to indicating the extent of the willingness and effort to be put that behavior into practice. The trainings related to ICT integration are expected to have an impact on pre-service teachers' willingness and skill to integrate ICT into their future classes (Anderson & Maninger, 2007). Willingness to use ICT in future teaching may string along with the notion of behavioral intention which is about desiring and intending to carry out something antecedently. Due to the fact that the pre-service teachers may not have numerous experiences in terms of teaching in the classes, it is understandably reasonable to give credit to behavioral intention for ICT integration in pre-service teachers' future classes (Myers & Halpin 2002; Sadaf, Newby, & Ertmer, 2016; Venkatesh, Morris, Davis, & Davis, 2003; Yushau, 2006; Zhou, Fang, Vogel, Jin, & Zhang, 2012). In other words, the more powerful the intention becomes, the more expectable the performance occurs. Intention can be a straight indicator of behavioral achievement. Pre-service teachers' behavioral intention presents auguring illumination about their actual use of ICT in their future classes. Behavioral intention to use ICT refers to pre-service teachers' self-report behavioral intention to use ICT in their future classes in this study.

Considering all of this evidence, very little attention has been paid to the unified impact of teacher related variables on student teachers' behavioral intention to use ICT in their future classes. Three studies are available for investigating the unified impact of at least one or at most three teacher related variables on pre-service teachers' behavioral intention to use ICT with the same variables taken into consideration in this study (Aslan & Zhu, 2016; Sang et al., 2010) one being about computer supported education (Celik & Yesilyurt, 2013). Additionally, some studies have been designed to investigate factors related to some teacher related variables and other factors (Aslan & Zhu, 2017). Aslan and Zhu (2017) focus on computer anxiety and computer attitude along with the variables indicated in table 4. Celik and Yesilyurt (2013) take into consideration computer self-efficacy and computer anxiety. Finally, Sang et al. (2010) pay attention to computer self-efficacy, constructivist teaching beliefs, and computer attitude. The related studies can be observed in table 4. Path analysis (Sang et al., 2010), and structural equation modeling (Aslan & Zhu, 2016; Celik & Yesilyurt, 2013) have been preferred for the analysis of the studies. However, no single

study exists which makes use of joint impact of computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude for predicting student teachers' behavioral intention to use ICT in their future classes by using first and second order change framework.

Table 4

Studies Related to Internal Factors for Behavioral Intention Models Among Pre-service Teachers

Authors	Field	Participants	Variables	Findings
R1: Aslan & Zhu (2017)	Department of Educational Studies, published in British Journal of Educational Technology	599 pre-service teachers including subject areas of Turkish language, social sciences, elementary mathematics, and science in their fourth year of training programs	ICT-related variables: perceived ICT competence, perceived competence in ICT integration, attitudes toward ICT, anxiety around ICT usage, external barriers to ICT integration, ICT-related courses, pedagogical knowledge, and prior experience concerning the use of ICT > integration of ICT into teaching practices	-Significant predictors > pedagogical knowledge, ICT-related courses, and perceived ICT competence (17% of the variance in predicting the integration of ICT into teaching practices)
Brickner (1995)	Doctor of Philosophy	24 participants (1 assistant principal, 1 computer coordinator, 22 mathematics teacher)	The relationship of first-order and second-order barriers to change	-Lack of computer or equipment facility was found as the biggest barrier to computer use followed by time for lesson preparation and availability of appropriate software (first-order barriers).
R2: Celik & Yesilyurt (2013)	Department of Educational Studies, published in Computers& Education	471 pre-service teachers	The effect level of attitudes towards technology, perceived computer self-efficacy and computer anxiety, and attitude towards computer supported education on each	Attitudes to technology, perceived computer self-efficacy and computer anxiety > important predictors of computer

			other and their ratios to each other	supported education (60% of the variance in predicting of teacher candidates' attitude toward using computer supported education)
R3: Sang, Valcke, van Braak, and Tondeur (2010)	Department of Educational Studies, published in Computers& Education	727 university students majoring in primary education from four teacher education universities in three cities of China (8 % in English)	Constructivist teaching beliefs, teaching self-efficacy, computer self-efficacy, and computer attitudes on their prospective ICT use	- Constructivist teaching beliefs, teacher self-efficacy, computer self-efficacy and computer attitudes in education directly and the gender of the student teachers indirectly predict their prospective ICT use (34% of the variance in predicting of student teachers' prospective computer use).
Wallace (2012)	Doctor of Education in Educational Leadership	285 subject area teachers (except Physical Education teachers)	First-order barriers: equipment, resources, and support Second-order barriers: knowledge/skills, and beliefs/attitudes Third-order barriers: school structure/organization and culture/climate	-First-order barriers seemed to be the greatest hindrance the teachers deal with in the integration of technology into their instruction.

Aslan and Zhu (2017) look into what extent ICT-related variables predict the integration of ICT into teaching practices of pre-service teachers. The findings indicate that pedagogical knowledge, ICT-related courses, and perceived ICT competence (17% of the variance in predicting integration of ICT into teaching practices) have a significant impact on predicting integration of ICT into teaching practices. On the other hand, "attitudes toward technology," "barriers to ICT integration," "computer anxiety," and "prior experience

concerning use of ICT" variables have not been found significant in predicting integration of ICT into teaching practices.

Brickner (1995) investigates the link of the first-order and second-order barriers to change in mathematic teachers' computer use in their classes. It has been revealed that the greatest obstacle for the mathematics teachers in the study is lack of technological facilities. Other first-order barriers hindering technology implementation are identified as lack of time and suitable software. From another perspective, it is suggested that the teachers may not prefer to use technology even if they are provided with computer facilities. The researcher's hunch for this is that they may be hindered by their second-order barriers as in the example of a participant. The participant seems to have refused to use computer in class due to his fear of computers and in case he makes mistakes in front of his class. At the end of the study, it has been observed that the teachers' technological self-efficacy develops while their computer anxiety diminishes. The findings reveal that the barriers mentioned by mathematics teachers are mostly based on first-order barriers and the-second-order barriers are identified as (Brickner, 1995, pp. 173-174):

> teachers' lack of commitment to invest the time, teachers' beliefs that they can or want to teach this way, and the lack of commitment and support from administrative and corporation level which might left many of the teachers unmotivated to engage in computer implementation efforts.

Celik and Yesilyurt (2013) search the attitudes towards technology, perceived computer self-efficacy, computer anxiety, and attitudes towards computer supported education on each other and their ratios to each other. The participants are 471 pre-service teachers from the department of psychological counseling and guidance, elementary education mathematics teaching, science and technology teaching, Turkish teaching, social studies teaching, classroom teaching, and English teaching (7.6%, n=36). The results indicate that "attitude to technology significantly and positively affects perceived computer self-efficacy" (p. 155). It has been found that "attitude to technology positively and significantly affects the attitude toward applying computer supported education" (p. 155). It was revealed that "attitude to technology affects computer anxiety positively and significantly" (p. 155). The findings present that "attitude to technology and computer anxiety together affect the attitude toward instituting computer supported education positively and significantly" (p. 155). It seems that "attitude to technology, perceived computer self-efficacy and computer anxiety together significantly explain the attitude toward making computer supported education at a ratio of 60%" (p. 155).

In their quantitative study investigating the impact of teacher thinking processes, namely, constructivist teaching beliefs, teaching self-efficacy, computer self-efficacy, and computer attitudes on their future ICT use, Sang et al. (2010) collect data from seven hundred and twenty seven pre-service teachers via five scales. The model which is tested by Sang et al. explains variance in prospective computer use with a ratio of 34%. They report that all teacher-related variables except gender directly affect future ICT integration of student teachers. Attitudes toward computer use in education have been found as the strongest predictor of prospective computer use.

Wallace (2012) attempts to investigate the most important barriers, namely, first, second, and third (suggested by Wallace) order barriers, that prevent teachers from using technology for instruction. The findings indicate that first order barriers have the highest average followed by third-order, and then second-order barriers in terms of the self-reported obstacles teachers face in integrating technology into instruction. In addition, it has been found that there is a considerable disparity between the teachers born before and after 1980 in second-order barriers.

Summary of the Chapter

This chapter starts with a general perspective to pre-service teacher education and ICT. It should be kept in mind that teacher educators must take serious responsibility for ICT use and integration into classes so that teacher educators can contribute to increasing student teachers' computer self-efficacy, attitude, comfort and constructivist teaching beliefs. Pre-service teacher education and competency framework stimulate the use of ICT in the classrooms. Integrating ICT into the classes is not an easy endeavor because the teachers can face first and second-order barriers and these barriers may stun their behavioral intention to integrate ICT. As a scope of this study, the researcher tries to establish a theoretical model about the impact of teacher-related variables on English student teachers' behavioral intention to use ICT in their future classes. In the following part, the methodology of this dissertation will be explained in detail.

CHAPTER III

METHODOLOGY

This chapter is concerned with the methodology, namely, research design, population and sample, data collection instruments, and data analysis. Additionally, there will be detailed information about the role of the researcher and validity and reliability issues.

Research Design

A correlational research design has been adopted in order to try to predict the contribution of teacher-related variables (computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude) to English student teachers' behavioral intention to use ICT in their future classes. "A correlational study describes the degree to which two or more quantitative variables are related, and it does so by using a correlation coefficient" (Fraenkel, Wallen, & Hyun, 2011, p. 331). Creswell (2014, p. 41) states that correlational designs "have been elaborated into more complex relationships among variables found in techniques of structural equation modeling, hierarchical linear modeling, and logistic regression". Based upon the nature of the study and the research question identified, the nature of the hypotheses, the theory used, and the use of already valid and reliable surveys make the research design appropriate for the study.

Population and Sample

The population of this study is composed of senior English pre-service teachers in different regions of Turkey. The senior pre-service teachers have been chosen because they are the most likely teacher candidates in the future. Firstly, the universities for data collection have been identified by using stratified random sampling which is "a process in which certain subgroups, or *strata*, are selected for the sample in the same proportion as they exist in the population" (Fraenkel et al., 2011, p. 95). Turkish Statistical Institute clarifies that Turkey is composed of twelve regions (Turkish Statistical Institute, 2016). Secondly, the researcher has sent out the questionarries to at least one university in each region by using convenience sampling. According to Fraenkel et al. (2011, p. 99), "a convenience sample is a group of individuals who (conveniently) are available for study". Student Selection and Placement Center population data in 2012 for ELT departments at universities were taken into consideration in the selection of the population because the senior pre-service teachers in 2016 were recruited to ELT departments in 2012. The population involves nearly two thousand nine hundred and sixty English student teachers (Measuring, Selection, and Placement Center, 2012). The researcher has reached eight regions in total and the population of the universities (one thousand four hundred and thirty five student teachers) as well as the sample (eight hundred and sixty one student teachers) in the department of English Language Teaching can be seen in table 5 based on eight regions in Turkey. Data have been collected at least from one university in each region.

Data management and analysis have been performed using SPSS, version 21. Eight hundred and sixty one English student teachers have taken part in the study of whom 75% are female and 25% are male. Mean of their age is calculated $\overline{X} = 21.90$. The researcher has distributed the questionnaires to English student teachers by sending out photocopies to universities and attempted to reach as many participants as possible in order to increase the generalization of the research. As a result, the data collected from English student teachers compose 60% of the population, which adds a great strength to this dissertation since Tabachnick and Fidell (2012) clarify that a sample size of 200 is sufficient for SEM analysis.

Table 5

Profile of the Participants

Region	City	University	Population	Sample
East Marmara	Bursa	Bursa Uludağ University	165	52
	Eskişehir	Anadolu University	160	81
West Marmara	Çanakkale	Çanakkale Onsekiz Mart University	100	100
	Edirne	Trakya University	80	75
Aegean	Denizli	Pamukkale University	90	37
	İzmir	Dokuz Eylül University	115	93
	Muğla	Muğla Sıtkı Koçman University	65	10
West Black Sea	Samsun	Ondokuz Mayıs University	65	59
West Anatolia	Konya	Necmettin Erbakan University	95	63
	Ankara	Gazi University	140	81
	Ankara	Hacettepe University	105	89
Central Anatolia	Kayseri	Erciyes University	70	12
Northeast Anatolia	Erzurum	Atatürk University	100	49
Central East Anatolia	Malatya	İnönü University	40	21
	Gaziantep	Gaziantep University	45	39
Total			1435	861

Data Collection Instruments

Four data collection tools are employed in the study as indicated in table 6.

Table 6

Data Collection Instruments

Computer technology integration survey by Wang et al. (2004)	Two factors: computer technology capabilities and strategies & external influences of computer technology uses
Computer anxiety rating scale (CARS) by Heinssen, Glass and Knight (1987)	One factor
Constructivist teaching beliefs (CTB) scale by Woolley, Benjamin and Woolley (2004)	One factor
Behavioral intention scale by Davis, Bagozzi and Warshaw (1989)	One factor
Computer attitude scale by Kay (1989)	Three factors: cognitive, affective, & behavioral

Computer Technology Integration Survey

This survey designed by Wang et al. (2004) is used in order to identify student teachers' self-efficacy beliefs related to technology integration. Factor analysis results indicate that the survey is composed of two factors: first factor =computer technology capabilities and strategies (46.92% of the covariance) and second factor=external influences of computer technology uses (8.4% of the covariance). Only the first factor was used in their study and Cronbach's Alpha was found .94 in pre-survey and .96 in post survey in their analysis.

For this dissertation, the statements have been examined one by one and their relation to the construct (here computer self-efficacy) has been critically evaluated. A pilot study has been conducted in order to make sure that the statements are clear to the participants because there may occur some misunderstandings due to such points as culture, context, and educational system of the country. Some statements have been modified or added extra information. The statement 'I feel confident about selecting appropriate technology for instruction based on curriculum standards' has been revised by deleting 'based on curriculum standards' since it has raised a vague meaning among the participants (some think it is syllabus, others think it is something related to lesson plans). The altered statements have been asked to learners and checked whether the statements raise the same meaning and understanding among participants.

Constructivist Teaching Beliefs Scale

Constructivist Teaching Beliefs Scale by Woolley et al. (2004) is used in order to measure pre-service teachers' constructivist teaching beliefs. The Cronbach's Alpha of the scale is found .73 in their analysis. Some modifications have been implemented in some statements after piloting. The statement 'I believe that expanding on students' ideas is an effective way to build my curriculum' has been updated as 'I believe that expanding on students' ideas is an effective way to build my teaching' because curriculum creates an ambiguity in participants' minds. The statement 'I prefer to cluster students' desks or use tables so they can work together' has been revised as 'I prefer to arrange students' desks or use tables so they can work together' in order to make the sentences more understandable since the participants are not familiar with the word 'cluster'. The statement 'I invite students to create many of my bulletin boards' has been exemplified by adding (pinboard or noticeboard) after bulletin boards in order to give 'bulletin boards' a more concrete meaning as 'I invite students to create many of my bulletin boards (pinboard or noticeboard)'.

Behavioral Intention Scale

Designed as a two statement- scale by Davis et al. (1989), behavioral intention scale is used in order to understand the behavioral intention of student teachers whether they will use ICT in the future. The Cronbach's Alpha of the scale evaluated twice is high (α= .84 at the beginning of the semester and α= .90 at the end of the semester) in their analysis.

Computer Anxiety Rating Scale

Computer Anxiety Rating Scale by Heinssen et al. (1987) is used in order to measure the level of pre-service teachers' anxiety towards computers. Item-total scores for the scale ranged from .23 to .64 ($p < .0001$). The scale indicates high reliability (α= .87) in terms of their analysis. Following piloting, the statement 'I look forward to using a computer on my job' has been changed into 'I look forward to using a computer in my teaching' in order to create a context for the participants. The statement 'I am sure that with time and practice I will be as comfortable working with computers as I am in working with a typewriter' has

been revised as ‘I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand’ since typewriter seems highly old-fashioned in today’s world. The statement ‘I feel apprehensive about using computers’ has been modified by adding (nervous) after apprehensive in order to enable the participants to understand the meaning easily. The statement ‘You have to be a genius to understand all the special keys contained on most computer terminology’ has been updated as ‘You have to be a genius to understand all the special keys contained on most computers’. The statement ‘I have avoided computers because they are unfamiliar and somewhat intimidating to me’ has been made clear by adding (scary) after intimidating. The statement ‘I feel computers are necessary tools in both educational and work settings’ has been revised as ‘I feel computers are necessary tools in educational settings’ since the context is education for participants.

Computer Attitude Scale

Computer Attitude Scale by Kay (1989) is used in order to identify the attitudes of pre-service teachers towards computers. The scale is composed of cognitive (α= .87), affective (α= .89), and behavioral (α= .94) subscales with a high reliability ratio. The internal reliability for the total scale is .94 based on Kay’s analysis. In addition, to the knowledge of the researcher there is no other scale composed of those subscales for assessing attitude of pre-service teachers towards computers. This scale has been chosen due to high reliability of the subscales and integration of three subscales for measuring attitude.

The Role of the Researcher

The researcher behaved very objective during data collection process. The researcher entered data to SPSS by herself. The researcher took into consideration the consent of the participants by giving them detailed information about the aim of the study and the identity of the researcher. The voluntary faculty members at the universities took the responsibility of applying the questionnaires.

Validity and Reliability of the Study

Validity and reliability are two crucial concepts that must be dealt with carefully during a study. Validity is defined as "the appropriateness, meaningfulness, correctness, and usefulness of the inferences a researcher makes" (Fraenkel et al., 2011, p. 147). Validity "reflects whether the research can be reasonably believed and to what extent generalisations can be made" (Woodrow, 2014, p. 26). In the following part, how validity and reliability of this dissertation is tried to be ensured will be mentioned in details. Firstly, internal and external validity will be touched upon accompanied by reliability.

Internal Validity

Internal validity can be thought as the fact that "observed differences on the dependent variable are directly related to the independent variable" (Fraenkel et al., 2011, p. 166). In order to accomplish internal validity in this dissertation, the researcher has used instruments of which validity and reliability have already been verified in order to diminish the threat to the internal validity. In addition to this, the researcher has verified the validity of each instrument via Confirmatory Factor Analysis. The correlational research design of the study is in alliance with the research question and hypotheses, choice of the participants and data collection tools. Consent forms including the aim of the study and the identity of the researcher have been provided to the participants and it is clarified that they can withdraw from the study any time they desire and they are assured that their identities are classified.

External Validity

External validity is defined as "the extent to which the results of a study can be generalized determines the external validity of the study" (Fraenkel et al., 2011, p. 103). It can be anticipated that the sample size is fair enough to be able to generalize the findings considering the fact that the researcher has reached 60% of the participants in this study. Therefore, it is thought that a representative sample has been gathered for this study.

Reliability

Reliability is described as "the consistency of scores or answers from one administration of an instrument to another, and from one set of items to another" (Fraenkel et al., 2011, p. 147). Woodrow (2014, p. 25) defines reliability as "the consistency of the results and how sure reader can be of replicability of the research". In order to ensure reliability in this dissertation, Cronbach's Alpha coefficients for each instrument have been calculated and reported. Some statements have been updated to make the sentences more clear and appropriate for the context. The modified items have been checked with the participants by asking what they understand from the statements. Expert judgment from two experts has been taken during the identification of the factors, instrumentation choice, pilot study, and the modification of the statements. The questionnaires have been distributed to different universities in different regions of Turkey.

Data Analysis

Data Screening

In the first place, data screening has been conducted in order to guarantee that there are no wrong data entered to SPSS because it is highly suggested that data screening should be applied before structural equation modeling (SEM) (Kline, 2011). It has been found out that there are some extreme, missing, and incomplete values in seventeen forms obtained from student teachers. Those forms have been extracted from the analysis and 844 out of 861 data have been used for the study. This process has made the data used in the study as accurate and complete as possible (Leong & Austin, 2006).

Structural Equation Modeling (SEM)

The aim of this study is to find out the contribution of teacher-related variables (computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude) to predicting English student teachers' behavioral intention to use ICT in their future classes. This study suggests a theoretical model, namely, I-PredICT model. Structural equation modeling (SEM) has been conducted in order to confirm the model via LISREL 8.8. The objective of using SEM is to study the hypothesized relationship among variables in the

research model, to see what types of relationships exist among them, and to figure out how significant each relationship is. SEM is preferred by many "social, behavioral, and educational" scholars since it both "provides researchers with a comprehensive method for the quantification and testing of substantive theories" and "explicitly takes into account measurement error that is ubiquitous in most disciplines, and typically contain latent variables" (Raykov & Marcoulides, 2006, p. 1).

SEM is composed of two sections, the measurement model and the structural model. Confirmatory factor analysis (CFA) has been performed in order to verify data collection instruments which are Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs Scale and Computer Attitude Scale. According to Raykov and Marcoulides (2006, p. 117), "CFA is considered to be a general modeling approach that is designed to test hypotheses about a factor structure, when the factor number and interpretation in terms of indicators are given in advance". SEM is called as a "technique that allows separate relationships for each of a set of dependent variables" (Hair, Black, Babin, & Anderson, 2010, p. 19). SEM is utilized in order to "specify the phenomenon under study in terms of tentative cause and effect variables and various causal effects" (Jöreskog & Sörbom, 1982, p. 404). In the light of these, SEM proves to be a perfect analysis method in order to verify I-PredICT model that is aimed to predict English student teachers' behavioral intention to use ICT in their future classes by using teacher-related variables. By using observed variables, namely, computer self-efficacy, computer attitude, constructivist teaching beliefs, and computer anxiety, in order to predict the latent variable, in other words, behavioral intention to use ICT, the researcher has foregrounded SEM analysis in this dissertation.

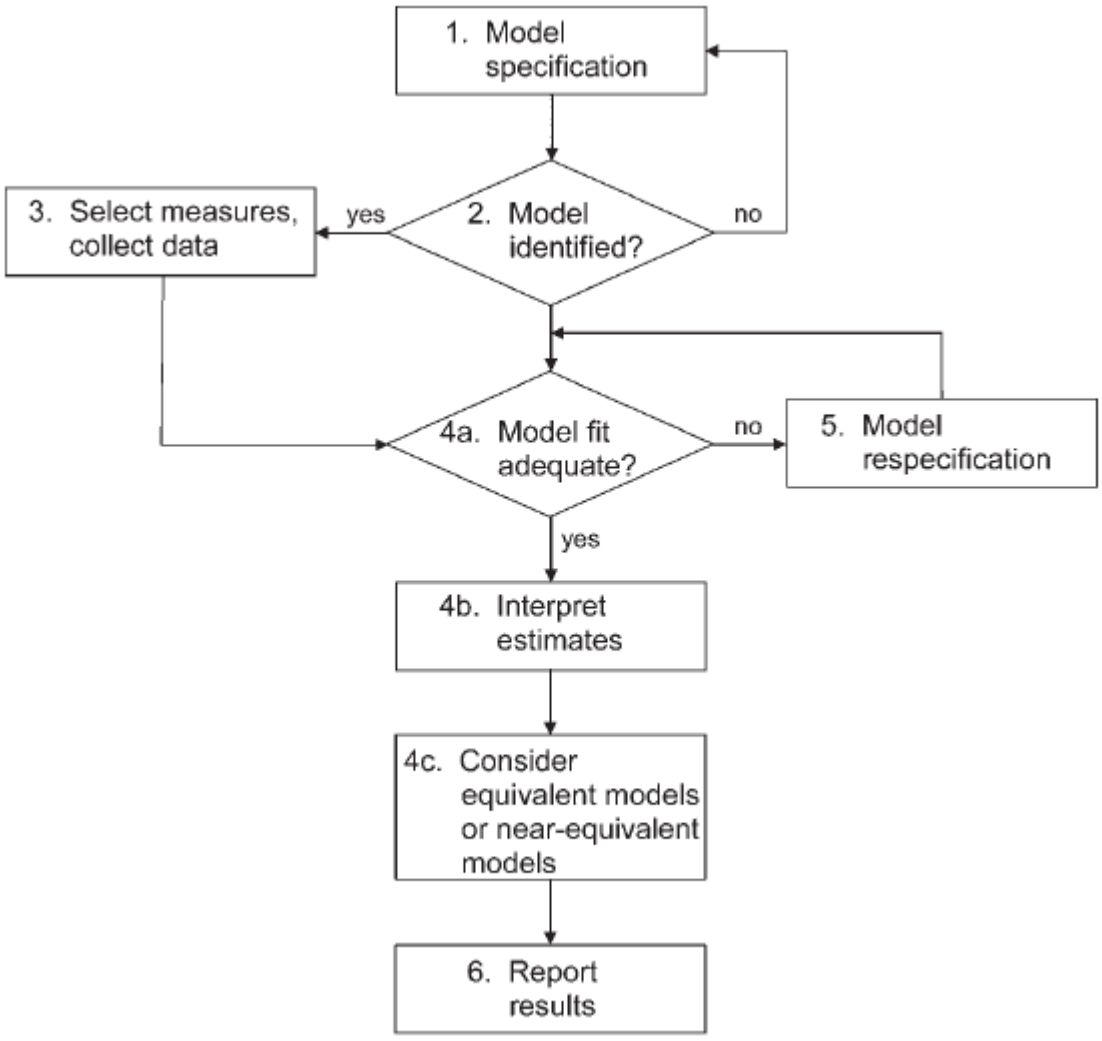


Figure 6. Flowchart of the basic steps of SEM. Adapted from "*Principles and practice of structural equation modeling*" by R. B. Kline, 2011, p. 92, USA, Guilford.

Kline (2011, p. 92) indicates the basic steps of SEM as indicated in figure 6. The flowchart starts with model specification that subsequently involves the identification of the model to assess the relationships from one variable to another in the specified model. Model specification and identification enlighten all types of hypothesized dependence relationships that exist among all factors and their magnitude or significance will be calculated. As can be seen in the basic steps of SEM, model identification and obtaining an acceptable level of goodness of fit for the suggested model are requisite for the validation of the model. Kline (2011) indicates that the most extensively used approximate fit indices that can be utilized to evaluate the fit between the hypothesized model and the data collected are The Root Mean Square Error of Approximation (RMSEA), Goodness of Fit

Index (GFI), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR). Fit indices that will be used in this dissertation are listed in table 7.

Table 7

Fit Indices

Fit Indices	Definition
The Root Mean Square Error of Approximation (RMSEA)	"… scaled as a badness-of-fit index where a value of zero indicates the best fit" (Kline, 2011, p. 205)
Normed Fit Index (NFI)	"This statistic assesses the model by comparing the $\chi 2$ value of the model to the $\chi 2$ of the null model" (Hooper, Coughlan, & Mullen, 2008, p. 55)
Nonnormed Fit Index (NNFI)	"The increment in fit obtained in evaluating any hierarchical step-up comparison of two models" (Bentler & Bonett, 1980, p. 599)
Standardized Root Mean Square Residual (SRMR)	"A measure of the mean absolute correlation residual, the overall difference between the observed and predicted correlations" (Kline, 2011, p. 205)
Goodness of Fit Index (GFI)	"A measure of overall fit" (Jöreskog & Sörbom, 1982, p. 408) "A measure of the relative amount of variances and covariances jointly accounted for by the model" (Jöreskog & Sörbom, 1982, p. 408)
Adjusted Goodness of Fit Index (AGFI)	"…using mean squares instead of total sums of squares in the numaretor and denominator" (Jöreskog & Sörbom, 1982, p. 408)
Chi-square/degrees of freedom ($\chi 2$/df)	"The *x2* goodness-of-fit statistic assesses the magnitude of discrepancy between the sample and fitted covariance matrices" (Hu & Bentler, 1999, p. 2)
Comparative Fit Index (CFI)	"An incremental fit index that measures the relative improvement in the fit of the researcher's model over that of a baseline model, typically the independence model" (Kline, 2011, p. 208)

Lastly, if the model fits the data and reach the acceptable fit levels indicated in table 8, the results are interpreted accordingly and reported. Fit indices for the model in table 8 have been formed based on the guidelines by Browne and Cudeck (1993); Byrne (1998); Diamantopoulos and Siguaw (2000); Hu and Bentler (1999); Kline (2011); MacCallum and Hong (1997); Raykov and Marcoulides (2006); Schermelleh-Engel and Moosbrugger (2003); Tabachnik and Fidell (2007); and Wheaton, Muthen, Alwin, and Summers (1977).

Table 8

Fit Indices & Their Acceptable Threshold Levels

Fit indices	Best fit	Acceptable
RMSEA	≤ .05	≤ .08
NFI	≥ .95	≥ .90
NNFI	≥ .97	≥ .95
SRMR	≤ .05	≤ .08
GFI	≥ .95	≥ .90
$\chi 2$/df	≤ 2	≤ 5
CFI	≥ .97	≥ .95
AGFI	≥ .90	≥ .85

Summary of the Chapter

This chapter gives an overview of research design and specific information about population and sampling, data collection instruments, and data analysis procedures. Using correlational research design, the researcher has collected data from 861 English student teachers by reaching 60% of the population in Turkey. The researcher has used already valid and reliable data collection instruments that contributed to both reliability and validity of the study. Lastly, SEM has been preferred for data analysis because latent variable (behavioral intention to use ICT) has been aimed to be explained by observed variables (computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer anxiety). The following chapter will give descriptions about normality test, confirmatory factor analyses and model fits of data collection tools and I-PredICT model.

CHAPTER IV

FINDINGS

This chapter gives sight into the exhibition of the confirmatory factor analyses and model fits of Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs, and Computer Attitude Scale. Additionally, I-PredICT model fit, descriptive statistics and reliability values of four factors are provided in detail.

Confirmatory Factor Analyses: Validity and Reliability Values

Normality Test

It is important to check whether the data have a multivariate normal distribution because this will affect the estimation method (Gao, Mokhtarian, & Johnston, 2008). Test of Multivariate Normality for Continuous Variables has been carried out in order to check the normality distribution of four data collection instruments and the suggested model. According to Schumacker and Lomax (2010, p. 216), "we might choose the maximum likelihood estimation technique because we meet the multivariate normality assumption (acceptable skewness and kurtosis)". However, the values in this dissertation show that multivariate normality is not provided based on the fact that Relative Multivariate Kurtosis is more than 1 as indicated in table 9. Therefore, Robust Maximum Likelihood (Robust ML) Estimation Method is used in this study.

Table 9

Relative Multivariate Kurtosis Values of Data Collection Instruments and I-PredICT Model

Data Collection Instruments	Relative Multivariate Kurtosis Values
Computer Technology Integration Survey	1.366
Computer Anxiety Rating Scale	1.307
Constructivist Teaching Beliefs Scale	1.505
Computer Attitude Scale	1.376
I-PredICT Model	1.162

Computer Technology Integration Survey

Computer Technology Integration Survey has originally been designed as a two-factor survey. However, confirmatory factor analysis of the survey reveals that two factors of the survey show a high covariance with a value of 0.91 in figure 7. This means that two factors overlap each other and uses almost similar items in terms of meaning.

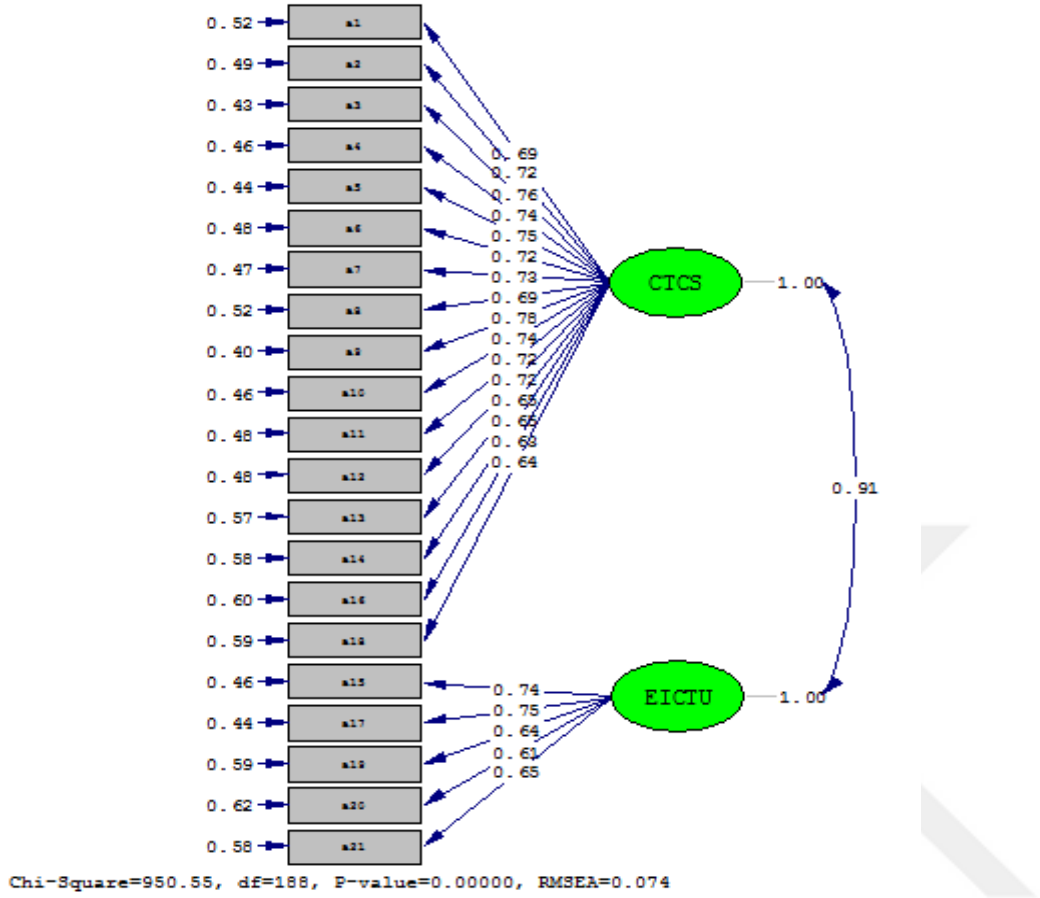


Figure 7. Two factors of Computer Technology Integration Survey

Therefore, two factors merge and one factor Computer Technology Integration Survey is confirmed and depicted in figure 8.

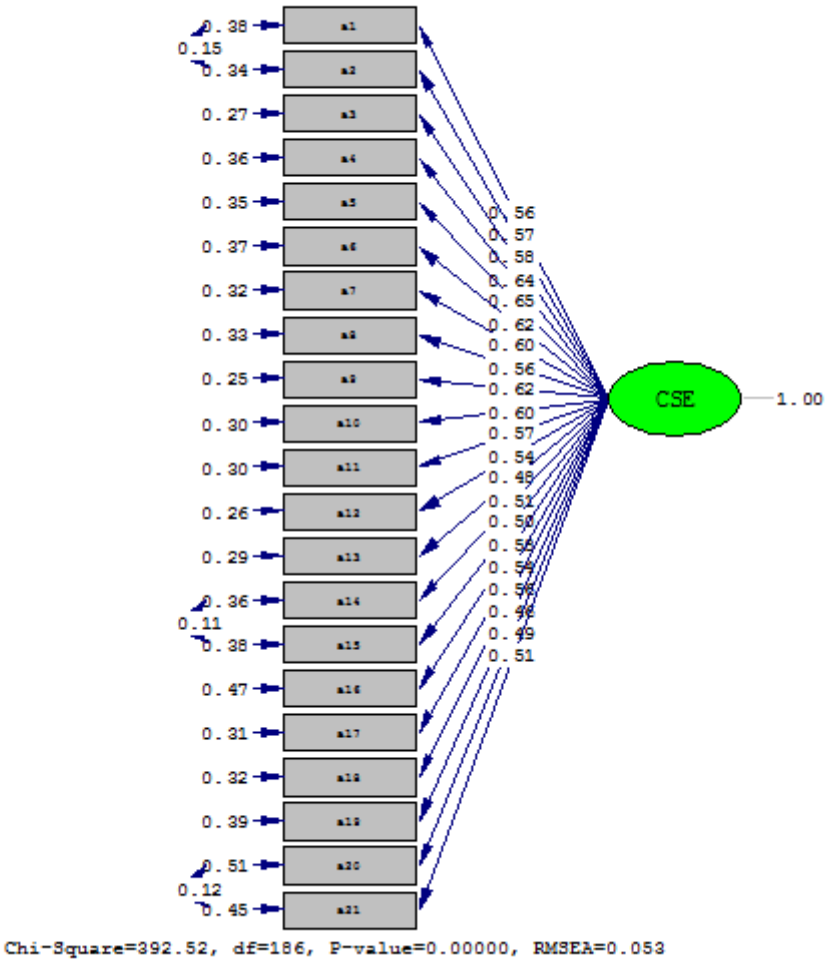


Figure 8. Path diagram with one-factor for Computer Technology Integration Survey

One can easily see from path diagram that there are twenty-one items and one factor in the survey. The modification indices have been observed based on a high covariance within their own factor and modifications between a2-a1, a15-a14, and a21-a20 have been carried out. Table 10 indicates the regression values and t values for the survey.

Table 10

Regression and t Values of Confirmatory Factor Analysis

Items	R^2	T
A1	0.45	11.03
A2	0.49	10.62
A3	0.56	11.96
A4	0.53	15.23
A5	0.55	15.91
A6	0.51	13.14
A7	0.53	13.77
A8	0.48	11.35
A9	0.61	13.81
A10	0.54	12.65
A11	0.52	0.044
A12	0.53	11.27
A13	0.44	9.83
A14	0.42	11.52
A15	0.40	10.68
A16	0.42	12.04
A17	0.49	11.24
A18	0.50	11.97
A19	0.35	8.55
A20	0.32	9.64
A21	0.37	10.67

The table above illustrates that A9 is the most significant item in the survey with a value of $R^2 = 0.61$ while A20 is the least significant item ($R^2 = 0.32$). What stands out in the table is that student teachers' confidence about mentoring students in appropriate uses of technology explains their computer self-efficacy the most. On the other hand, student teachers' confidence about developing creative ways to cope with system constraints (such as budget cuts on technology facilities) and continuing to teach effectively with technology influences student teachers' computer self-efficacy the least.

Table 11

Computer Technology Integration Survey Fit Indices and Concordance

Fit indices	Best fit	Acceptable	Scale fit indices	Concordance
RMSEA	≤ .05	≤ .08	0.053	Acceptable
NFI	≥ .95	≥ .90	0.98	Best
NNFI	≥ .97	≥ .95	0.99	Best
SRMR	≤ .05	≤ .08	0.047	Best
GFI	≥ .95	≥ .90	0.90	Acceptable
AGFI	≥ .90	≥ .85	0.85	Acceptable
χ2/df	≤ 2	≤ 5	2.11	Acceptable
CFI	≥ .97	≥ .95	0.99	Best

Table 11 presents an overview of fit indices for the survey. The values from the table 11 reveal that RMSEA (Browne & Cudeck, 1993), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel & Moosbrugger, 2003, p. 43), χ2/df (Wheaton et al., 1977) exhibit acceptable fit. Additionally, NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel & Moosbrugger, 2003, p. 41), SRMR (Byrne, 1998; Diamantopoulos & Siguaw, 2000) and CFI (Schermelleh-Engel & Moosbrugger, 2003, p. 42) display best fit for the survey.

Computer Anxiety Rating Scale

Confirmatory factor analysis has been conducted in order to verify Computer Anxiety Rating Scale. One-factor scale has not been confirmed with the original items. The statements whose t-values are not statistically significant have been detected and extracted from the scale (b2, b4, b5, b6, b7, b9, b10, b17, b19). These items have been recognized to be positively worded in the original scale. Ten items verify one-factor Computer Anxiety Rating Scale as indicated in figure 9.

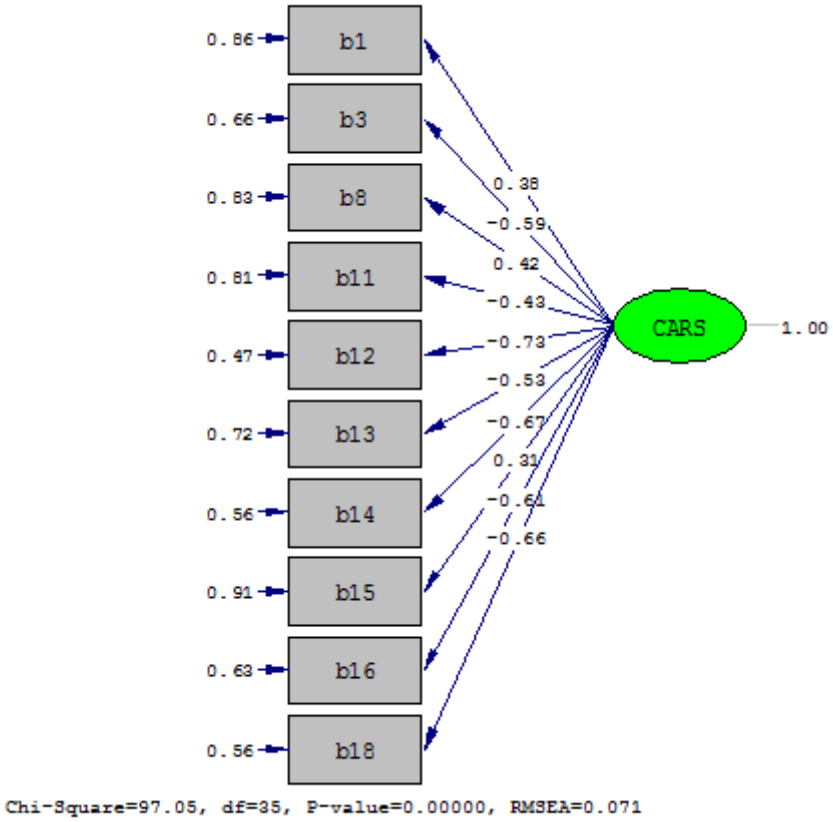


Figure 9. Path diagram with one-factor for Computer Anxiety Rating Scale

The results of the confirmatory factor analysis are set out in figure 9. There are ten items and one factor in the scale. Table 12 indicates the statistics for the regression values and t values of the scale.

Table 12

Regression and t Values of Confirmatory Factor Analysis

Items	R^2	t
B1	0.14	6.07
B3	0.34	-9.38
B8	0.17	6.68
B11	0.19	-6.58
B12	0.53	-11.30
B13	0.28	-7.45
B14	0.44	-9.72
B15	0.093	4.52
B16	0.37	-10.09
B18	0.44	-10.56

As shown in table 12, B12 is the most significant item with a value of $R^2 = 0.53$. On the other hand, B15 is the least significant item with $R^2 = 0.093$ value. Closer inspection of the table shows that student teachers' apprehension about using computers describes their computer anxiety the most. Nevertheless, student teachers' hesitation to use a computer for fear of making mistakes that they cannot correct explains their computer anxiety the least.

Table 13

Computer Anxiety Rating Scale Fit Indices and Concordance

Fit indices	Best fit	Acceptable	Scale fit indices	Concordance
RMSEA	≤ .05	≤ .08	0.071	Acceptable
NFI	≥ .95	≥ .90	0.93	Acceptable
NNFI	≥ .97	≥ .95	0.95	Acceptable
SRMR	≤ .05	≤ .08	0.062	Acceptable
GFI	≥ .95	≥ .90	0.93	Acceptable
AGFI	≥ .90	≥ .85	0.89	Acceptable
$\chi 2/df$	≤ 2	≤ 5	2.77	Acceptable
CFI	≥ .97	≥ .95	0.96	Acceptable

The fit indices obtained from confirmatory factor analysis are summarized in table 13. It is quite clear from the table that RMSEA (Browne & Cudeck, 1993), NFI (Hu & Bentler,

1999, p. 4), NNFI (Hu & Bentler, 1999, p. 27; Schermelleh-Engel & Moosbrugger, 2003, p. 41), SRMR (Hu & Bentler, 1999, p. 27), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel & Moosbrugger, 2003, p. 43), $\chi 2/df$ (Wheaton et al., 1977), and CFI (Hu & Bentler, 1999, p. 27) exhibit acceptable fit.

Constructivist Teaching Beliefs Scale

Confirmatory factor analysis has been conducted in order to verify Constructivist Teaching Beliefs Scale. One-factor scale has been verified and t-values of the items are statistically significant as indicated in figure 10.

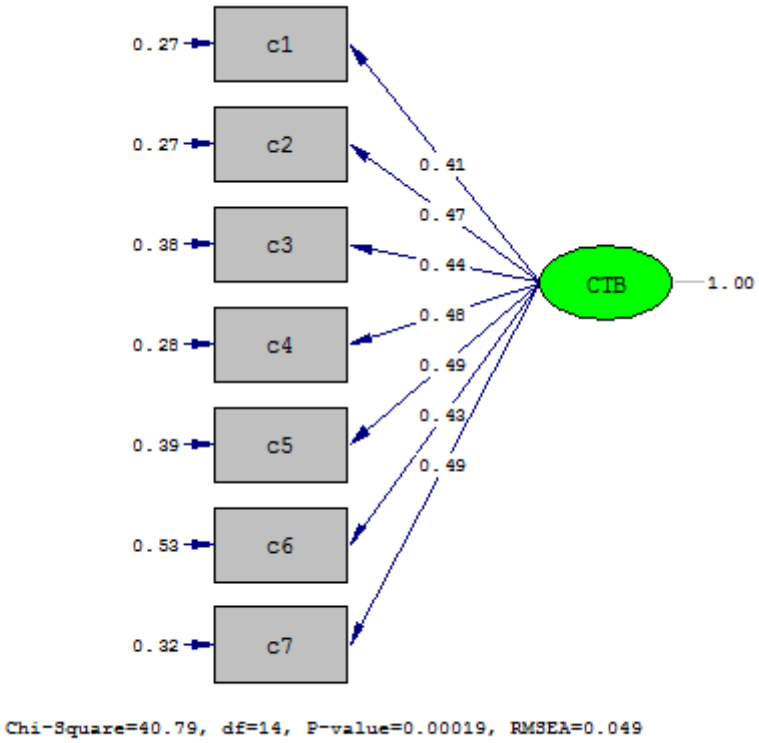


Figure 10. Path diagram with one-factor for Constructivist Teaching Beliefs Scale

The figure above illustrates that there are seven items and one factor in the scale. Table 14 indicates the regression values and t values for the scale.

Table 14

Regression and t Values of Confirmatory Factor Analysis

Items	R^2	t
C1	0.38	11.62
C2	0.44	15.25
C3	0.33	14.01
C4	0.46	15.38
C5	0.38	13.90
C6	0.26	13.06
C7	0.43	13.67

As can be seen from the table above, C4 is found as the most significant item with R^2 = 0.46 value whereas C6 is seen as the least significant item with a value of R^2 = 0.26 in the scale. It can be deduced from this table that student teachers' involving students in evaluating students' own work and setting students' own goals accounts for student teachers' constructivist teaching beliefs the most. Nonetheless, student teachers' preference to assess students informally through observations and conferences justifies their constructivist teaching beliefs the least.

Table 15

Constructivist Teaching Beliefs Scale Fit Indices and Concordance

Fit indices	Best fit	Acceptable	Scale fit indices	Concordance
RMSEA	≤ .05	≤ .08	0.049	Best
NFI	≥ .95	≥ .90	0.98	Best
NNFI	≥ .97	≥ .95	0.98	Best
SRMR	≤ .05	≤ .08	0.032	Best
GFI	≥ .95	≥ .90	0.98	Best
AGFI	≥ .90	≥ .85	0.96	Best
$\chi 2/df$	≤ 2	≤ 5	2.91	Acceptable
CFI	≥ .97	≥ .95	0.99	Best

From the data in table 15, it is apparent that RMSEA (Browne & Cudeck (1993), NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel & Moosbrugger, 2003, p. 41), SRMR

(Byrne, 1998; Diamantopoulos & Siguaw, 2000), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel & Moosbrugger, 2003, p. 43) and CFI (Schermelleh-Engel & Moosbrugger, 2003, p. 42) display best fit for the survey. Only $\chi 2/df$ (Wheaton et al., 1977) exhibits acceptable fit.

Computer Attitude Scale

Confirmatory factor analysis has been conducted in order to verify Computer Attitude Scale. Three-factor scale has been verified and t-values of the items are statistically significant as indicated in figure 11.

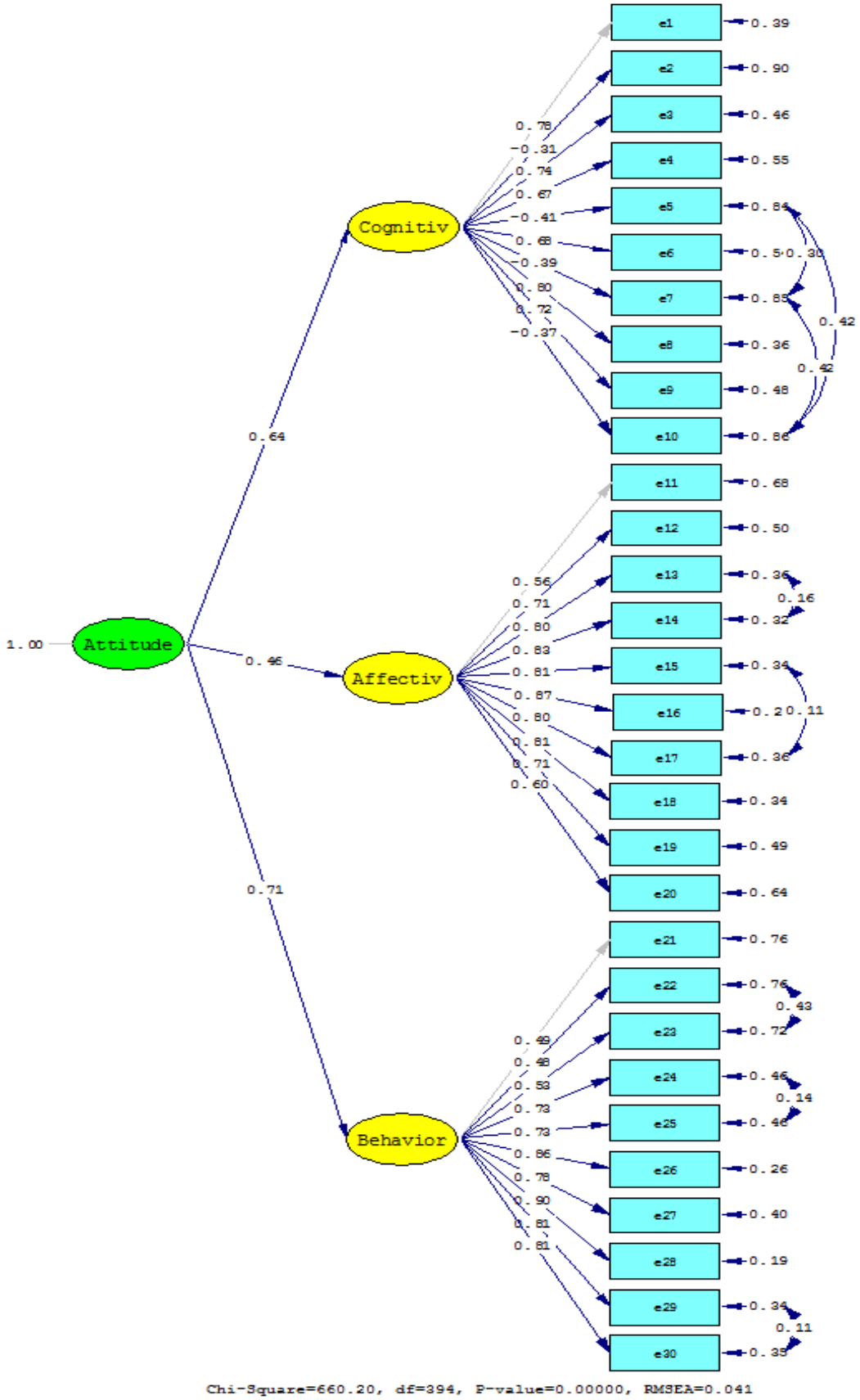


Figure 11. Path diagram with three-factor for Computer Attitude Scale

Figure 11 is quite revealing that there are thirty items and three factors, namely cognitive, affective, and behavior, in the scale. The researcher has checked the modification indices and the pairs with high error covariance have been detected. Modifications between e14-e13, e23-e22, e10-e5, e10-e7, e7-e5, e17-e15, e30-e29, and e25-e24 have been conducted. Table 16 provides the statistics for the regression values and t values of the scale.

Table 16

Regression and t Values of Confirmatory Factor Analysis

Items & Factors	R^2	t
Cognitive	0.41	6.85
E1	0.61	6.67
E2	0.097	-4.19
E3	0.54	11.94
E4	0.45	10.30
E5	0.16	-6.13
E6	0.46	12.49
E7	0.15	-5.99
E8	0.64	13.23
E9	0.52	11.34
E10	0.14	-5.83
Affective	0.21	4.89
E11	0.32	8.50
E12	0.50	8.08
E13	0.64	7.84
E14	0.68	7.87
E15	0.66	8.11
E16	0.76	8.02
E17	0.64	7.97
E18	0.66	7.51
E19	0.51	7.36
E20	0.36	7.22
Behavior	0.51	5.40
E21	0.24	12.05
E22	0.24	9.56
E23	0.28	9.48
E24	0.54	7.97
E25	0.54	7.96
E26	0.74	7.91
E27	0.60	8.60
E28	0.81	8.13
E29	0.66	8.15
E30	0.65	8.00

From the table above it can be seen that E8 is the most significant item with R^2 = .64 value while E2 is the least significant item with a value of R^2 = 0.097 in cognitive factor. As table 16 shows, student teachers' belief about computers' helping student teachers to be more creative explains student teachers' computer attitude's cognitive dimension the most whereas student teachers' belief about computers' not significantly improving the quality of education for their learners describes student teachers' computer attitude's cognitive dimension the least. E16 is found the most significant item with a value of R^2 = 0.76 whereas E11 is the least significant item with R^2 = 0.32 value in affective factor. Student teachers' emotions about computers' being uncomfortable justifies student teachers' computer attitude's affective dimension the most. On the other hand, student teachers' emotions about computers' being unlikable stands for student teachers' computer attitude's affective dimension the least. E28 is seen as the most significant item with a value of R^2 = 0.81 while E21 and E22 are the least significant items with R^2 = 0.24 value in behavior dimension. Student teachers' experiment with a new computer software package defines student teachers' computer attitude's behavior dimension the most. Nonetheless, student teachers' using a word processor and a computer on a regular basis explains student teachers' computer attitude's behavior dimension the least. It should be noted that behavior, cognitive, and affective factors are respectively found significant with a value of R^2 = 0.51, 0.41, and 0.21 in the scale.

Table 17

Computer Attitude Scale Fit Indices and Concordance

Fit indices	Best fit	Acceptable	Scale fit indices	Concordance
RMSEA	≤ .05	≤ .08	0.041	Best
NFI	≥ .95	≥ .90	0.97	Best
NNFI	≥ .97	≥ .95	0.98	Best
SRMR	≤ .05	≤ .08	0.075	Acceptable
GFI	≥ .95	≥ .90	0.90	Acceptable
AGFI	≥ .90	≥ .85	0.85	Acceptable
χ2/df	≤ 2	≤ 5	1.67	Best
CFI	≥ .97	≥ .95	0.99	Best

Table 17 presents an overview of fit indices for the scale. RMSEA (Browne & Cudeck (1993), NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel & Moosbrugger, 2003, p. 41), χ2/df (Tabachnick & Fidell, 2007), and CFI (Schermelleh-Engel & Moosbrugger, 2003, p. 42) show best fit. SRMR (Hu & Bentler, 1999, p. 27) GFI (MacCallum & Hong, 1997, p. 208), and AGFI (Schermelleh-Engel & Moosbrugger, 2003, p. 43) exhibit acceptable fit in the scale.

Reliability Values

Reliability values of data collection instruments have been calculated by using Cronbach's Alpha and values are exhibited in table 18. Field (2009, p. 675) indicates that "a value of .7 to .8 is an acceptable value for Cronbach's α".

Table 18

Cronbach's Alpha Values of Data Collection Instruments

Data Collection Instruments		Cronbach's Alpha	Number of items
Computer Technology Integration Survey		.95	21
Computer Anxiety Rating Scale		.88	10
Constructivist Teaching Beliefs Scale		.81	7
Computer Attitude Scale		.92	30
	Cognitive	.85	10
	Affective	.93	10
	Behavior	.92	10

The Cronbach's Alpha of Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs Scale, and Computer Attitude Scale has been calculated .95, .88, .81, and .92. Cronbach's Alpha of cognitive, affective, and behavior factors under Computer Attitude Scale are respectively .85, .93, and .92. One can assume that data collection instruments all have high reliabilities.

Descriptive Statistics of Four Factors

The descriptive statistics of Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs Scale, and Computer Attitude Scale are exhibited in table 19.

Table 19

Descriptive Statistics of Four Factors

	N	Minimum	Maximum	Mean ($\overline{X}$)	Std. Deviation
Computer Self-efficacy	844	21	105	81.57	12.28
Computer Anxiety	844	5	50	22.24	7.17
Constructivist Teaching Beliefs	844	.00	35	28.10	4.32
Computer Attitude	844	.00	205	141.30	26.10
Cognitive	844	.00	70	44.15	6.37
Affective	844	.00	70	49.09	16.02
Behavior	844	.00	70	48.05	12.94
Behavioral Intention	844	.00	10	8.59	1.91

Table 19 clearly indicates that computer self-efficacy levels of English student teachers are high ($\overline{X}$ = 81.57). English student teachers can be observed to have low anxiety in terms of integrating ICT into their future classes ($\overline{X}$ = 22.24). The results present that English student teachers feel positive about using ICT in their future classes ($\overline{X}$ = 141.30). Additionally, cognitive sub-factor ($\overline{X}$ = 44.15), affective sub-factor ($\overline{X}$ = 49.09), and behavior sub-factor ($\overline{X}$ = 48.05) of attitude factor exhibit that participants are cognitively, affectively, and behaviorally positive towards the use of ICT in their future classes. English student teachers believe that they have high constructivist teaching beliefs ($\overline{X}$ = 28.10). The mean of English student teachers' behavioral intention to use ICT in their future classes is high ($\overline{X}$ = 8.59).

I-PredICT Model

Suggested model, I-PredICT, for predicting the behavioral intention of English student teachers to use ICT in their future classes has been confirmed and the path diagram for I-PredICT model can be observed in figure 12.

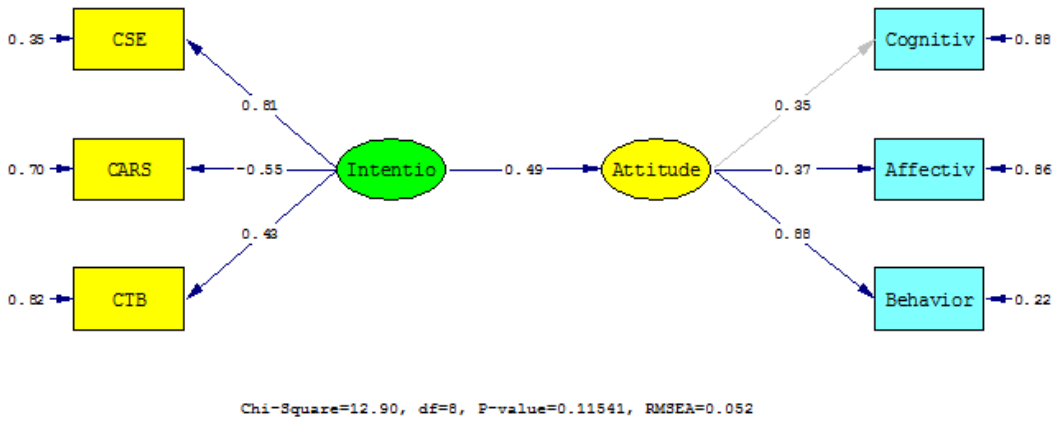


Figure 12. Path diagram of I-PredICT Model

As can be seen from the figure above, I-PredICT model is composed of 4 factors, namely Computer Self-efficacy, Computer Anxiety, Constructivist Teaching Beliefs, and Computer Attitude. The results of regression values and t values are summarized in table 20.

Table 20

Regression and t Values of I-PredICT Model

Factors		R^2	t
Computer self-efficacy → Behavioral Intention		0.65	7.43
Computer anxiety → Behavioral Intention		0.30	-6.72
Computer attitude → Behavioral Intention		0.24	2.25
	Cognitive → Computer Attitude	0.12	4.24
	Affective→ Computer Attitude	0.14	2.62
	Behavior→ Computer Attitude	0.78	2.54
Constructivist teaching beliefs → Behavioral Intention		0.18	4.03

What is striking about the values in the table above is that Computer Self-efficacy is the most significant factor with a value of $R^2 = 0.65$. Computer Anxiety and Computer Attitude factors are found respectively significant with $R^2 = 0.30$ and 0.24. Constructivist Teaching Beliefs is found as the forth significant factor with a value of $R^2 = 0.18$.

The results obtained from the fit indices are shown in table 21. It is quite clear from the table that χ2/df (Tabachnick & Fidell, 2007), p value (Schermelleh-Engel & Moosbrugger, 2003, p. 52) and CFI (Schermelleh-Engel & Moosbrugger, 2003, p. 42) show best fit. RMSEA (Browne & Cudeck, 1993), NFI (Hu & Bentler, 1999, p. 4), NNFI (Hu & Bentler, 1999, p. 27; Schermelleh-Engel & Moosbrugger, 2003, p. 41), SRMR (Hu & Bentler, 1999, p. 27), and AGFI (Schermelleh-Engel & Moosbrugger, 2003, p. 43) exhibit acceptable fit in I-PredICT model.

Table 21

I-PredICT Model Fit Indices and Concordance

Fit indices	Best fit	Acceptable	Scale fit indices	Concordance
RMSEA	≤ .05	≤ .08	0.052	Acceptable
NFI	≥ .95	≥ .90	0.94	Acceptable
NNFI	≥ .97	≥ .95	0.96	Acceptable
SRMR	≤ .05	≤ .08	0.072	Acceptable
GFI	≥ .95	≥ .90	0.95	Best
AGFI	≥ .90	≥ .85	0.88	Acceptable
χ2/df	≤ 2	≤ 5	1.61	Best
CFI	≥ .97	≥ .95	0.98	Best
p value	> .05	≥ .01	0.115	Best

I-PredICT model has been confirmed with its four factors and affords to be a valid model in order to predict the behavioral intention of English student teachers to use ICT in their future classes. Additionally, the findings prove that all four hypotheses are accepted. The following formula exhibits the variance of the model in predicting behavioral intention of English student teachers for integrating ICT into their future classes.

Behavioral Intention to use ICT= (CSE X 0.65) – (CARS X 0.30)+ (Attitude X 0.24) + (CTB X 0.18) = 0.77

The model explains 77% of the variance in predicting behavioral intention to use ICT in English student teachers' future classes. This study makes an exciting opportunity to advance our knowledge of the factors affecting student teachers' behavioral intention to

use ICT in their future classes by finding this ratio in explaining variance the most with a similar theoretical framework with a ratio of 34% by Sang et al. (2010).

Summary of the Chapter

This part has been composed of normality tests, confirmatory factor analyses, fit indices and regression values of four data collection instruments and I-PredICT model. Due to the fact that the data is not distributed normally based on Relative Multivariate Kurtosis Values, Robust ML Estimation Method has been preferred. In order to assess model fit of four data collection tools and I-PredICT model, such fit indices as $\chi 2/df$, RMSEA, SRMR, CFI, GFI, AGFI, NFI, and NNFI have been checked. In order to compute reliability of four tools, The Cronbach's Alpha value has been utilized. All four tools have been confirmed and found valid and reliable in order to evaluate computer self-efficacy, computer anxiety, constructivist teaching beliefs, and computer attitude levels of English student teachers in Turkey. Additionally, I-PredICT model has been verified as a valid model in order to predict the behavioral intention of English student teachers to use ICT in their future classes with a strong variance of 77%. All hypotheses have been accepted and the research's relevance to literature, theoretical framework, and previous studies will be analyzed in the following part.

CHAPTER V

DISCUSSION

This part highlights the interpretation of the findings in relation to the research question and four hypotheses. In addition, the findings are given emphasis in relation to the hypotheses and literature review.

Research Question: To what extent do teacher-related variables predict English student teachers' behavioral intention to use ICT in their future classes?

Integrating ICT into the classroom in a meaningful way is an enduring process affected by many internal and external factors. Designed to predict the impact of teacher-related variables on English student teachers' behavioral intention to use ICT in their future classes, this study provides a new understanding. In the literature, the impact of perceived ease of use, perceived usefulness, social influence, facilitating conditions, computer self-efficacy, computer anxiety, constructivist teaching beliefs and computer attitude on predicting the behavioral intention of student teachers have been explored (Baydas, 2015; Becit-İşçitürk, 2012; Birch & Irvine, 2009; Sang, Valcke, van Braak, & Tondeur, 2010; Wong, Teo, & Russo, 2013). The theoretical frameworks used by the studies (Baydas, 2015; Becit-İşçitürk, 2012; Birch & Irvine, 2009; Wong, Teo, & Russo, 2013) are mainly based on UTAUT model, which is composed of such factors as performance expectancy,

effort expectancy, social influence, and faciliting conditions along with key moderators (gender, age, experience, and voluntariness of use). Sang et al. (2010) uses such teacher-related variables as teaching self-efficacy, computer self-efficacy, constructivist teaching beliefs, computer attitude, and gender. Nonetheless, in this dissertation, research instruments which have been used are not similar to those used in Sang et al. (2010)'s study (just constructivist teaching beliefs scale). Factors that are considered to predict use of ICT in future classes are different in that computer anxiety is added for this particular research while teaching self-efficacy and gender factors from Sang et al.'s (2010) study are not included in I-PredICT model. It is now well established from the literature that there is a scarcity of research for a model using teacher-related variables based on first and second order change framework for predicting the behavioral intention of student teachers to integrate ICT into their future classes. This study has been especially carried out to fill this gap in the literature since to the best knowledge of the researcher, this sets out to be the first study to design a model in order to investigate the contribution of teacher-related variables to English student teachers' behavioral intention to use ICT in their future classes. The present dissertation confirms previous findings and suggests evidence that there are some factors, namely, computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs affecting the integration of ICT among student teachers in their future classes. This study provides a model, in other words, I-PredICT model, for the exploration of English student teachers' behavioral intention to integrate ICT into their future classes with a ratio of 77% of the variance, which is higher than the ratio (34%) found by Sang et al. (2010). SEM analysis reveals that computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs have been respectively found as the predictors of English student teachers' behavioral intention to integrate ICT into their future classes.

ISTE Standards for Teachers in the worldwide trend, which highlights the importance of becoming a teacher with such standards as the skills of designing and digital age learning experiences, modeling digital age work and learning along with digital citizenship, and in Turkey, the attempts of MoNE and The Council of Higher Education for identifying the qualifications of teachers by putting the use of ICT in English language teaching as a competency add more value to I-PredICT model. MoNE (2008) in Turkey explicitly clarifies that English Language Teachers are supposed to make use of ICT in language

teaching. Teacher-related variables should be given more attention in terms of adaptation to the changing world demands because "the success of new technologies in the classroom depends in large part on the teacher's ability to apply them meaningfully" (Reinders, 2005, p. 233). As far as Reinders' (2005, p. 230) emphasis on the fact that "technology plays an ever-growing role in all aspects of our lives and increasingly impacts what happens in the language classroom" is concerned, technology is altering the jobs of language teachers (Chapelle, 2005). It is of high importance that teachers need to equip themselves with necessary competent skills demanded in the 21st century and the findings indicate that English student teachers seem to have sufficient confidence, attitude, and skills in order to be able to integrate ICT into their teaching in reference to the findings of this present study.

Using the first and second order change framework by Cuban (1993), the researcher has specified a model to see the impact of teacher-related variables on English student teachers' behavioral intention to use ICT in their future classes. The relationship between teacher-related variables and behavioral intention to integrate ICT into English student teachers' future classes, as illustrated in the structural equation model, is confirmed in the present study. I-PredICT model has been confirmed to explain 77% of the variance in determining English student teachers' behavioral intention to use ICT in their future classes. In accordance with the scope of this dissertation, the second-order factors, namely, computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs have been respectively found significant predictors of student teachers' behavioral intention to use ICT in their future classes. In accordance with previous research, this dissertation supports the conceptualization of teacher-related variables in illustrating the prediction of integrating ICT as empowered by Becker (2000), Sang et al. (2010), and Veen (1993). The hypothesized model meets the criteria for model fit with adequate fit indices values and I-PredICT model fits the data. The results of the analyses reveal that hypothesized relationships in I-PredICT model are supported by data. The section that follows moves on to consider the discussion of the hypotheses in relation to the research question.

Research Hypothesis 1. English student teachers' computer self-efficacy is a significant predictor of their behavioral intention to use ICT in their future classes.

I-PredICT model confirms that computer self-efficacy is the most significant predictor of student teachers' behavioral intention to integrate ICT into their future classes. Computer Technology Integration Survey has been verified by CFA and has become a valid and reliable research instrument supported by data in order to measure computer self-efficacy of student teachers.

The findings of this study are in accord with those of Chen (2010), and Sang et al. (2010) indicating that self-efficacy significantly contributes to student teachers' behavioral intention to use ICT in their future classes. Chen (2010) comes up with the idea that "preservice teachers' perceived confidence in using computers in general and integrating technology in their teaching in particular was a strong determinant of their decisions to use technology to facilitate students' learning with technology" (p. 39). Sang et al. (2010) see computer self-efficacy as a strong predictor of student teachers' prospective computer use. In light of these findings, teacher educators should give enough importance to their pre-service teachers' computer self-efficacy levels and give support to them about analyzing their capacity about a particular ICT integration task.

In accordance with the theory of self-efficacy, I-PredICT model supports the idea that self-efficacy has been seen as the predictor of the tasks (Bandura, 1977). Self-efficacy plays a critical role in predicting the actual behavior since self-efficacy is both about how much the person feels confident in carrying out that behavior and how much benefit the person sees in achieving that behavior. The importance of self-efficacy for the actualization of a behavior has already been emphasized (Olivier & Shapiro, 1993). Bandura (1982, p. 125) points out the fact that "perceived self-efficacy was a better predictor of subsequent behavior than was performance attainment in treatment". Furthermore, confidence is as important as having the necessary abilities in integrating ICT (Anderson, Groulx, & Maninger, 2011) and people with higher computer self-efficacy can be more liable to try various software and hardware (Compeau & Higgins, 1995). In line with the literature, I-PredICT model demonstrates the association between computer self-efficacy and English student teachers' behavioral intention to use ICT in their future classes. The more language teachers feel themselves efficacious in using computers, the more language teachers intend to use ICT in their future classes with reference to the relationship between computer self-

efficacy and English student teachers' behavioral intention to use ICT in their classes in I-PredICT model. According to Compeau & Higgins (1995), the more individuals interact with computers, the more probable they are supposed to improve high self-efficacy. Additionally, self-efficacy holds a crucial part in forming individuals' feelings and behaviors.

English student teachers' computer self-efficacy levels in this study are similar to those by Giles and Kent (2016), Seferoglu (2007), and Wall (2004). In Giles and Kent's study (2016), most pre-service teachers are observed to have high self-efficacy for choosing and using technology in teaching. According to Seferoglu (2007), "research indicates that in order for people to use computers successfully, they need to have self-confidence. If they don't feel comfortable in using computer as a tool, they can't be successful in their teaching" and in his study, computer self-efficacy levels are high. Wall (2004) comes up with the finding that most pre-service teachers have a high and very high level of computer self-efficacy. In line with these previous findings, computer self-efficacy levels of English student teachers are found high based on the analysis of the findings. This may be due to the fact that they are born into a digital world and as Lei (2009, p. 92) indicates "born around 1989, this generation of digital-native preservice teachers witnessed a dramatic increase in the access to computers and the Internet in schools throughout their K-12 years". English student teachers may have experienced computer related courses and have been familiar with ICT integrated practices druing their pre-service teacher education. However, for those whose computer self-efficacy level is not very high, providing a vision with a regard to integrating ICT into educational settings should be employed (Baker et al., 1996; Kerr, 1996; Roblyer, 1993), which can be accomplished by modeling what teachers practiced (Aslan & Zhu, 2016; Hammond et al., 2009; Tondeur et al., 2012), collaboration, and reflection (Ertmer, 1999). Pre-service teachers can take advantage of observing role models for ICT integration practices during their training (Enochson & Rizza, 2009; Hammond et al., 2009; Jayachandran, 2009; Funkhouser, 2011; Tondeur et al., 2012). This kind of modeling provides student teachers with a perspective about the different ways of ICT integration and student teachers can observe what it is like to actually integrate ICT into teaching in a real classroom environment. Additionally, observing an educator making use of technology can turn into a motive force for pre-service teachers to integrate ICT into their future classes (Haydn & Barton, 2007). Thus, faculty members should be models for

ICT integration implementations (Kuker, 2009; Yildirim & Kiraz, 1999). Ertmer et al. (2003) point out that the more pre-service teachers encounter new practices and technology integration styles, the higher their computer self-efficacy becomes about their capability for integrating ICT in various styles. They also put forward that examining the practices of technology using teachers via electronic observations could work out better for developing pre-service teachers' computer self-efficacy. Moreover, developing computer self-efficacy of these pre-service teachers contributes to their future ICT integration practices in their future classes (Ertmer et al., 2003).

In short, the importance of good role models in terms of technology integration practices should not be denied in promoting technology integration (Akçaoğlu, 2008; Brickner, 1995). By being a role model in the class, the teacher trainers should provide an example for teachers about how to integrate technology into the classes with its strengths and problems. Reinders (2005, p. 236) explicitly acknowledges that "the challenge for teachers will be more one of helping learners develop the skills to deal successfully with the increased control and independence that technology demands. As teacher educator our job is to help prepare our teachers for this changing role". In this respect, to see the findings of this dissertation is encouraging because English student teachers seem to have confidence to select, and carry out ICT-related tasks. Therefore, they may be more interested in following their teacher educators' ICT practices during the courses and more willing to involve in ICT-related practices in their own language classes.

Turning now to another finding of this study is that English student teachers seem confident about facilitating students' ICT use practices while helping students construct their own knowledge with the help of authentic and meaningful tasks. Participants in the study of Sadaf et al. (2016) worked on a 5-week Web 2.0 project in which they acquired knowledge and skills that contributed to their confidence to use these and other tools; nevertheless, they do not feel sufficient in practice using Web 2.0 tools in a real class environment. In this sense, it has widely been put forward that ICT training for pre-service teachers should be implemented in authentic teaching environments (Tondeur et al., 2012). The courses in pre-service teacher education ought to give opportunities to pre-service teachers so that they can have active and practice-based experience (Doering et al., 2003; Sadaf et al., 2016; Saito, 2012; Schmid, 2009). The findings indicate that English student

teachers in this study feel confident in improving their ability to address their students' technology needs.

It should be highlighted that "technology is changing the jobs of language teachers through the changes it prompts in the language itself, the opportunities for studying language, and the options available for teaching language" (Chapelle, 2005, p. 745). Thus, educators need to be knowledgeable about "technology standards, current research, changes in technology" (Hastings, 2009). Therefore, the findings of this study are consistent with those of others in that self-efficacy provides invaluable insight by being a good indicator of behavioral intention to integrate ICT (Anderson & Maninger, 2007; Chen, 2010; Gialamas & Nikolopoulou, 2010; Teo, 2009).

Research Hypothesis 2. English student teachers' computer anxiety is a significant predictor of their behavioral intention to use ICT in their future classes.

The finding that computer anxiety is the second most significant predictor of student teachers' behavioral intention to integrate ICT into their future classes is a fundamental one because teachers need to overcome their negative feelings towards computers. Teachers should understand that computers are not replacing their places and computers are helpful tools for teachers in order to improve the quality of education in terms of 21st century standards. Teachers may fail to understand that computers are not downgrading their profession (Pine-Thomas, 2017). In order to handle with this notion, teachers should use computers more and more in their classes and try to understand the improvements in their performances and learner outcomes. It should be noted that "people experience anxiety when they perceive themselves ill equipped to manage potentially injurious events" (Bandura, 1982, p. 141). It should be noted that the more the teachers are engaged with the computers, the less anxious they feel (Becker, 1991). I-PredICT model supports the hypothesis from the data that the less anxious pre-service teachers feel, the more they intend to use ICT in their future classes. Being the second most significant predictor of student teachers' behavioral intention to integrate ICT into their future classes, computer anxiety should be overcome during pre-service teacher education. In line with this notion, Yildirim and Kiraz (1991) point up the fact that anxiety of pre-service teachers toward computers should be handled and teacher training programs should bring forth technology-

training courses in alliance with schools with a regard to pre-service teachers' self-efficacy, and anxiety.

From another perspective, ICT integration knowledge and skills should be promoted during pre-service teacher education so that they can lower their computer anxiety levels. Following the principles of Thompson et al. (2002) for ICT training in teacher education, it is important for student teachers to experience technology during their teacher education. It is obviously true that if the teacher feels anxious about using computer in the classes, the teacher will deter himself/herself from using computer during teaching. If student teachers come across with faculty members integrating ICT into their courses, student teachers may benefit from faculty members' experiences and concomitantly, they may feel less tense while attempting to integrate ICT into their future classes. It should not be forgotten that whenever a teacher comes across an innovation, the teacher thinks about whether they are going to make use of the innovation or not. If it comes to taking this notion from the perspective of student teachers' behavioral intention to use ICT in their future classes, "lack of training" (Cox et al., 1988), "frustration in learning how to use a computer" and "fear" (Hannafin & Savenye, 1993) as well as "losing control of center stage" and "looking stupid" (Wiske et al., 1990) can prevent teachers from integrating technology (as cited in Brickner, 1995, p. 47). A participant from Brickner's (2005) study, seems to have refused to use computer in class due to his fear of computers and in case he makes mistakes in front of his class. One should bear in mind that computer anxiety is negatively related to English student teachers' behavioral intention to use ICT in their future classes as supported by data in I-PredICT model.

Compeau and Higgins (1995) bring to notice that anxiety has a prominent impact on computer use and those with high self-efficacy exhibit less computer anxiety. Considering the fact that English student teachers in this study have high computer self-efficacy levels and low computer anxiety levels, it should be emphasized that the level of computer anxiety affects student teachers' behavioral intention to use ICT in their future classes as verified in I-PredICT model. One can see from the findings that English student teachers are going to be comfortable using ICT in their teaching, which seems to be a predictor of their behavioral intention to use ICT in their future classes because high computer self-efficacy and low computer anxiety levels are needed as indicated in the literature from the theories of Bandura (1999) regarding self-efficacy and anxiety; Brickner (1995), and

Compeau and Higgins (1995) with a specific reference to computer self-efficacy and computer anxiety. The individuals in the study of Compeau and Higgins (1995, p. 203) "with high self-efficacy used computers more, derived more enjoyment from their use, and experienced less computer anxiety".

In accordance with previous research by Aslan and Zhu (2017) and Baydas (2015), the anxiety levels of English student teachers are not high in regard to the findings. Aslan and Zhu (2017) find out in their study that pre-service teachers are feeling neutral in anxiety regarding the integration of ICT. Baydas (2015) reports in her study that pre-service teachers have low anxiety levels for integrating ICT into their classes, which can bring out an increase in pre-service teachers' behavioral intention to use ICT if pre-service teachers' anxiety levels become low. It may be commented that English student teachers may have experience in using computers and may be accustomed to applying ICT integrated practices in the classes because as Prensky (2001) emphasizes that today's generation is digital natives.

To sum up, computer anxiety has been verified as the second most significant predictor of English student teachers' behavioral intention to use ICT in their future classes and Computer Anxiety Rating Scale has been found a valid and reliable research instrument to measure computer anxiety levels of student teachers based on CFA analysis. It can be understood from the findings that English student teachers feel low computer anxiety in terms of using ICT in language classes.

Research Hypothesis 3. English student teachers' constructivist teaching beliefs are significant predictors of their behavioral intention to use ICT in their future classes.

Constructivist teaching beliefs have been found as the forth most significant predictor of pre-service teachers' behavioral intention to use ICT in their future classes in I-PredICT model. Constructivist Teaching Beliefs Scale has been verified by CFA and has become a valid and reliable research instrument supported by data in order to measure constructivist teaching belief levels of student teachers.

It should not be forgotten that the impact of teacher beliefs on teacher practice has been perceived more important than the impact of teacher knowledge (Kagan, 1992; Pajares, 1992). It should be kept in mind based on the findings that English student teachers are

reported to have high constructivist teaching skills in this study and it seems necessary that teachers have an innovative understanding in integrating ICT into their future classes because as Ringstaff, Sandholtz, and Dwyer (1991, p. 7) direct attention to that "increasing attention is being paid to the idea that lasting change in the classroom must be accompanied by changes in teachers' beliefs about the purpose and nature of instruction, and that these belief systems are remarkably resistant to change". In 'English Language Teacher' Special Field Competencies under the competency of 'Planning and Regulation of English Teaching Procedures' by MoNE (2008), special emphasis is given to planning language learning process by taking into consideration learners' needs, learning styles, language proficiency and learners' active participation and involvement during the activities with the encouragement of pair and group works. Given such training during pre-service education with a focus on student-centred learning, contstructivist teaching, and reflective practice in accordance with CEFR in Turkey (Cephe, 2009; Çakır & Balçıkanlı, 2012; Özmen, 2012), predominantly, English student teachers seem to have high levels of constructive teaching beliefs, which is a fundamental finding since in order to meet today's learners' needs, teachers should take into consideration sociocultural theory and social constructivist learning (Vygotsky, 1978) accompanied by ICT integration practices in designing tasks (Dysthe, 2002; Elliot, 2009; Raith, 2009; Sturm et al., 2009; Vygotsky, 1978) since social constructivism represents constructing meaning through both cooperation and social-interaction (Cunningham & Duffy, 1996; Jonassen, 1991) and it leads to more learner-centered learning environments (Sturm et al., 2009).

Moving on now to consider constructive teaching beliefs of English student teachers in this study, constructive teaching beliefs can be a good contributor to English student teachers' behavioral intention to use ICT in their future classes since it is an expected outcome that English student teachers are likely to associate what they have in their minds with respect to teacher and learner roles, the class environment, assessment, and learner outcomes with what ICT can offer them (Ertmer, 1999). In line with this finding, it is stated in the literature that teachers who believe in the positive outcomes of using ICT in the classes for their learners adapt their teaching accordingly (Cox, Cox, & Preston, 2000; Hur, Shannon, & Wolf, 2016; Pedretti, Mayer-Smith, & Woodrow, 1999). It should be noted that teachers' beliefs towards ICT integration are pivotal and teacher professional development

should be established to help teachers see the benefits of ICT to support student learning (Hur et al., 2016).

As discussed above, the findings of this dissertation are in accord with those of others in that there is a relationship between teachers' constructivist teaching beliefs and ICT integration (Becker & Ravitz 1999; Higgins & Moseley 2001; Mumtaz, 2000; Sang et al., 2010). Additionally, Becker (2001, p. 11) emphasizes that "it is clear that teachers with the most constructivist teaching philosophies are stronger users of computers: They use computers more frequently, they use them in more challenging ways, they use them more themselves, and they have greater technical expertise". Similarly, it can be derived from the results that English student teachers' tendency towards constructivist teaching beliefs can be a good indicator of the fact that English student teachers are going to benefit from ICT practices in their language classes because teacher beliefs serve as a filter for their precedence of how much ICT integration occurs (Pine-Thomas, 2017). Furtheromore, this tendency may contribute to English student teachers' likelihood to promote in their future classes 21st century skills which are mainly creativity, communication, collaboration and critical thinking. Borg (2003, p. 88) clarifies the importance of previous experiences by highlighting that "teachers' prior language learning experiences establish cognitions about learning and language learning which form the basis of their initial conceptualisations of L2 teaching during teacher education, and which may continue to be influential throughout their professional lives".

As was pointed out in the introduction to this dissertation, Williams and Burden (1997, p. 44) clearly highlight that "education is concerned not just with theories of instruction, but with learning to learn, developing skills and strategies to continue to learn, with making learning experiences meaningful and relevant to the individual, with developing and growing as a whole person". Therefore, ensuring pre-service teachers with the attempts to think critically about the pedagogical uses of web 2.0 tools may exert a positive influence on incorporating those tools into their future classes (Coutinho, 2008). Considering the importance of educational beliefs, one ought to understand that professional development sessions with a focus on educational beliefs should be carried out in order to develop ICT integration practices in teaching and learning (Antonietti & Giorgetti, 2006; Higgins & Moseley, 2001). Therefore, "teacher education should be carried out in constructivist learning environment and provide student teachers with a conducive and non-threatening

environment to experience success in using computers" (Sang et al., 2010, p. 7). As Judson (2006, p.581) stresses, "constructivist-minded teachers maintain dynamic student-centered classrooms where technology is a powerful learning tool". The findings of this dissertation reveal that English student teachers hold constructivist teaching beliefs, which is a sign of the fact that English student teachers in this study seem to have more student-centered perspective towards teaching, learning, and the construction of meaning with the help of collaboration and interaction (Vygotsky, 1978).

In like manner, Ertmer (2005) indicates that teacher beliefs influence the way technology is integrated. Moreover, teachers holding more constructivist teacher beliefs can be more liable to make use of ICT more often, efficiently, and innovatively (Ertmer, 2005; Higgins & Moseley, 2001; Pajares, 1992; Wang, 2002). Therefore, teachers' pedagogical beliefs should be shaped before being encouraged for the use of ICT in the classes (Hew & Brush, 2007; Miranda & Russell, 2012) because teacher beliefs affect teachers' peculiar technology incorporation applications (Albion & Ertmer, 2002; Balçıkanlı & Cephe, 2012; Becker, 2000; Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al., 2015; Ertmer, Paul, Molly, Eva, & Denise, 1999; Niederhauser & Perkmen, 2008; Russell et al., 2003; Tondeur et al., 2008a). In the light of the relevant literature, it is very pleasing to see that English student teachers hold constructivist teaching beliefs and this may have a positive effect on their behavioral intention to use ICT in their future classes. Furthermore, it should be emphasized that the more the teachers have constructivist teaching beliefs, the more they try to incorporate ICT (Becker, 2000; 2001; Becker & Ravitz, 1999; Becker & Riel, 2000; Chai, 2010; Ertmer et al., 2015; Greer, 2017; Higgins & Moseley 2001; Judson, 2006; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Rakes, Fields, & Cox, 2006; Tondeur et al., 2008; Zhao, Pugh, Sheldon, & Byers, 2002; Webb & Cox, 2004).

Research Hypothesis 4. English student teachers' computer attitude is a significant predictor of their behavioral intention to use ICT in their future classes.

I-PredICT model indicates that computer attitude is the third most significant predictor of pre-service teachers' behavioral intention to integrate ICT into their future classes. The verification of Computer Attitude Scale as a valid and reliable research instrument to evaluate computer attitude levels of student teachers is a significant finding of this study.

In line with the findings of this dissertation, studies over the past two decades have provided invaluable insight into the importance of attitudes towards integrating ICT into classes (Ertmer et al., 1999; Fabry & Higgs, 1997; Myers & Halpin, 2002; Russell et al., 2003; Scherer et al., 2017; Tondeur et al., 2008b; van Braak et al., 2004). Feeling positive for using ICT is a good illustration of predicting English student teachers' behavioral intention to use ICT in their future classes on the basis of I-PredICT model. The findings of this study are in agreement with those obtained by Alkan and Erdem (2010), Aslan and Zhu (2017), Harmandaoğlu-Baz (2016), Hismanoglu and Hismanoglu (2011), Kuo (2008), Sang et al. (2010), and Yüksel and Kavanoz (2010). Pre-service teachers in Aslan and Zhu's (2017) study have positive attitudes toward ICT. Harmandaoğlu-Baz (2016) emphasizes in her study that the student teachers seem to have highly positive attitudes towards the use of technology in language learning and teaching and seem to be positive about implementing technology into their future classes. Kuo's (2008) study indicates that student teachers adopt positive attitudes towards the use of Internet-assisted language learning and teaching.

In order to highlight the place of computer attitudes in using technology, Woodrow (1991) brings attention to the development and preservation of positive attitudes toward computers substantially among pre-service teachers. Celik and Yesilyurt (2013)'s study reveal that attitude has an impact on computer-supported education. The findings of this dissertation support the findings of previous research by Aslan and Zhu (2017) in that pre-service teachers have positive attitudes towards the use of ICT in teaching. Furthermore, it is important that pre-service teachers have positive attitudes and high self-efficacy for integrating ICT into their teaching (Inal, 2015). It can be understood from the findings of this dissertation that positive attitudes of English student teachers can have a positive effect on their perceptions about their capabilities to use computers and promote use of ICT in language classes as is clearly discerned in the study of Chen (2008).

In a similar vein, Woodrow (1991, p. 165) espouses the value of pre-service teachers' positive attitudes towards computers in that "attitudes toward computers are thought to influence not only the acceptance of computers, but also future behaviors, such as using a computer as a professional tool or introducing computer applications into the classroom". As far as English student teachers' positive computer attitude tendencies are considered, this finding supports the association between computer attitude and English student

teachers' behavioral intention to use ICT in their future classes. Additionally, this study seems to be consistent with other research by Russell et al. (2003) who place emphasis on the value of teachers' attitudes toward technology for determining to integrate ICT into their classes. These findings provide further support for the hypothesis that computer attitude is a very good indicator of English student teachers' behavioral intention to use ICT in their future classes and it is encouraging to see that English student teachers seem to be cognitively, affectively, and behaviorally positive towards the use of ICT in their future classes.

Overall, the contribution of teacher-related variables to predicting English student teachers' behavioral intention to integrate ICT into their future classes by using first and second order change framework is evidenced by the current findings. I-PredICT model has been confirmed to explain 77% of the variance in predicting English student teachers' behavioral intention to use ICT in future language classes, which is a noteworthy contribution to the literature since teacher education programs can adapt their programs in accordance with such variables confirmed in I-PredICT model as computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs. Additionally, this dissertation extends our knowledge of the factors affecting behavioral intention to use ICT among student teachers. The present study should prove to be particularly valuable to those who are interested in using the research instruments for their studies. All four research instruments have been confirmed via CFA and they can be used as valid and reliable research instruments for further studies. All in all, it can be pointed out from the findings of this dissertation that student teachers need to develop their computer self-efficacy, lower their computer anxiety, enhance their positive attitudes, and transform their pedagogical beliefs into constructivist teaching beliefs in order to be able integrate ICT into their future classes.

Summary of the Chapter

This chapter involves the interpretation of the findings with a relation to literature, theoretical framework, and previous studies. The findings illustrate that computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs are respectively significant predictors of English student teachers' behavioral intention to integrate ICT into their future classes by explaining 77% of the variance. It should be noted

that I-PredICT model gives perspectives to those who are at the education field with a regard to how to raise technologically competent teachers for 21st century learners by revealing the significant factors affecting English student teachers' behavioral intention to use ICT in their future classes. In the following part, the suggestions and pedagogical implications of this research will be presented with the concluding remarks.

CHAPTER VI

CONCLUSION

This chapter is composed of concluding remarks, pedagogical implications, and suggestions for further research.

Conclusion

This dissertation has argued that the importance of teacher-related variables on predicting student teachers' behavioral intention to use ICT has been neglected. To fill this gap, this dissertation sets out to be the first study to design a theoretical model in order to determine the effects of second-order factors on student teachers' behavioral intention to integrate ICT into their future classes. The model of this study, I-PredICT, yields results that significantly predict behavioral intention of English student teachers to integrate ICT into their future classes with a regard to teacher-related variables. First and second order change framework has been found to be a valid framework in order to predict student teachers' behavioral intention to use ICT in their future classes. Intrinsic factors have been found crucial for ICT integration practices among pre-service teachers (Ertmer et al., 2006). As a result of a correlational research design, the findings of this dissertation may help us to understand that computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs are respectively significant predictors of English student teachers' behavioral intention to integrate ICT into their future classes by explaining 77% of the variance. Therefore, some pedagogical implications for policy makers, teacher educators, teachers, and pre-service teachers are provided below.

Pedagogical Implications

The present study should prove to be particularly valuable to policy makers, teacher educators, teachers, and pre-service teachers in terms of being the first study investigating the contribution of teacher-related factors to English student teachers' behavioral intention to integrate ICT into their future classes by using Cuban's (1993) first and second order change framework with a ratio of 77% of the variance. The present study makes several noteworthy contributions to understanding the impact of second-order factors on predicting student teachers' behavioral intention to use ICT in their future classes.

Teacher beliefs have a crucial place in teachers' professional development process. During pre-service education, teachers' beliefs toward the role of teachers and learners; the place of learning; the importance of creativity, collaboration, communication, and critical thinking skills in constructing meaning throughout the activies, and the place of ICT integration during language teaching and learning process are mostly shaped. Policy makers need to develop their curriculum and syllabi in order to develop those dimensions mentioned above. Through the incorporation of teacher-related variables used in I-PredICT model, policy makers can see their path by following the findings of this dissertation. Stake-holders should take into consideration the factors affecting student teachers' behavioral intention to use ICT in their classes along with ISTE Standards and Pre-service Teacher Education & Competencies Framework of Teachers and Teacher Eduation Programs in Turkey and adapt pre-service teacher education framework accordingly. Policy makers should keep in their minds such factors as promoting computer self-efficacy, computer attitude, and constructivist teaching beliefs while lowering computer anxiety of student teachers in designing pre-service teacher education framework.

In the same vein, I-PredICT model has important implications for teacher educators. They can design workshops and programs equipped with courses about the instructional practices of ICT usage in the classrooms so that pre-service teachers can increase their ICT integration practices. At this point, the researcher does not imply the existence of a stand-alone technology course. Instead, the researcher implies the integration of ICT into methods course and if possible into the whole teacher education program. It is highly touched upon in the literature that ICT integration practices should be inserted into teacher education programs' methods courses (Chai & Lim, 2011, Duncan & Barnett, 2009; Lei, 2009; Sutton, 2011).

The findings of this study indicate that computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs have been respectively found significant predictors of English student teachers' behavioral intention to use ICT in their future classes. Considering self-efficacy, Bandura (1977) clearly indicates that doing the work by oneself greatly contributes to one's confidence as well as the vicarious experience. Therefore, teacher educators should give student teachers opportunities to experience ICT integration during courses especially teaching demonstrations since if student teachers see themselves successful at practice during their pre-service teacher education, their computer-self efficacy is likely to increase while their computer anxiety is likely to diminish. By being a model for implementing ICT during the courses, teacher educators can be an invaluable source for student teachers in terms of seeing the procedure of ICT integration in practice. This effort has tremendous effect on promoting student teachers' computer self-efficacy because student teachers can take advantage of observing role models for ICT integration practices during their pre-service teacher education (Enochson & Rizza, 2009; Funkhouser, 2011; Hammond et al., 2009; Jayachandran, 2009; Tondeur et al., 2012). This process does not necessarily have to occur in one's own teacher education program. The present study raises the possibility that ICT integration training process can turn into a collaborative process by tele-conferencing with other education faculties. This effort may contribute to student teachers' understanding about the different instructional practices, too. Student teachers can meet the exemplary teachers and observe them in action both in the role of students and teacher candidates. Student teachers can encounter new practice ways and increase their computer-self efficacy. An implication of this experience is the possibility that increasing student teachers' computer self-efficacy may automatically lower their computer anxiety and strengthen their intentions to integrate ICT into their future classes. The less fearless student teachers feel, the more confident they become in using ICT, which can contribute to student teachers' developing positive attitudes towards the use ICT in language classes. Taken together, the way they interact with ICT can enhance their perspectives and their attitudes are supposed to change positively. One thing that must be underlined is that student teachers need an environment to discuss ICT integration attempts and experiences, share their opinions, see their strengths, and weaknesses. In accordance with the qualities of constructivism, teacher educators should provide follow-up sessions in order to discuss ICT integration process, give feedback, value pair opinions and evaluate the process as a whole with a specific

reference to student teachers' beliefs, identity, collaboration and interaction skills, and how much the student teacher can reflect the whole process with its strengths and flaws. This kind of modeling, reflection, and collaboration can be exemplified as the ways to promote a vision for integrating ICT (Ertmer, 1999). It should not be forgotten that greater efforts are needed in order to alter the beliefs of student teachers regarding teaching and learning. Ensuring appropriate courses, mentors, and support for becoming a more constructivist teacher sometimes may not be enough to change the teacher's beliefs. As stated in the introduction part of this dissertation, no matter what facilities, training, or mentors are provided to teachers, it is the teacher after all who decides whether to use ICT or not in the class. Furthermore, the teacher again decides whether to use ICT in a meaningful, cooperative, interactive way or traditionally. Thus, pre-service teachers should leave their teacher education programs with the necessary skills and competencies which are demanded in the 21st century. For this to happen, pre-service teachers should become aware of the importance of planning, monitoring, and evaluating their ICT integration practices, for which pre-service teachers should demand feedback sessions from their peers and teacher educators. If this dissertation is about the encouragement of ICT use in the classes, it will be a necessity to mention the online platforms which pre-service teachers should apply for improving their ICT integration practices. Pre-service teachers ought to look for online forums and teacher professional development websites to catch up with the latest trends in the world. By writing on the online forums specially designed to share experiences, take some advices for the specific situations, or announcing an effective practice in the class, pre-service teachers can "negotiate their meaning and, by so doing, to extend and reframe the ways in which they look at their own practice. (Bailey, Hawkins, Irujo, Larsen-Freeman, Rintell & Willet, 1998, p. 537). Through this way, pre-service teachers can see different ICT integration practices just from where they stand, comment on the example situations, or give suggestions how to make better the problematic conditions that may occur in the classes during ICT use. Lastly, pre-service teachers should not expect all the training from teacher education programs and should take responsibility for their own teacher development and try to find their unique teaching style by scrutinizing their beliefs, confidence, anxiety, positive tendency, and constructivist teaching beliefs for not only ICT integration practices but also becoming a teacher questioning and keeping up with the changes in the developing world.

Suggestions for Further Research

The current study offers valuable insights into examining the second order variables in terms of predicting student teachers' behavioral intention to integrate ICT into their future classes by making use of first and second order change framework. I-PredICT model is confirmed to explain 77% of the variance in determining behavioral intention of English student teachers to use ICT in their future classes. If the debate is to be moved forward, following research suggestions can open new doors to understanding more about understanding the factors affecting behavioral intention of student teachers:

- The researchers can include first-order changes in addition to second-order changes in order to predict the behavioral intentions of English student teachers to integrate ICT into their future classes. This study explains English student teachers' behavioral intention to use ICT in their future classes with a ratio of 77% of the variance. By inserting such variables from first-order variables as providing facilities, technical support, the researchers can extend the findings from this particular dissertation.
- A training module can be adapted based on I-PredICT model in order to provide training to pre-service teachers. I-PredICT model confirms data and computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs have been subsequently found as significant predictors of English student teachers' behavioral intention to use ICT in their future classes. In designing a training module, preferably integrated into the methods course, teacher educators can give specific attention to the variables mentioned above and design the activities for the improvement of computer self-efficacy, computer anxiety, computer attitude, and constructivist teaching beliefs.
- The researchers can observe the exemplary teachers and research those teachers in terms of the relationship between the variables in this study and the variables that make them exemplary teachers in terms of integrating ICT into their classes.
- The research can be replicated in other countries and similar/different points in terms of model fit and the variances of the variables can be reflected.

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ÖZGEÇMİŞ

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Yabancı Dil	İngilizce

Yayınlar

Diğer İndeksler Tarafından Taranan Makaleler

Harmandaoğlu-Baz, E. (2016). Attitudes of Turkish EFL student teachers towards technology use. *TOJET*, *15*(2), 1-10. (ERIC)

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APPENDICES

APPENDIX A

Gönüllü Katılım (Bilgilendirilmiş Onay) Formu

Sayın katılımcı,

Bu çalışmada, tamamen araştırma amacıyla kullanılmak üzere, dört tane anket doldurmanız rica edilmektedir. Çalışma, Gazi Üniversitesi İngiliz Dili Eğitimi Bölümünde araştırma görevlisi olarak çalışan Esra Harmandaoğlu Baz tarafından yürütülmektedir. Anketler, katılımcılar için rahatsız edici olabilecek herhangi bir soru içermemektedir. Çalışmaya katılım tamamen gönüllülük esasına dayanmaktadır; anketleri istediğiniz zaman yarıda bırakabilir, katılımdan vazgeçebilirsiniz. Anketleri tamamlamak yaklaşık 20-25 dakika sürmektedir. Katılımcıların isimleri gizli tutulacak; hiçbir şekilde herhangi bir tezde, makalede ya da sunumda yer almayacaktır. Çalışmaya katılımda herhangi bir yarar ya da risk söz konusu değildir.

Çalışmayla ilgili herhangi bir sorunuz varsa, araştırmacıya her zaman aşağıdaki iletişim bilgilerinden ulaşabilir, sorularınızı sorabilirsiniz.

Anket 1: Computer Anxiety Rating Scale

Anket 2: Computer Attitude Scale

Anket 3: Computer Technology Integration Survey

Anket 4: Constructivist Belief Scale

Anket 5: Behavioral Intention Scale

"Çalışma hakkında yukarıdaki bilgileri okudum. Çalışmaya ilişkin herhangi bir soruyu herhangi zamanda araştırmacıya sorabileceğimin ve sorularımın yeterli ölçüde cevaplanacağının, çalışmayı istediğim zaman bırakabileceğimin ve bu durumda bana ait verilerin kullanılmayacağının farkındayım. Çalışmaya gönüllü olarak katılıyorum."

Katılımcının Adı-soyadı: _____

E-posta adresi: _____

İmzası: _____

Esra Harmandaoğlu Baz

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COMPUTER TECHNOLOGY INTEGRATION SURVEY

Dear Teacher Trainees of English Language,

Gender: **Age:**

Direction:

The purpose of this survey is to determine how you feel about integrating technology into language teaching. For each statement below, indicate the strength of your agreement or disagreement by circling one of the five scales.

Below is a definition of technology integration with accompanying examples:

Technology integration:

- Using computers to support students as they construct their own knowledge through the completion of authentic, and meaningful tasks.

Examples:

- ✓ Students working on research projects, obtaining information from the Internet.
- ✓ Students constructing Web pages to show their projects to others.
- ✓ Students using application software to create student products (such as composing music, developing PowerPoint presentations, developing HyperStudio stacks).

Using the above as a baseline, please circle one response for each of the statements in the table:

SD = Strongly Disagree

D = Disagree

NA/ND = Neither Agree nor Disagree

A= Agree

SA= Strongly Agree

Esra Harmandaoğlu Baz

Computer Technology Integration Survey	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I feel confident that I understand computer capabilities well enough to maximize them in my classroom.					
2. I feel confident that I have the skills necessary to use the computer for instruction.					
3. I feel confident that I can successfully teach relevant subject content with appropriate use of technology.					
4. I feel confident in my ability to evaluate software for teaching and learning.					
5. I feel confident that I can use correct computer terminology when directing students' computer use.					
6. I feel confident I can help students when they have difficulty with the computer.					
7. I feel confident I can effectively monitor students' computer use for project development in my classroom.					
8. I feel confident that I can motivate my students to participate in technology-based projects.					
9. I feel confident I can mentor students in appropriate uses of technology.					
10. I feel confident I can consistently use educational technology in effective ways.					
11. I feel confident I can provide individual feedback to students during technology use.					
12. I feel confident I can regularly incorporate technology into my lessons, when appropriate to student					

learning.					
Computer Technology Integration Survey	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
13. I feel confident about selecting appropriate technology for instruction.					
14. I feel confident about assigning and grading technology-based projects.					
15. I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.					
16. I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.					
17. I feel confident that I will be comfortable using technology in my teaching.					
18. I feel confident I can be responsive to students' needs during computer use.					
19. I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.					
20. I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.					
21. I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues.					

COMPUTER ANXIETY RATING SCALE

Dear Teacher Trainees of English,

Directions: The aim of this survey is to find out your anxiety level about computers. You can choose the best choice from 1 (Strongly Disagree) to 5 (Strongly Agree).

1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
1. I feel insecure about my ability to interpret a computer printout.					
2. I look forward to using a computer in my teaching.					
3. I do not think I would be able to learn a computer programming language.					
4. The challenge of learning about computers is exciting.					
5. I am confident that I can learn computer skills.					
6. Anyone can learn to use a computer if they are patient and motivated.					
7. Learning to operate computers is like learning any new skill--the more you practice, the better you become.					
8. I am afraid that if I begin to use computers, I will become dependent upon them and lose some of my reasoning skills.					
9. I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand.					
10. I feel that I will be able to keep up with the advances happening in the computer field.					
11. I dislike working with machines that are smarter than I am.					
12. I feel apprehensive (nervous) about using computers.					
13. I have difficulty in understanding the technical aspects of computers.					
14. It scares me to think that I could cause the					

computer to destroy a large amount of information by hitting the wrong key.					
15. I hesitate to use a computer for fear of making mistakes that I cannot correct.					
16. You have to be a genius to understand all the special keys contained on most computers.					
17. If given the opportunity, I would like to learn about and use computers.					
18. I have avoided computers because they are unfamiliar and somewhat intimidating (scary) to me.					
19. I feel computers are necessary tools in educational settings.					

CONSTRUCTIVIST BELIEF SCALE

Dear Teacher Trainees of English,

Directions: Imagine how you will set up your own future classroom as you read each of the following survey statements. As you think about your future classroom, write a number on the line beside each statement to indicate how much you disagree or agree with the statement on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
1. I believe that expanding on students' ideas is an effective way to build my teaching.					
2. I prefer to arrange students' desks or use tables so they can work together.					
3. I invite students to create many of my bulletin boards (pinboard or noticeboard).					
4. I involve students in evaluating their own work and setting their own goals.					
5. I make it a priority in my classroom to give students time to work together when I am not directing them.					
6. I prefer to assess students informally through observations and conferences.					
7. I often create thematic units based on the students' interests and ideas.					

BEHAVIORAL INTENTION TO USE TECHNOLOGY

Directions: The aim of this survey is to reveal your intention to use technology in your future classrooms. You can choose the best choice from 1 (Strongly Disagree) to 5 (Strongly Agree).

1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I will use computers in future.					
2. I plan to use computers often.					

Thank you very much ☺
Esra Harmandaoğlu Baz

COMPUTER ATTITUDE SCALE

Dear Teacher Trainees of English Language,

DIRECTION: The purpose of this scale is to determine what your attitude towards computer is.

YÖNERGE: Bu ölçeğin amacı, siz İngilizce öğretmen adaylarının bilgisayarlara yönelik tutumunuzu belirlemektir.

QUESTION: Please indicate your **degree of agreement** with each of the following statements **by circling the appropriate number.**

SORU: Lütfen aşağıdaki maddelere **ne kadar katıldığınızı** size **uygun olan numarayı daire içine alarak** işaretleyiniz.

Statements	Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Neutral 4	Slightly Agree 5	Agree 6	Strongly Agree 7
1. Computers would help me more creative.	1	2	3	4	5	6	7
2. Computers would not significantly improve the quality of education for my students.	1	2	3	4	5	6	7
3. Computers would help make my work more interesting.	1	2	3	4	5	6	7
4. It is important that I keep up with educational computer innovations.	1	2	3	4	5	6	7
5. I would not need a computer in my classroom.	1	2	3	4	5	6	7
6. My student's mental abilities would improve significantly by interacting with computers.	1	2	3	4	5	6	7
7. Computers would make my students lose valuable skills.	1	2	3	4	5	6	7
8. Computers would help me be more productive.	1	2	3	4	5	6	7
9. Computers would motivate my students do better work.	1	2	3	4	5	6	7
10. Computers would make my life in the classrooms more difficult.	1	2	3	4	5	6	7

DIRECTION: This section is **DIFFERENT** from others.

YÖNERGE: Bu kısım diğer kısımlardan biraz daha farklı bir işaretleme yöntemi gerektiriyor.

QUESTION: I feel the experience of using a computer is:

SORU: Bilgisayar kullanımı tecrübesi konusunda hissettiğim:

FOR EXAMPLE: If you circled the number 2 in ITEM 1, you would be saying that the experience of using a computer would be **MODERATELY** unlikable.

On the other hand, if you circled the number 6 in ITEM 1, you would be saying that the experience of using a computer would be **MODERATELY** likeable.

ÖRNEĞIN, 1. madde için 2'yi işaretlerseniz bilgisayar kullanmanın sizin için **MODERATELY UNLIKABLE** olduğu anlamına gelir.

Fakat 1. madde için 6'yı işaretlerseniz bilgisayar kullanmanın sizin için **MODERATELY LIKABLE** olduğu anlamına gelir.)

	Extremely	Moderately	Slightly	Neither	Slightly	Moderately	Extremely	
1. Unlikable	1	2	3	4	5	6	7	Likable
2. Bad	1	2	3	4	5	6	7	Good
3. Unhappy	1	2	3	4	5	6	7	Happy
4.Unpleasant	1	2	3	4	5	6	7	Pleasant
5. Dull	1	2	3	4	5	6	7	Exciting
6. Uncomfor-table	1	2	3	4	5	6	7	Comfor-table
7. Empty	1	2	3	4	5	6	7	Full
8. Suffoca-ting	1	2	3	4	5	6	7	Fresh
9. Tense	1	2	3	4	5	6	7	Calm
10. Artificial	1	2	3	4	5	6	7	Natural

DIRECTION: Please **circle the appropriate number.**

YÖNERGE: Lütfen size uygun olan numarayı daire içine alınız.

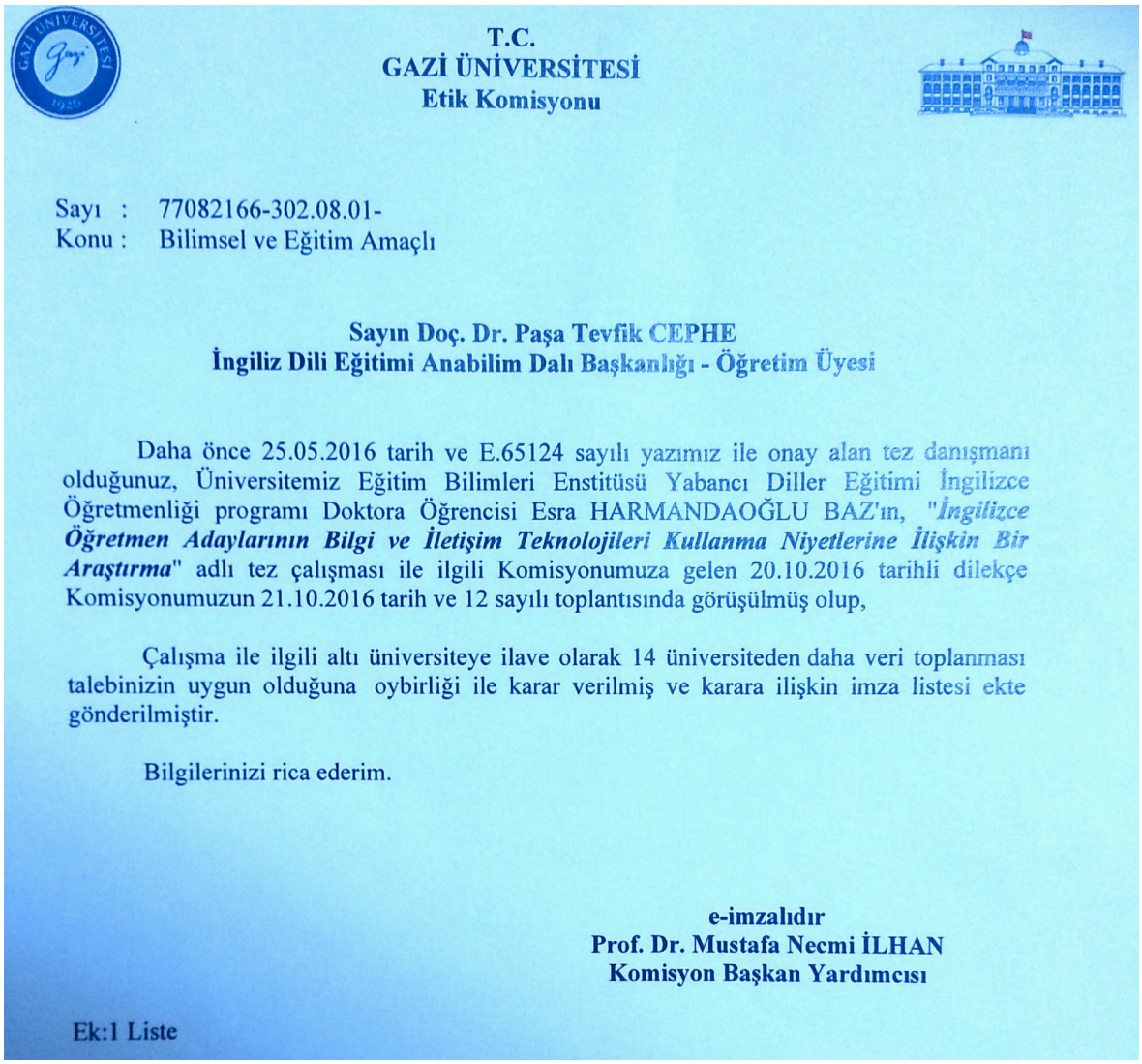
QUESTION: If it were **ONLY UP TO YOU**, how likely is it that you would do each of the following activities, in the **NEXT 6 TO 8 MONTHS.**

SORU: Eğer **sadece size kalmış olsa**, önümüzdeki **6 ile 8 ay arasında** aşağıdaki aktivitileri yapma ihtimaliniz nedir?

	Extremely Unlikely 1	Unlikely 2	Somewhat Unlikely 3	Neither 4	Somewhat Likely 5	Likely 6	Extremely Likely 7
1. Use a word processor	1	2	3	4	5	6	7
2. Use a computer on a regular basis	1	2	3	4	5	6	7
3. Do a significant task on a computer.	1	2	3	4	5	6	7
4. Buy or borrow	1	2	3	4	5	6	7

computer software or hardware							
5. Use a disk operating system (DOS)	1	2	3	4	5	6	7
6. Investigate different kinds of software	1	2	3	4	5	6	7
7. Work with computer-aided instruction	1	2	3	4	5	6	7
8. Experiment with a new computer software package	1	2	3	4	5	6	7
9. Work with a computer graphics package	1	2	3	4	5	6	7
10. Use data-base software	1	2	3	4	5	6	7

APPENDIX B



T.C.
GAZİ ÜNİVERSİTESİ
Etik Komisyonu

Sayı : 77082166-302.08.01-
Konu : Bilimsel ve Eğitim Amaçlı

Sayın Doç. Dr. Paşa Tevfik CEPHE
İngiliz Dili Eğitimi Anabilim Dalı Başkanlığı - Öğretim Üyesi

Daha önce 25.05.2016 tarih ve E.65124 sayılı yazımız ile onay alan tez danışmanı olduğunuz, Üniversitemiz Eğitim Bilimleri Enstitüsü Yabancı Diller Eğitimi İngilizce Öğretmenliği programı Doktora Öğrencisi Esra HARMANDAOĞLU BAZ'ın, "***İngilizce Öğretmen Adaylarının Bilgi ve İletişim Teknolojileri Kullanma Niyetlerine İlişkin Bir Araştırma***" adlı tez çalışması ile ilgili Komisyonumuza gelen 20.10.2016 tarihli dilekçe Komisyonumuzun 21.10.2016 tarih ve 12 sayılı toplantısında görüşülmüş olup,

Çalışma ile ilgili altı üniversiteye ilave olarak 14 üniversiteden daha veri toplanması talebinizin uygun olduğuna oybirliği ile karar verilmiş ve karara ilişkin imza listesi ekte gönderilmiştir.

Bilgilerinizi rica ederim.

e-imzalıdır
Prof. Dr. Mustafa Necmi İLHAN
Komisyon Başkan Yardımcısı

Ek:1 Liste

APPENDIX C

Gmail **esra harmandaoğlu <esraharmandaoglu@gmail.com>**

Permission for your Self-Efficacy Survey

Ling Wang <lingwang@nova.edu> Mon, Oct 19, 2015 at 9:44 PM
To: Esra Harmandaoglu <esraharmandaoglu@gmail.com>

Dear Esra,

Yes, please feel free to use the instrument in your dissertation study.

Ling

Ling Wang, Ph.D.
Professor
Nova Southeastern University
College of Engineering and Computing
Room 4123, Carl DeSantis Building
3301 College Ave.
Fort Lauderdale, FL 33314
Tel: (954) 262-2020
Fax: (954)-262-3915
Web: http://cec.nova.edu/~lingwang

From: Esra Harmandaoglu [mailto:esraharmandaoglu@gmail.com]
Sent: Sunday, October 18, 2015 10:53 AM
To: Ling Wang <lingwang@nova.edu>
Subject: Permission for your Self-Efficacy Survey

[Quoted text hidden]

Gmail esra harmandaoğlu <esraharmandaoglu@gmail.com>

Permission for your CARS scale

Carol R Glass <glass@cua.edu> Wed, Feb 3, 2016 at 2:11 PM
To: Esra Harmandaoglu Baz <esraharmandaoglu@gmail.com>

Hi Esra,

Thank you for your interest in our research. You have my permission to use the CARS scale in your research. It is now almost 30 years old, though, so it is possible that some of the items may not be as relevant to computer use today. This scale was developed at a time when many people in the U.S. did not own personal computers, and work was sometimes done on "terminals" connected to a mainframe computer.

I have attached a scanned copy of what the scale looked like that we gave to participants. Good luck with your dissertation research!

Best,
Dr. Carol Glass

[Quoted text hidden]

CARS.pdf
311K

Gmail esra harmandaoğlu <esraharmandaoglu@gmail.com>

Permission for your scale

Anita Woolley <awoolley@andrew.cmu.edu> Thu, Feb 4, 2016 at 9:11 PM
To: Esra Harmandaoglu Baz <esraharmandaoglu@gmail.com>

Dear Esra,
Yes, it is fine if you want to use the scale. Using only the constructivist teaching scale is fine, as is switching to a five point scale.
Best,
Anita Woolley
[Quoted text hidden]
--
****
Anita Williams Woolley | Assoc. Professor of Organizational Behavior & Theory
Carnegie Mellon University | Tepper School of Business
5000 Forbes Avenue | Pittsburgh, PA 15213
(412) 268-2287 | awoolley@cmu.edu

Gmail esra harmandaoğlu <esraharmandaoglu@gmail.com>

Permission for your Computer Attitude Scale

Robin Kay <Robin.Kay@uoit.ca> Thu, Dec 24, 2015 at 9:09 PM
To: Esra Harmandaoglu <esraharmandaoglu@gmail.com>

Hi Esra,

My goodness - that's over 20 years ago - I have attached what I think are the relevant scales - I would call it the Computer Attitude Scale because that is what you are referring to NOT the other components. And you can use anything of mine that will help your research.

Robin

Dr. Robin Kay
Director of Graduate Studies<http://education.uoit.ca/graduate/index.php>
Professor<http://faculty.uoit.ca/kay/home/> - Faculty of Education
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MEd Graduate Webpage: education.uoit.ca/graduate<http://education.uoit.ca/graduate>
Facebook: www.facebook.com/uoitedugrad<http://www.facebook.com/uoitedugrad>
Twitter: @uoitmed<https://twitter.com/uoitmed> and @kayuoit<https://twitter.com/kayuoit> #uoitmed
Research Gate: <https://twitter.com/uoitmed> http://bit.do/rgkay

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GAZILI OLMAK AYRICALIKTIR...