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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 in 2016 at state universities in Turkey. Four different instruments 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 for all 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.

Keywords Behavioral intention to use ICT · Pre-service teacher education · Structural equation modeling

1 Introduction

In an increasingly technological world, the growth of ICT and proliferation of computers have extensively strengthened ICT integration in foreign and second language

This study was extracted from the corresponding author's dissertation.

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instruction (Hubbard & Levy, 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 do not offer much related to technology instruction and education (Hubbard, 2008; Hubbard & Levy, 2006; Koehler et al., 2011). 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 (Hutchison, 2012) because filling the classrooms with computers does not necessarily mean that technology has been adopted by the learners (Vallance, Vallance, & Matsui, 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 (Bodnar, Cucchiarini, Strik, & Hout, 2016; Hubbard & Levy, 2006; Nami, Marandi, & Sotoudehnama, 2016; Schmid, 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 do not offer much related to technology instruction and education (Hubbard, 2008; Hubbard & Levy, 2006; Koehler et al., 2011). 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 (Hutchison, 2012) 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; Merç, 2015; Patridge, 2006) 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).

Taking all these into consideration, this study focuses on developing a model for predicting English student teachers' behavioral intention to use ICT in their future classes. This research aligns with the necessity to investigate teacher-related variables' contribution toEnglish student teachers' behavioral intention to integrate ICT in their classes because teacher-related variables have been found significant during this process and there is a scarcity of research into the combined effect of teacher-related variables on predicting student teachers' behavioral intention to use ICT in their future classes.

2 Theoretical framework

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 and identifies incremental changes as first-order and fundamental changes as second-order changes. 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.

2.1 Factors affecting ICT integration

2.1.1 Behavioral intention to use ICT

Ajzen (1991) 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 in his theory of planned behavior. The more powerful the intention becomes, the more expectable the performance occurs. Behavioral intention to use ICT refers to student teachers' self-report behavioral intention to use ICT in their future classes in this study.

2.1.2 Computer 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). There is a large volume of published studies describing the role of attitude in the integration of ICT into classes (Davis, 1989; Scherer, Tondeur, Siddiq, & Baran, 2017; Tondeur, Valcke, & van Braak, 2008b). Computer attitude in this study refers to student teachers' attitudes towards the use of ICT in their future classes.

2.1.3 Computer anxiety

Bandura (1982) sees human anxiety as "inefficacy in coping with potentially aversive events that makes them fearsome" (Bandura, 1982, p. 136). Computer anxiety, on the other hand, can be defined as a "situation-specific anxiety, similar to test anxiety and math anxiety" (Antoine, 2011, p. 29). 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.

2.1.4 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 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; Pajares, 1992). 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 with more tendency towards constructivist beliefs can be more liable to endeavor to integrate technology (Becker, 2001; Becker & Riel, 2000; Tondeur et al., 2008a).

2.1.5 Computer self-efficacy

Self-efficacy theory is believed to be important to people's capability to act (Bandura, 1977). Computer self-efficacy is pertinent to "a judgment of one's capability to use a

computer" (Compeau & Higgins, 1995, p. 192). It should be noted that self-efficacy can be a good indicator of behavioral intention to use ICT (Anderson & Maninger, 2007; Chen, 2010; Teo, 2009). Computer self-efficacy in this study refers to student teachers' perceived self-efficacy about the integration of ICT into their future classes.

2.1.6 Towards an integrated theoretical perspective

What is needed is to train teachers about how to use technology in order to adjust to the twenty-first century teacher profile because technology integration is a very crucial skill in this century (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). 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 (Baydaş, 2015; Becit-İşçitürk, 2012; Sang, Valcke, van Braak, & Tondeur, 2010; Wong, Teo, & Russo, 2013). However, the studies in Turkey are limited by how pre-service teachers employ and integrate ICT into their teaching, faculty members' view about ICT related opinions and capabilities, and hindering factors to integrate ICT into pre-service teacher education (Akbaba Altun, Kalayci, & Avci, 2011; Akçaoğlu, 2008; Goktas, Yildirim, & Yildirim, 2008; Gülbahar, 2008). Some researchers have carried out studies using Technology Acceptance Model, The Theory of Planned Behavior, Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework (Becit-İşçitürk, 2012; Sadaf, Newby, Ertmer, 2012; Teo, 2008, 2009, 2012; Teo, Ursavas, & Bahcekapili, 2011, 2012; Venkatesh, Morris, Davis, & Davis, 2003; Valtonen, Kukkonen, Konthkanen, Sormunen, Dillo, & Sointu, 2015) in order to establish a model for behavioral intention to use technology.

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). 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. Even 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 models 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 researchers, this study sets out to be the first

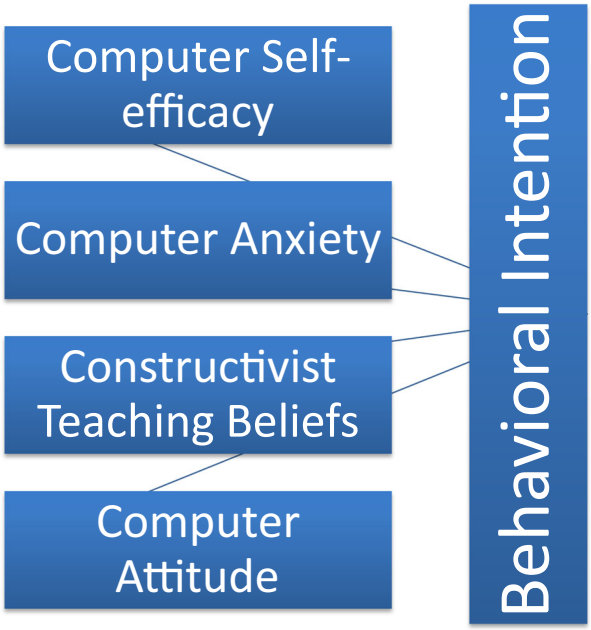

Fig. 1 A suggested model: I-PredICT Model

study pertinent to the effect of internal factors on English 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 by testing out I-PredICT model (*I is referring to intention*):

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 (Fig. 1).

3 Methodology

3.1 Research design

"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). Based upon the nature of the study and the research question identified, of the hypotheses, the theory used, and the use of already valid and reliable surveys make the research design appropriate for the study.

3.2 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 (last grade of a forth-year programme) have been chosen because they are the most likely teacher candidates in the future. The population data in 2012 for ELT departments at universities were taken by the Student Selection and Placement Center 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).

Data analysis has been performed using SPSS. 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 $\bar{X} = 21.90$. The researchers have 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 (the return ratio is 60%). As can be seen in Table 1, the researchers reached eight hundred and sixty one English student teachers, which adds a great strength to this study since Tabachnick and Fidell (2012) clarify that a sample size of 200 is sufficient for SEM analysis.

3.3 Data collection instruments

Four data collection tools are employed in the study as indicated in Table 2.

Table 1 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

Table 2 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

3.3.1 Computer technology integration survey

This survey (Wang et al., 2004) is used in order to identify student teachers' self-efficacy beliefs about 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 study, 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 some misunderstandings may occur due to such points as culture, context, and educational system of the country. Some statements have been modified or added extra information. The altered statements have been asked to English student teachers and checked whether the statements raise the same meaning and understanding among participants.

3.3.2 Constructivist teaching beliefs scale

Constructivist Teaching Beliefs Scale by Woolley et al. (2004) is used so as to measure pre-service teachers' constructivist teaching beliefs. The Cronbach's Alpha of the scale was found .73 in their analysis. Some modifications have been implemented in some statements after piloting.

3.3.3 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 ($\alpha = .84$ at the beginning of the semester and $\alpha = .90$ at the end of the semester) in their analysis.

3.3.4 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 ($\alpha = .87$) in terms of their analysis. Following piloting, some statements have been changed.

3.3.5 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 ($\alpha = .87$), affective ($\alpha = .89$), and behavioral ($\alpha = .94$) subscales with a high reliability ratio. The internal reliability for the total scale is .94 based on Kay's analysis.

3.4 Data analysis

3.4.1 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).

3.4.2 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. Confirmatory factor analysis (CFA) has been performed in order to verify data collection instruments.

According to Kline (2011), model specification, 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 study are listed in Tables 3 and 4.

Lastly, if the model fits the data and reach the acceptable fit levels indicated in Table 3, the results are interpreted and reported accordingly. Fit indices for the model in Table 3 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 et al. (2003); Tabachnick & Fidell (2007); and Wheaton, Muthen, Alwin, and Summers (1977).

Table 3 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

3.4.3 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). The values in this study show that multivariate normality is not provided based on the fact that Relative Multivariate Kurtosis is more than 1 as indicated in Table 4. Therefore, Robust Maximum Likelihood (Robust ML) Estimation Method is used in this study.

4 Findings

4.1 Confirmatory factor analyses: Validity and reliability values

4.1.1 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. This means that two factors overlap each other and uses almost similar items in meaning (Fig. 2).

Therefore, two factors merge and one factor Computer Technology Integration Survey is confirmed. One can easily see from path diagram that there are twenty-one items and one factor in the survey. One can easily see from path diagram that there are

Table 4 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

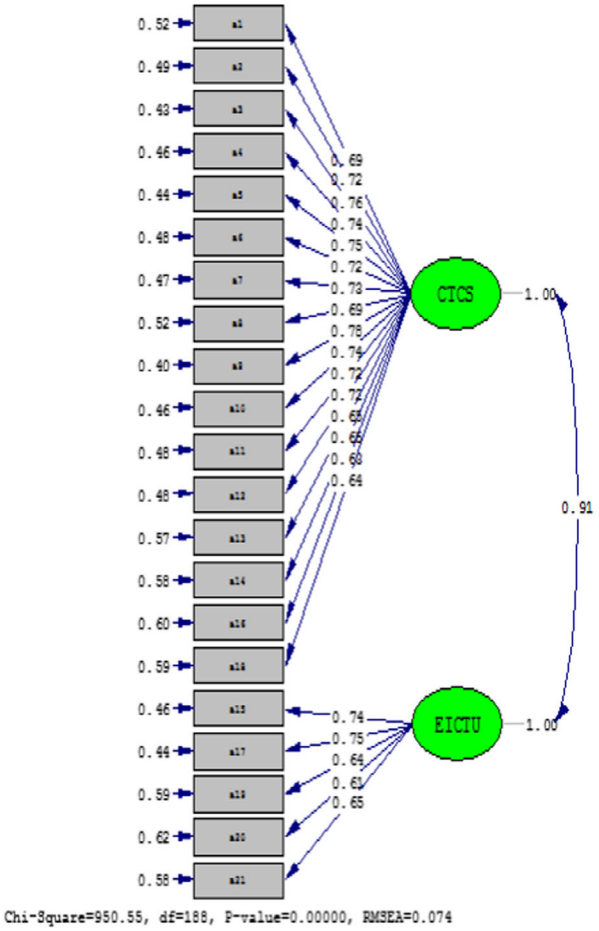

Fig. 2 Two factors of Computer Technology Integration Survey

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 (Fig. 3).

Table 5 indicates the regression values and t values for the survey. The table below 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 6 presents an overview of fit indices for the survey. The values from the Table 6 reveal that RMSEA (Browne & Cudeck, 1993), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel et al., 2003, p. 43), x2/df (Wheaton et al.,

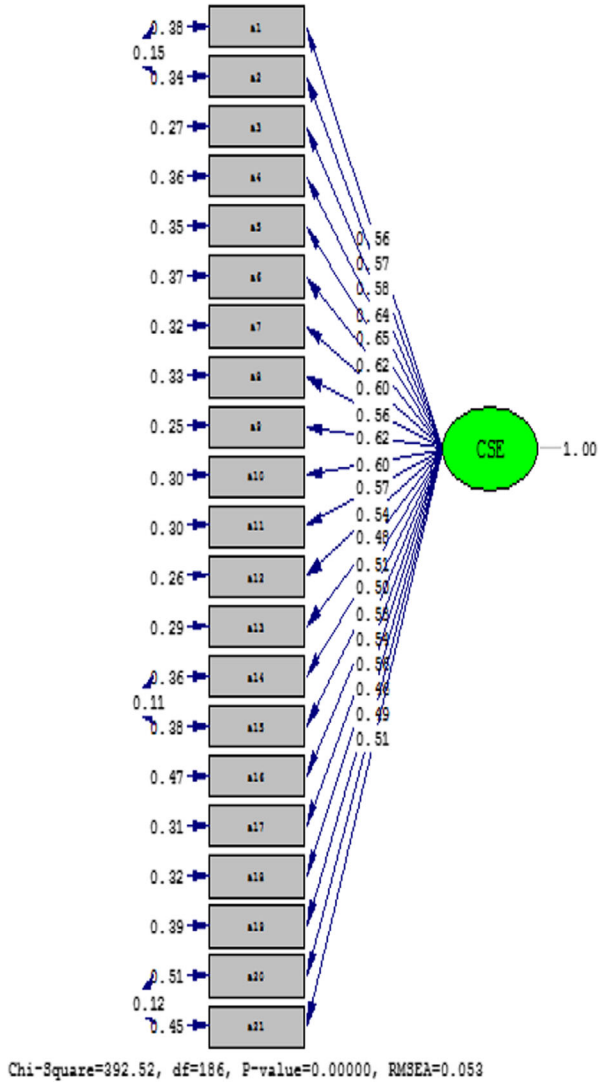

Fig. 3 Path diagram with one-factor for Computer Technology Integration Survey

1977) exhibit acceptable fit. Additionally, NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel et al., 2003, p. 41), SRMR (Byrne, 1998; Diamantopoulos & Siguaw, 2000) and CFI (Schermelleh-Engel et al., 2003, p. 42) display best fit for the survey.

4.1.2 Computer anxiety rating scale

One-factor scale has not been confirmed with the original items. There are ten items and one factor in the scale. The statements whose t-values are not statistically significant have been detected and extracted from the scale (b2, b4, b5, b6, b7, b9,

Table 5 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

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 Fig. 4.

As shown in Table 7, 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

Table 6 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
x2/df	$\leq$ 2	$\leq$ 5	2.11	Acceptable
CFI	> .97	> .95	0.99	Best

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.

The fit indices obtained from confirmatory factor analysis are summarized in Table 8. 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 et al., 2003, p. 41), SRMR (Hu & Bentler, 1999, p. 27), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel et al., 2003, p. 43), $\chi 2/df$ (Wheaton et al., 1977), and CFI (Hu & Bentler, 1999, p. 27) exhibit acceptable fit.

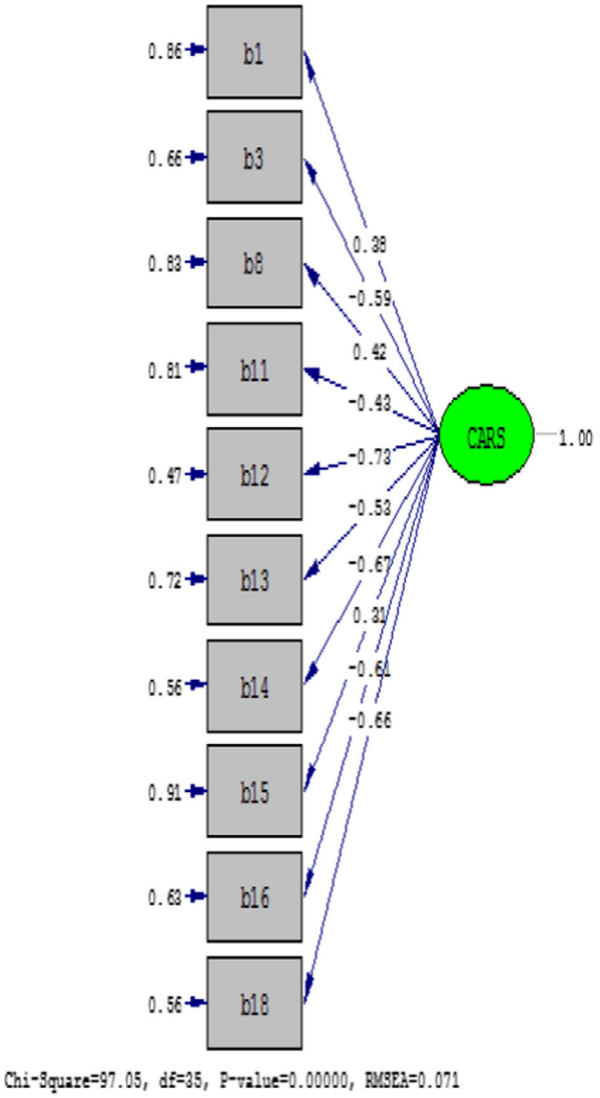

Fig. 4 Path diagram with one-factor for Computer Anxiety Rating Scale

Table 7 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

4.1.3 Constructivist teaching beliefs scale

One-factor scale has been verified and t-values of the items are statistically significant. There are seven items and one factor in the scale (Fig. 5).

As can be seen from the table below, 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 9).

From the data in Table 10, it is apparent that RMSEA (Browne & Cudeck (1993), NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel et al., 2003, p. 41), SRMR (Byrne, 1998; Diamantopoulos & Siguaw, 2000), GFI (MacCallum & Hong, 1997, p. 208), AGFI (Schermelleh-Engel et al., 2003, p. 43) and CFI (Schermelleh-Engel et al., 2003, p. 42) display best fit for the survey. Only χ2/df (Wheaton et al., 1977) exhibits acceptable fit.

Table 8 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
χ2/df	≤ 2	≤ 5	2.77	Acceptable
CFI	≥ .97	≥ .95	0.96	Acceptable

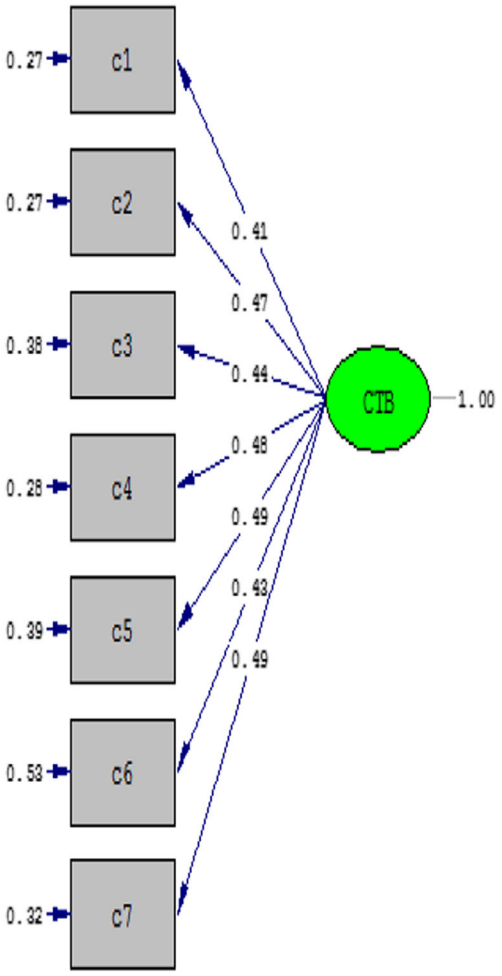

Fig. 5 Path diagram with one-factor for Constructivist Teaching Beliefs Scale

Table 9 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

Table 10 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
χ2/df	< 2	< 5	2.91	Acceptable
CFI	> .97	> .95	0.99	Best

4.1.4 Computer attitude scale

Three-factor scale has been verified and t-values of the items are statistically significant. There are thirty items and three factors, namely cognitive, affective, and behavior, in the scale. 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 (Fig. 6).

From the table below, 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 11 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 12 presents an overview of fit indices for the scale. RMSEA (Browne & Cudeck (1993), NFI (Hu & Bentler, 1999, p. 4), NNFI (Schermelleh-Engel et al., 2003, p. 41), χ2/df (Tabachnick & Fidell, 2007), and CFI (Schermelleh-Engel et al., 2003, p. 42) show best fit. SRMR (Hu & Bentler, 1999, p. 27) GFI (MacCallum & Hong, 1997,

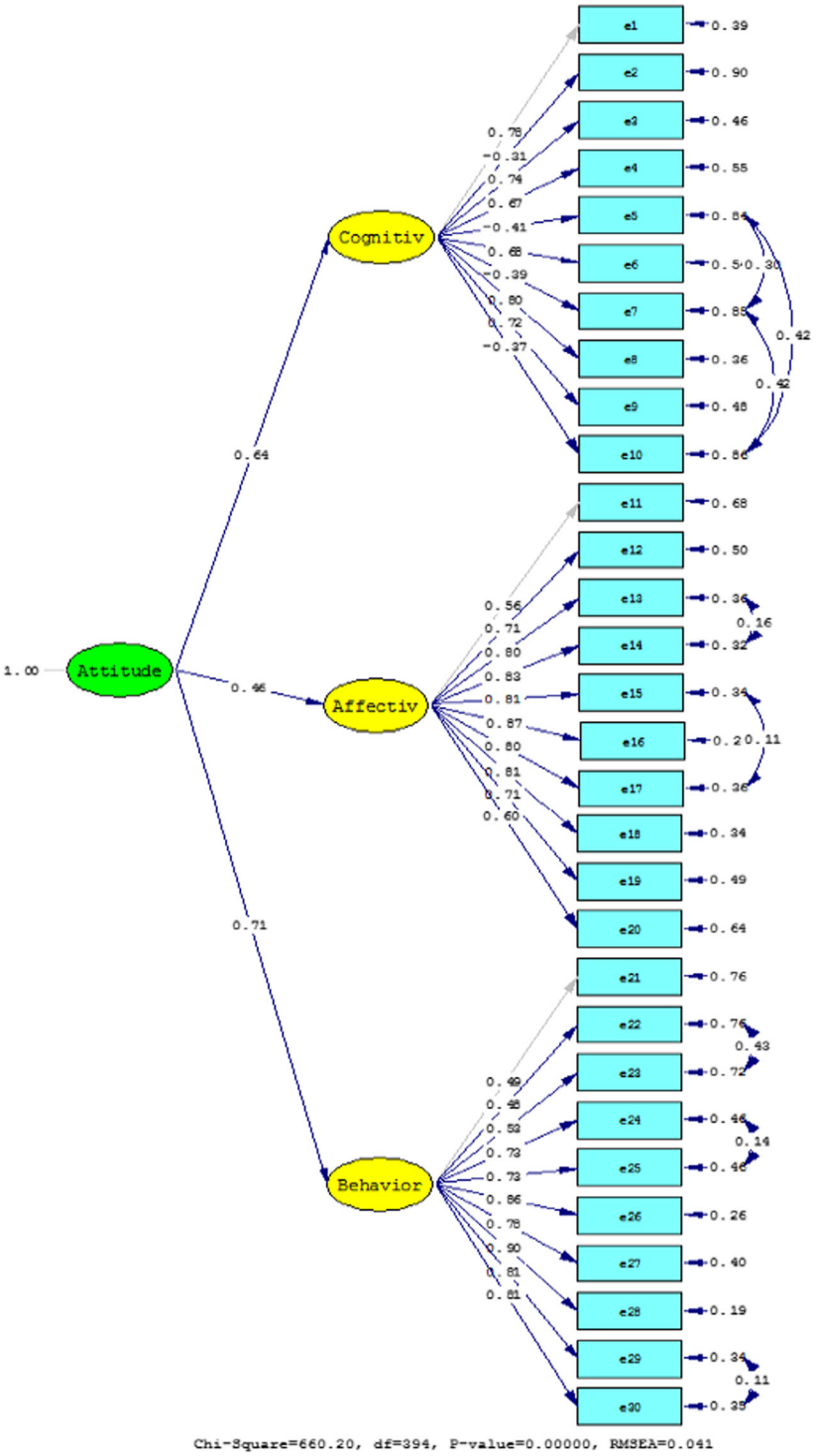

Fig. 6 Path diagram with three-factor for Computer Attitude Scale

Table 11 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

p. 208), and AGFI (Schermelleh-Engel et al., 2003, p. 43) exhibit acceptable fit in the scale.

4.1.5 Reliability values

Reliability values of data collection instruments have been calculated by using Cronbach's Alpha and values are exhibited in Table 13. Field (2009, p. 675) indicates that "a value of .7 to .8 is an acceptable value for Cronbach's α".

Table 12 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
$\chi 2/df$	< 2	< 5	1.67	Best
CFI	> .97	> .95	0.99	Best

4.1.6 Descriptive statistics of four constructs

The descriptive statistics of Computer Technology Integration Survey, Computer Anxiety Rating Scale, Constructivist Teaching Beliefs Scale, and Computer Attitude Scale are exhibited in Table 14.

Table 14 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).

Table 13 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

Table 14 Descriptive statistics of four constructs

	N	Minimum	Maximum	Mean ($\bar{X}$)	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

4.1.7 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 Fig. 7.

As can be seen from the figure above, I-PredICT model is composed of 4 constructs, namely Computer Self-efficacy, Computer Anxiety, Constructivist Teaching Beliefs,

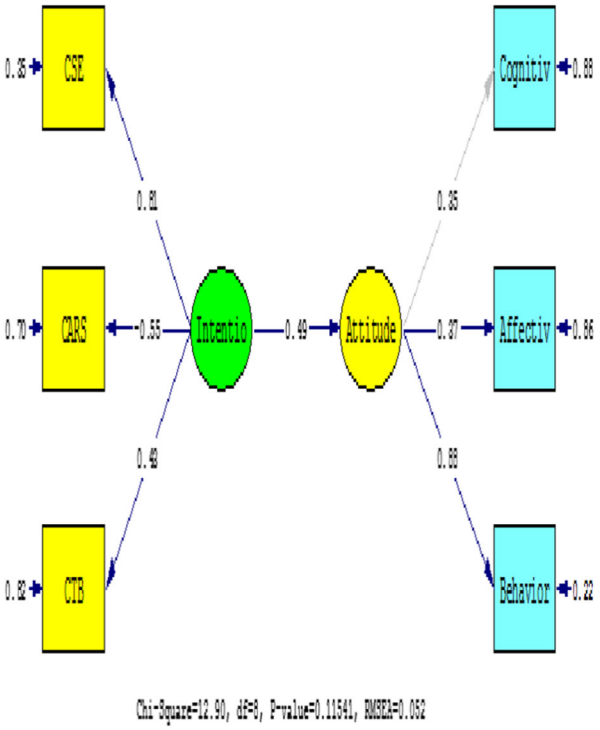

Fig. 7 Path diagram of I-PredICT Model

Table 15 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

and Computer Attitude. The results of regression values and t values are summarized in Table 15.

What is obvious 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 indicate that $\chi 2/df = 1.61$ (Tabachnick & Fidell, 2007), p value = 0.115 (Schermelleh-Engel et al., 2003, p. 52) and CFI = 0.98 (Schermelleh-Engel et al., 2003, p. 42) show best fit. RMSEA = 0.052 (Browne & Cudeck, 1993), NFI = 0.94 (Hu & Bentler, 1999, p. 4), NNFI = 0.96 (Schermelleh-Engel et al., 2003, p. 41), SRMR = 0.072 (Hu & Bentler, 1999, p. 27), and AGFI = 0.88 (Schermelleh-Engel et al., 2003, p. 43) exhibit acceptable fit in I-PredICT model.

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).

5 Discussion

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 researchers, 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 study confirms previous findings and suggests evidence that there are some constructs, 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, 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. In accordance with previous research, this study 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).

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, 2009, p. 233). As far as Reinders' (2009) emphasis on technology's advancing role not only in our lives but also in language classes, 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 twenty-first 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. The hypothesized model meets the criteria for model fit with adequate fit indices values and I-PredICT model fits the data. This study 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 study 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.

> 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 English student teachers' behavioral intention to integrate ICT into their future classes. In this study, 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 English 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. 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. Computer self-efficacy levels of English student teachers in this study are similar to those offered by Giles and Kent (2016), Seferoglu (2007), and Wall (2004). This may be due to the fact that they are born into a digital world and as Lei (2009) indicates digital native pre-service teachers born in late ninety eighties have been in touch with the digital world during their K-12 years. English student teachers may have experienced computer related courses and have been familiar with ICT integrated practices during their pre-service teacher education but as Reinders (2009, 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". It should be highlighted that technological developments have been altering the language teacher proficiency, the methodology to study and teach a language along with the nature of the language itself (Chapelle, 2005). As in the study of Jeong (2017), a CALL-integrated EFL student teacher training programme can contribute to student teachers' ICT integration progress in a confident and efficient way. 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. Thus, educators need to be knowledgeable about standards for technology, research for the status quo, and technological alterations (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; Teo, 2009). 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.

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 English 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 they are not placed by computers and computers are helpful tools for teachers in order to improve the quality of education in terms of the twenty-first century standards. 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. 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. English student teachers seem 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 (1977; 1982) regarding self-efficacy and anxiety; Brickner (1995), and Compeau and Higgins (1995) with a specific reference to computer self-efficacy and computer anxiety. In accordance with previous research by Aslan and Zhu (2017) and Baydaş (2015), the anxiety levels of English student teachers are not high. Aslan and Zhu (2017) found out in their study that pre-service teachers are feeling neutral in anxiety regarding the integration of ICT. Baydaş (2015) reported in her study that pre-service teachers have low anxiety levels for integrating ICT into their classes, which can produce an increase in pre-service teachers' behavioral intention to use ICT if pre-service teachers' anxiety levels become low. ICT integration knowledge and skills should be promoted during pre-service teacher education so that they can lower their computer anxiety levels. Computer anxiety should be overcome during pre-service teacher education and Reinders (2009) argues although computer assisted language learning concept is not a recent one but the notion of technology in language teacher education. Nevertheless, it may be the case 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 students are digital natives. 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 English student teachers based on CFA analysis in this study. It can be understood from the findings that English student teachers feel low computer anxiety in terms of using ICT in language classes. 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.

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 (1977; 1982) regarding self-efficacy and anxiety; Brickner (1995), and Compeau and Higgins (1995) with a specific reference to computer self-efficacy and computer anxiety.

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 fourth most significant predictor of English student teachers' behavioral intention to use ICT in their future classes in I-PredICT model. In this study, Constructivist Teaching Beliefs Scale has been verified by CFA and has become a valid and reliable research instrument supported by the data in order to measure constructivist teaching belief levels of

English 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 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 a changing world, Williams and Burden (1997, p. 44) present that the focus of education should be not only on teaching but also on learning with the timely skills and strategies by attaining meaningful learning and whole person development. 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).

As discussed above, the findings of this study are in accord with those of others in that there is a relationship between teachers' constructivist teaching beliefs and ICT integration (Becker & Ravitz 1999; Mumtaz, 2000; Sang et al., 2010). Moreover, teachers holding more constructivist teacher beliefs can be more liable to make use of ICT more often, efficiently, and innovatively (Ertmer, 2005; Pajares, 1992; Wang, 2002). Therefore, teachers' pedagogical beliefs should be shaped before being encouraged for the use of ICT in the classes (Miranda & Russell, 2012) because teacher beliefs affect teachers' peculiar technology incorporation applications (Balçıkanlı & Cephe, 2012; Ertmer, 2005; Ertmer et al., 2015; Niederhauser & Perkmen, 2008). In the literature, it is indicated 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; Ertmer et al., 2015; Greer, 2017; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Tondeur et al., 2008a, b).

> 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 English student 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 English student teachers is a significant finding of this study. In line with the findings of this study, studies over the past two decades have provided invaluable insights into the importance of attitudes towards integrating ICT into classes (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, as suggested by 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 (2011)

in that pre-service teachers hold positive attitudes towards the use of ICT in language classes. With regard to ICT use in language classes, 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). 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". 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 study 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). 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.

6 Conclusion and pedagogical implications

The present study should prove to be particularly valuable to policy makers, teacher educators, teachers, and pre-service teachers because it is 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. Through the incorporation of teacher-related variables used in I-PredICT model, policy makers can see their path by following the findings of this study. 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 use in the classrooms so that pre-service teachers can increase their ICT integration practices. At this point, the researchers do not imply the existence of a stand-alone technology course. Instead, the researchers imply the integration of ICT into methods course and if possible into the whole teacher education program. It is highly suggested in the literature that ICT integration practices should be inserted into teacher education programs' methods courses (Lei, 2009). 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 teaching demonstrations especially in courses like teaching language skills and techniques for language teaching 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 from the aspect of seeing the procedure of ICT integration in practice. This effort has a 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 (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' positive attitudes towards the use ICT in language classes. 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 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).

If this study is about the encouragement of ICT use in the classes, it will be a necessity to mention 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 advice 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. Finally, 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.

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 study.

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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Declaration

Conflict of interest None.

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