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Influential factors on preservice teachers' intentions to use ICT in future lessons

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ABSTRACT

This study aims (a) to make a comprehensive examination of factors influential on preservice teachers' intentions to use ICT in their future lessons and (b) to determine differences in those factors resulting from gender, university, and department. The data were obtained from 2904 preservice teachers from 16 universities through a survey. Comparative design was employed, and the data were analyzed through descriptive analysis, content analysis, and a MANOVA. Gender and university were not found to have any influence on perceived usefulness, perceived ease-of-use and efficacy, social influence, facilitating conditions, anxiety, or intention. The variable of department, on the other hand, had an influence on all factors except for social influence. While preservice teachers studying primary mathematics and Turkish had the lowest intentions of using ICT in comparison to their peers, preservice teachers studying English and science had the highest. All in all, as differences were found between departments in terms of intentions to use ICT, preservice teacher training programs should be subject-specific.

1. Introduction

Rapidly developing and changing information and communications technology (ICT) has dramatically affected many sectors to a considerable extent, including education. ICT has become a focus of interest to education researchers because it makes learning entertaining and enhances the effectiveness and productivity of teaching. That focus manifests itself most clearly in the substantial allocation of financial resources to the integration of ICT into lessons in many countries around the world (Liu, 2012; Peeraer & Van Petegem, 2012; Rodríguez, Nussbaum, & Dombrovskaia, 2012; Tondeur, van Braak, & Valcke, 2007; Wang & Woo, 2007). Though several studies have been carried out on this subject, no system perfectly fulfilling students' needs has yet been developed (Ertmer & Ottenbreit-Leftwich, 2010; Peeraer & Van Petegem, 2012; Tondeur et al., 2007). Over the last 30 years, the Republic of Turkey Ministry of National Education (MNE) has conducted and supported various projects aimed at forming an ICT infrastructure and generalizing the use of ICT in schools across Turkey. Infrastructure projects started in 1984, while projects aimed at generalizing the use of ICT were put into practice in 1998 (Topuz & Göktaş, 2015). Projects such as Basic Education I and II, Internet access, e-school, an e-learning portal, and a recent FATIH project are the result of these growing interests. Within the scope of Basic Education II from 2002 to 2007, computer laboratories were installed in 4002 classrooms at 3000 primary schools, and educational materials were delivered to 4000 primary schools in rural areas (MNE, 2007). In addition, the ongoing FATIH project is aimed at providing schools with multifunctional printers, document cameras, interactive whiteboards, and wired Internet connections. Obviously, the use of such equipment requires teachers to have relevant skills (Goktas, Yildirim, & Yildirim, 2008; Nelson, Christopher, & Mims, 2009). In this regard, preservice teachers should be provided with adequate training on the way they are expected to teach with ICT (Baki, 2006).

The main purpose of such trainings is to influence preservice teachers' willingness and skill to use ICT in their future lessons (Anderson & Maninger, 2007). Willingness to use ICT in future lessons may be associated with the concept of intention, which refers to wanting and planning to do something beforehand. Because preservice teachers have limited to no experience in the classroom, the literature understandably highlights the importance of intentions for future use of ICT (Venkatesh, Morris, Davis, &

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Davis, 2003; Zhou, Fang, Vogel, Jin, & Zhang, 2012). In this sense, examining factors influential on preservice teachers' intentions to use ICT in future lessons is important for shaping teacher training programs. Various behavioral intention (BI) models have been developed in the literature, and attention has been focused on factors such as perceived usefulness (PU), perceived ease-of-use and efficacy (PEUE), social influence (SI), facilitating conditions (FC), and computer anxiety (CA). These concepts constitute the theoretical framework of the current study (see Fig. 1).

1.1. Significance of and reason for the study

Preservice teachers' intentions to use ICT offer predictive information about their actual use of ICT in the future. Therefore, influential factors such as PU, PEUE, SI, FC, and CA may provide comprehensive information about BI. In addition, determining variations in these factors in terms of gender may provide detailed information on differences between preservice teachers. This is because; the relevant literature contains contradictory findings concerning the integration of IT (Teo, 2008). Previous studies indicate that males play a more dominant role in the integration of IT into lessons (Markauskaite, 2006; Panteli, Stack, Atkinson & Ramsay, 1999). However, as gender differences in the use of IT have disappeared recently (Sang, Valcke, van Braak, & Tondeur, 2010; Wong, Teo, & Russo, 2013), more generalizable results can be obtained if a large sample is used. In addition, determining the differences between the preservice teachers studying in different branches in terms of the factors influential on the use of IT may provide a framework for IT programs on the basis of branch. Additionally, it is reported that the education received by preservice teachers in their university years has a considerable influence on their beliefs in using IT (Bell, Maeng, & Binns, 2013; Coutinho, 2008). IT trainings provided in different universities may involve different methods and techniques. The exploration of the differences between universities in terms of preservice teachers' intentions to use IT may provide an insight into the IT policies of the universities and departments in Turkey.

1.2. Aim of the study

This study aims at making a comprehensive examination of the factors influential on preservice teachers' intentions to use ICT in their future lessons as well as determining differences regarding those intentions in terms of such factors as gender, university, and department. To this end, two research questions were investigated:

1. What are the levels of the factors influential on preservice teachers' intentions to use ICT in their future lessons?
2. Is there any difference between preservice teachers in terms of factors influential on their intentions to use ICT in their future lessons according to gender, department, or university?

2. Method

Comparative design was used to examine differences between preservice teachers in terms of the selected variables (McMillan & Schumacher, 2010)—perceived usefulness, perceived ease-of-use and efficacy, social influence, facilitating conditions, anxiety, and intention—according to gender, university, and department.

2.1. Study group

Data were collected through a survey from students in their final years at faculties of education in Turkey. The research sample consisted of preservice teachers studying to teach preschool (n = 391), primary school (n = 694), primary mathematics (n = 348), science (n = 464), social studies (n = 510), English (n = 179), and Turkish (n = 318). To select these departments, a distribution of courses was evaluated, and departments with the most course hours were selected.

The universities attended by participants were selected through stratified sampling, which ensures that subgroups in a research universe are represented by the sample. In stratified sampling, the universe is divided into substrata, and unbiased sampling is done in each stratum to obtain a total sample (Balci, 2009). Data were collected from at least one university in each of the 12 regions of Turkey as per the Nomenclature of Units for Territorial Statistics (NUTS). The universities in each region were chosen through convenience sampling, where the researchers selected participants from among easily accessible people (Fraenkel & Wallen, 2009; Johnson & Christensen, 2004; McMillan & Schumacher, 2010). In all, 16 universities were selected.

Within the framework of the second research question, universities were categorized to determine differences between factors influential on preservice teachers' intentions to use ICT according to gender, university, and department. In categorizing the 16 universities, four groupings were determined on the basis of entrance scores. Table 1 shows the 2014 ranks of these universities according to the University Ranking by Academic Performance (URAP, 2015), identifies whether the universities are located in metropolitan municipalities, and lists the foundation years of the universities as well as their lowest entrance scores.

3. Data collection tools and data collection process

The Preservice Teachers ICT Acceptance Scale used in the study was developed by the authors (2015) and is a 5-point Likert-type survey composed of 30 items. Construct validity of the survey was verified, and its reliability coefficient was found to be .88. The survey also included two open-ended questions aimed at revealing factors influential on the preservice teachers' intentions to use ICT in the future.

A total of 4050 survey forms were sent to the 16 universities, and data were collected from 2904 preservice teachers. Nearly three-quarters (71.7%) of the survey forms were returned. Extreme values and missing data were taken into consideration in preparing the data for statistical procedures, and 64 survey were excluded. Ultimately, data obtained from 2839 preservice teachers were analyzed.

3.1. Data analysis

First, descriptive statistics (arithmetic mean, standard deviation, and frequency) related to the six-factor survey were calculated within the scope of data analysis. Meanwhile, the open-ended questions were subjected to content analysis.

MANOVA was carried out in order to determine differences between the preservice teachers in terms of the study factors of gender, university, and department. Sample size was adequate according to the assumptions of MANOVA, and the coefficients of skewness and kurtosis (+2 and −2), the indicators of normality, were within ranges reported in the literature (Field, 2009). First, missing data were made whole based on frequently repeated values, and 65 instances of extreme data were excluded from analysis after calculation of Mahalanobis distance. When variances were equal, the following values were obtained for each factor: FC = 1.621, $p < .05$; PEUE = 1.515, $p < .05$; CA = 1.044, $p > .05$; PU = 1.319, $p > .05$; SI = 1.064, $p > .05$; BI = 2.321, $p < .05$. Variances were equal for all factors apart from FC, PEUE, and BI. For Box's M test, 1599.50, $p < .05$ values were reached following MANOVA to

Perceived Usefulness (PU)	Perceived usefulness refers to personal beliefs regarding the contribution of a specific system to an individual's working performance (Venkatesh et al., 2003). From this perspective, people are more likely to use tools that they believe will improve their job performance. When preservice teachers become aware of potential positive outcomes from using IT in their future lessons, they will have higher intentions to integrate it. Some examples of perceived usefulness are belief that IT may increase and promote student learning (Gialamas & Nikolopoulou, 2010); belief that it may ensure student motivation and make lessons visual and concrete (Sadaf, Ertmer, & Newby, 2012); belief that it may contribute to the professional development of teachers (Terzis & Economides, 2011); and belief that it may improve profitability through saving of time (Teo, Lee, & Chai, 2008).
Perceived Ease-of-Use and Efficacy (PEUE)	Perceived ease-of-use indicates the perception of an individual regarding the ability to use a system easily (Venkatesh et al., 2003). Buchanan, Sainter, and Saunders (2013) and Compeau, Higgins, and Huff (1999) have argued that perceived ease-of-use is associated with self-efficacy beliefs. In this regard, researchers state that individuals having high self-efficacy regarding the use of a technology have a higher perceived ease-of-use of such technology. Bandura (1977) defined self-efficacy as the capability to demonstrate and self-organize the behaviors required to achieve given goals within a framework of individual skills.
Social Influence (SI)	According to Venkatesh and Davis (2000), when employees use a system effectively, other employees are prone to use it, too. Social learning suggests that people's learning a behavior depends on the way such behavior is displayed by others and what they obtain when they display it. The similarity of the model and the observer in terms of character, age, and status increases the rate of imitation of a behavior (Bandura, 1977). From this perspective, social influence, which plays a role in shaping the behaviors of individuals, is the degree of perception of other people regarding the importance of using a system (Venkatesh et al., 2003). The literature has revealed that teachers' use of IT in lessons can be influenced by colleagues, administrators, and students (Pynoo et al., 2011).
Facilitating Conditions (FC)	Facilitating conditions refer to beliefs regarding the ability of an existing technical infrastructure to support the use of certain systems (Venkatesh et al., 2003). However, facilitating conditions have been evaluated under different scopes in different studies. For instance, Teo, Lee, and Chai (2008) defined facilitating conditions as environmental factors influential on an individual's capability to fulfill a task. Teo and Noyes (2014), on the other hand, focused on money, time, and technical compliance. Facilitating conditions are also regarded as environmental factors that make it easier for a task to be fulfilled (Teo & Noyes, 2014; Teo et al., 2008). In the case of teachers, they may involve technology accessibility, the availability of technical support and units that can provide teachers with support, and the availability of adequate time.
Computer Anxiety (CA)	One of the greatest obstacles to successful integration of IT into education is technology anxiety during teaching and learning (Rahimi & Yadollahi, 2011). Chang (2005) has described computer anxiety as teachers feeling uneasy or worried about activities related to using a computer, expecting negative results and fearing failure. Computer anxiety involves psychological variables (e.g. attitude towards computer, self-efficacy), functional components (e.g. first experiences, frequency of using computer, having a personal computer), and social factors (e.g. age, gender, ethnicity, socio-economic status) (Rahimi & Yadollahi, 2010).

Fig. 1. Descriptions drawn from the literature of influential factors on intentions to use ICT. (References cited: Bandura, 1977; Chang, 2005; Compeau, Higgins, & Huff, 1999; Giallamas & Nikolopoulou, 2010; Pynoo et al., 2011; Rahimi & Yadollahi, 2011; Teo & Noyes, 2014; Teo, Lee, & Chai, 2008; Terzis & Economides, 2011; Venkatesh & Davis, 2000.)

Table 1
Categorization of universities according to specific criteria.

Category code	University	Lowest university entrance score	URAP	Municipality	Foundation of university
1st level	Istanbul University	367.97	14	√	1933
	Gazi University	351.59	2	√	1982
	Kocaeli University	344.32	19	√	1992
	Akdeniz University	335.32	12	√	1982
2nd level	Gaziantep University	334.23	46	√	1987
	Adnan Menderes University	326.65	50	√	1992
	Karadeniz Technical University	321.32	8	√	1955
	Trakya University	315.38	31		1982
3rd level	Ataturk University	314.73	21	√	1957
	Yuzuncu Yil University	313.99	32	√	1982
	Ahi Evran University	310.25	52		2006
	Amasya University	309.78	67		2006
4th level	Kilis 7 Aralik University	308.08	92		2007
	Recep Tayyip Erdogan University	304.94	63		2006
	Gaziosmanpasa University	303.54	35		1992
	Erzincan University	300.6	57		2006

determine the equality of covariance matrices. There was no equality of covariance in the study. Pearson's correlation test was conducted in order to identify the relationships between the dependent variables, and medium relationships were found between all of them. However, there was not linearity in all linearity graphs and not all assumptions of MANOVA were fulfilled. The use of Pillai's Trace test is recommended in the literature when there are problems in a dataset, the sample size is inadequate, there is a big difference between numbers of participants in groups, or a test's conditions are not fulfilled (Akbulut, 2010). As not all assumptions were fulfilled in the current study, Pillai's Trace test was applied. After a significant difference was found through MANOVA, a Bonferroni correction was made to check the type I error, and the data were tested at a significance level of (.05/6) .008. To determine between which groups there was a difference, Scheffe's test, a post-hoc test, was administered when variances were equal, and Tamhane's T2 test, another post-hoc test, was used when variances were not equal.

4. Results

4.1. The levels of the factors influential on the preservice teachers' intention to use ICT in future lessons

Qualitative and quantitative data are presented together in this study, including descriptive statistics (frequency, mean, standard deviation, and percentage) related to the factors included in the study (see Table 2). Column *f* of Table 2 indicates the frequencies of the qualitative data, and the other columns show the descriptive expressions of the quantitative data. The averages are organized in descending order, and outstanding item frequencies are emphasized in bold.

When analyzing the qualitative data, negative statements regarding the use of IT in lessons were collected into a separate category (see Table 3). For example, participants frequently mentioned the likelihood that IT might be used by students for non-educational purposes in the classroom.

4.2. Differences between preservice teachers in terms of influential factors according to gender, department, and university

MANOVA was carried out to determine differences between the preservice teachers in terms of their intentions to use IT in future lessons as well as to examine influential factors on those intentions according to gender, university, and department. Gender was found to have no influence on the dependent variables (Pillia's Trace = .006, $F = 2.66$, $p > .01$, $R^2 = .006$). Similarly, no difference was found between the preservice teachers in terms of intention to use IT in their future lessons with regard to university (Pillia's Trace = .009, $F = 1.32$, $p < .01$, $R^2 = .019$). On the other hand, department was determined to be influential on the dependent variables (Pillia's Trace = .062, $F = 4.83$, $p < .01$, $R^2 = .010$). Table 4 presents the test results.

Differences were found between all dependent variables by department (PU: $F = 9.95$, $p < .008$, $R^2 = .021$; PEUE: $F = 17.44$, $p < .008$, $R^2 = .036$; SI: $F = 4.36$, $p < .008$, $R^2 = .009$; FC: $F = 6.43$, $p < .008$, $R^2 = .014$; CA: $F = 4.14$, $p < .008$, $R^2 = .009$; BI: $F = 12.34$, $p < 008$, $R^2 = .026$). Table 5 provides detailed results.

Post-hoc tests were conducted for each dependent variable. Tamhane's T2 test was conducted for facilitating conditions, perceived ease-of-use and efficacy, and intention because variances were not equal. Scheffe's test was used for other factors.

The preservice teachers studying primary mathematics (M = 3.96) differed from those in all departments other than Turkish education ($p < .008$) in terms of PU. In addition, the preservice teachers studying English (M = 4.42) differed from those studying in departments other than science and primary school teaching ($p < .008$). While the lowest PU level occurred for preservice teachers of primary mathematics, the highest occurred for preservice teachers of English.

On the other hand, though MANOVA indicated a difference by department in terms of social influence, post-hoc test results did not. A significance value of .008 was taken as reference as a result of the Bonferroni correction. Table 6 presents details about the factors of PEUE, CA, SI, FC, and BI.

5. Discussion

5.1. Levels of factors influential on preservice teachers' intentions to use ICT in future lessons

The levels of the factors influential on preservice teachers' intentions to use ICT in their future lessons were determined both qualitatively and quantitatively. Consistent with the literature, in terms of PU, the preservice teachers expressed that ICT saves time, contributes to the concretization and visualization of lessons, increases student interest, and makes lessons more entertaining (Fonseca, Marti, Redondo, Navarro, & Sanchez, 2014; Kreijns, Van Acker, Vermeulen, & van Buuren, 2013; Shen, Liu, & Wang, 2013). Participants clearly presented a positive view about the use of ICT in teaching.

As to PEUE, the quantitative data showed that many participants

Table 2
Descriptive data.

	Items	%							
		f	M	SD	strongly disagree	disagree	neutral	agree	strongly agree
PU (M = 4.14)	I think IT will make course sources richer.	7	4.24	.72	.5	2.1	7.7	52.4	37.3
	I think IT will increase students' interest in lessons.	**223**	4.19	.75	.5	2.6	10.4	50.9	35.6
	I think IT will increase the satisfaction of students with lessons.	66	4.15	.73	.3	2.3	11.7	53.2	32.5
	I think I can improve myself professionally by using IT in my lessons in the future.	1	4.13	.76	.7	2.8	10.9	53.5	32.1
	I think IT will improve student achievement.	**187**	4.10	.75	.5	2.9	12.7	54.4	29.5
	I think IT will provide visualization and concretization.	**168**							
	I think IT will increase communication and interaction.	**98**							
	I think IT will save time.	78							
	I think IT will make lessons student-centered.	43							
	I think IT will provide convenience in methods and techniques.	9							
PEUE (M = 3.58)	I have basic knowledge and skill to use IT.	2	3.71	.92	1.5	8.6	26.6	43.6	19.7
	I have necessary knowledge and skill to integrate IT into my future lessons.		3.66	.91	1.6	8.6	29.3	43.0	17.4
	I can easily access IT materials related to my field.	**42**	3.64	.91	1.4	9.5	29.1	43.8	16.3
	Using IT is easy for me.		3.55	.96	2.2	11.4	31.1	39.5	15.8
	Using IT in my future lessons will not mean any extra effort for me.		3.38	1.03	3.2	18.5	28.5	36.1	13.7
	I might have imperfect basic knowledge and skill to use IT.	**80**							
SI (M = 3.70)	That IT counselors give advice to me affects my use of IT in my lessons.		3.83	.89	2.1	6.5	17.7	54.1	19.6
	The success of department teachers in using IT affects my use of IT in my lessons.	2	3.81	.90	2.0	7.4	17.9	52.9	19.8
	That the Ministry of National Education makes the use of IT compulsory in lessons affects my use of IT in my lessons.	**57**	3.77	.95	3.0	7.7	18.4	51.4	19.5
	That people on whom I model myself think that I must use IT in my lessons affects my use of IT in my lessons.		3.72	.95	2.8	8.8	20.6	49.5	18.2
	My peers' use of IT in their lessons affects my practice and work with IT.	20	3.63	.97	3.2	10.3	22.9	47.3	16.3
	As the use of IT in teaching brings prestige, it affects my use.	**54**	3.61	.99	3.5	11.0	23.1	45.7	16.7
	That I get positive reactions from students when I use IT in my lessons affects my use of IT.*	**81**							
	That administrators support me affects my use of IT in my lessons.	41							
	The readiness of students affects my use of IT.	39							
	The existence of collaboration with family affects my use of IT in my lessons.	29							
FC (M = 4.25)	I can use IT if I have necessary equipment.		4.36	.70	.7	1.5	5.0	47.2	45.6
	I can use IT if my school has adequate Internet infrastructure.	45	4.35	.68	.2	1.8	5.4	48.2	44.4
	I can use IT if I have necessary software and content.	14	4.35	.68	.4	1.5	4.8	49.6	43.6
	I can use IT if my school has adequate IT infrastructure.	**207**	4.32	.69	.2	1.7	6.7	48.3	43.1
	I can use IT if I am provided with technical support.	**113**	4.23	.74	.8	2.4	7.2	52.8	36.8
	I can use IT if there is a special person/group that helps me integrate it into my lessons.	18	4.06	.85	1.0	4.9	13.3	48.4	32.4
CA (M = 42.49)	That the information I get via IT may be wrong worries me.	50	2.89	1.10	11.4	27.4	27.4	28.1	5.7
	The feeling that I may not finish lessons on time when I use IT in the future worries me.	**106**	2.61	1.12	17.2	34.3	23.7	20.3	4.6
	Fear of making a mistake while using IT in lessons worries me.	18	2.56	1.12	18.5	35.8	21.1	20.9	3.9
	Having to use IT in teaching worries me.	5	2.35	1.08	23.4	39.7	18.7	15.0	3.1
	I feel worried while I am using IT.	6	2.34	1.08	23.4	40.0	19.3	14.0	3.3
	I avoid using IT in my future lessons even if I can use it adequately.	5	2.21	1.11	30.5	38.5	14.5	12.8	3.7
BI	I think I can use IT in my future lessons.		4.01	.77	1.0	3.5	13.6	57.4	24.6
	I plan to use IT as soon as I start to work.		3.71	.89	1.2	7.1	30.9	41.5	19.3

Table 3
Negative statements regarding the use of IT in lessons.

Negative statements regarding the use of IT in lessons	*f*
IT may be used for non-educational purposes.	122
IT may accustom students to ready-made things.	56
Lack of appropriate materials may affect the use of IT negatively.	43
IT may make lessons boring.	40
IT may prevent socialization among students.	36
Establishment of IT infrastructure may cost a lot.	33
Teachers may fail to keep up with developments in IT.	30
Imperfect IT knowledge/skill among students may limit the use of IT.	24
IT may not be appropriate to course contents.	23
IT may make students technology-addicted.	20
IT may be harmful to health.	19
IT may accustom teachers to ready-made knowledge.	17
Overcrowded classrooms may make the use of IT difficult.	16
The use of IT may make it difficult to discipline class.	16
Value attached to books may decrease as a result of the use of IT.	14
IT may not be appropriate to students who have poor visual intelligence.	10
IT may restrict psychomotor skills.	6

thought it would be easy to use ICT in lessons, while a considerable number of participants were hesitant (Chai, Koh, & Tsai, 2010; Gulbahar, 2008 Usta & Korkmaz, 2010). This result may be explained by the preservice teachers having the basic knowledge

Table 4
MANOVA test results.

	Pillia's trace	*F*	Sig. (*p*)	R^2
Intercept	.981	24316.301	.000	.981
Gender	.006	2.660	.014	.006
University	.009	1.321	.163	.003
Department	**.062**	**4.831**	**.000**	**.010**
Gender * University	**.019**	**2.956**	**.000**	**.006**
Gender * Department	.019	1.436	.044	.003
University * Department	**.061**	**1.681**	**.000**	**.010**
Gender * University * Department	**.052**	**1.441**	**.002**	**.009**

Table 5
Differences between dependent variables by gender, university, and department.

Independent Variables	Dependent Variables	Sum of squares	df	Sum of averages	*F*	*Sig. (p)*	R^2
Department	**PU**	**21.631**	**6**	**3.605**	**9.959**	**.000**	**.021**
	PEUE	**59.058**	**6**	**9.843**	**17.440**	**.000**	**.036**
	SI	**11.816**	**6**	**1.969**	**4.362**	**.000**	**.009**
	FC	**11.733**	**6**	**1.956**	**6.434**	**.000**	**.014**
	CA	**17.585**	**6**	**2.931**	**4.141**	**.000**	**.009**
	BI	**35.475**	**6**	**5.912**	**12.349**	**.000**	**.026**
Gender * University	PU	5.111	3	1.704	4.707	.003	.005
	PEUE	**14.953**	**3**	**4.984**	**8.831**	**.000**	**.009**
	SI	4.856	3	1.619	3.585	.013	.004
	FC	2.791	3	.930	3.061	.027	.003
	CA	4.053	3	1.351	1.909	.126	.002
	BI	5.124	3	1.708	3.568	.014	.004
University * Department	**PU**	**21.744**	**17**	**1.279**	**3.533**	**.000**	**.021**
	PEUE	12.987	17	.764	1.354	.150	.008
	SI	13.019	17	.766	1.696	.037	.010
	FC	**12.677**	**17**	**.746**	**2.454**	**.001**	**.015**
	CA	**46.371**	**17**	**2.728**	**3.854**	**.000**	**.023**
	BI	**18.401**	**17**	**1.082**	**2.261**	**.002**	**.014**
Gender * University * department	PU	6.719	17	.395	1.092	.355	.007
	PEUE	16.214	17	.954	1.690	.038	.010
	SI	8.345	17	.491	1.087	.360	.007
	FC	**13.926**	**17**	**.819**	**2.695**	**.000**	**.016**
	CA	15.421	17	.907	1.282	.194	.008
	BI	16.475	17	.969	2.024	.008	.012

and skill to incorporate ICT in lessons but lacking confidence about integration (Lei, 2009; Maddux & Cummings, 2004; Sadaf, Newby, & Ertmer, 2012; Valtonen, Dillon, Hacklin, & Vaisanen, 2010; Valtonen et al., 2011).

The preservice teachers focused much attention on SI. The qualitative and quantitative data obtained in the study indicated that participants thought that if the Ministry of National Education made ICT compulsory in schools, its use would be generalized. However, making ICT mandatory may negatively affect the attitudes of teachers. As attitude is an important influential factor on BI, this shift may lead to its decrease (Venkatesh et al., 2003). In addition, some preservice teachers stated their future use of ICT might be affected by its ability to generate prestige. Though ICT is mainly regarded as a tool to increase interaction, it improves knowledge and skills as well as enhances social prestige for graduates (Klimova & Semradova, 2013). This use of ICT may be an important source of prestige for students, especially in areas with a low socio-economic level.

With regard to FC, another factor influential on preservice teachers' intentions to use ICT, participants concentrated on the existence of required equipment, software, and Internet infrastructure for the use of ICT in lessons, which is consistent with findings in the literature (Buckenmeyer & Freitas, 2005; Goktas, Yildirim, & Yildirim, 2009; Hew & Brush, 2007; Wachira & Keengwe, 2011). However, even in schools with superior technological infrastructure, teachers may still fail to integrate ICT into lessons effectively, a result that has been reported in many studies (Chen, 2008; Gorder, 2008; Hermans, Tondeur, van Braak, & Valcke, 2008; Wang, Ertmer, & Newby, 2004). Therefore, technical infrastructure must be reinforced and technical support must be provided to teachers (Bingimlas, 2009; Dionys, 2012; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Goktas et al., 2009).

The last factor influential on intention to use ICT was CA. The quantitative data showed that the preservice teachers had low anxiety about using ICT in their future lessons. The qualitative data, on the other hand, indicated that the preservice teachers were worried that they would not be able to finish lessons on time due to the use of ICT. To use time effectively, people should be willing to establish habits that will help them (Demirtas & Ozer, 2007). Preservice teachers may have the above-mentioned anxiety because they are inexperienced using ICT in their lessons. Participants also expressed anxiety about information gained via ICT being wrong. Thus, reliable online resources should be generalized and promoted. Additionally, some preservice teachers stated that the high ICT competency of today's students triggers the fear of making a mistake and falling into disgrace among their peers. Barbeite and Weiss (2004) have described computer anxiety as fear of using a computer in dread of appearing stupid or causing physical damage to the computer.

The present study revealed preservice teachers' positive intentions to use ICT in future lessons, which is consistent with the literature (Lei, 2009; Valtonen et al., 2011; Yushau, 2006). The qualitative data indicated that the participants also had negative views about the use of ICT in lessons, such as the potential for students to use ICT for non-educational purposes. Today's students live in a world full of technology, and many of them frequently spend time in platforms such as digital games, social networks, and virtual environments (Palfrey & Gasser, 2008; Vrocharidou & Efthymıou, 2012). For that reason, proper ICT filtering resources are needed. On the other hand, though it was mentioned by some participants that ICT increases motivation and interest among students, other participants felt that it would make lessons boring. Similarly, while some preservice teachers said that ICT improves

Table 6
Post-hoc results by department.

	Department	M	Primary school teaching	Social studies teaching	Science teaching	Pre-school teaching	Primary education mathematics teaching	Turkish teaching
PU	Primary School Teaching	4.22						
	Social Studies Teaching	4.15	.622					
	Science Teaching	4.21	1.000	.867				
	Pre-school Teaching	4.08	.025	.807	.114			
	Primary Education Mathematics Teaching	3.96	**.000**	**.003**	**.000**	.323		
	Turkish Teaching	4.15	.751	1.00	.913	.893	.016	
	English Teaching	4.42	.012	**.000**	.010	**.000**	**.000**	**.000**
PEUE	Primary School Teaching	3.64						
	Social Studies Teaching	3.59	.967					
	Science Teaching	3.81	**.004**	**.000**				
	Pre-school Teaching	3.54	.663	.993	**.000**			
	Primary Education Mathematics Teaching	3.23	**.000**	**.000**	**.000**	**.000**		
	Turkish Teaching	3.44	**.005**	.315	**.000**	.799	.008	
	English Teaching	3.89	**.002**	**.001**	.944	**.000**	**.000**	**.000**
SI	Primary School Teaching	3.75						
	Social Studies Teaching	3.72	.993					
	Science Teaching	3.78	.997	.895				
	Pre-school Teaching	3.61	.062	.398	.020			
	Primary Education Mathematics Teaching	3.64	.325	.796	.143	.999		
	Turkish Teaching	3.79	.997	.921	1.00	.048	.218	
	English Teaching	3.83	.928	.722	.996	.032	.128	.998
FC	Primary School Teaching	4.32						
	Social Studies Teaching	4.25	.623					
	Science Teaching	4.34	.998	.374				
	Pre-school Teaching	4.22	.252	.996	.122			
	Primary Education Mathematics Teaching	4.16	**.003**	.441	**.001**	.871		
	Turkish Teaching	4.21	.163	.970	.076	1.00	.976	
	English Teaching	4.51	**.000**	**.000**	**.002**	**.000**	**.000**	**.000**
CA	Primary School Teaching	2.50						
	Social Studies Teaching	2.51	1.000					
	Science Teaching	2.44	.945	.915				
	Pre-school Teaching	2.36	.304	.285	.938			
	Primary Education Mathematics Teaching	2.69	.070	.169	.006	**.000**		
	Turkish Teaching	2.66	.221	.386	.029	**.001**	1.000	
	English Teaching	2.16	**.001**	**.001**	.026	.309	**.000**	**.000**
BI	Primary School Teaching	3.95						
	Social Studies Teaching	3.86	.507					
	Science Teaching	3.98	.998	.269				
	Pre-school Teaching	3.82	.230	.998	.103			
	Primary Education Mathematics Teaching	3.52	**.000**	**.000**	**.000**	**.000**		
	Turkish Teaching	3.76	**.004**	.719	**.005**	.957	**.001**	
	English Teaching	4.11	.269	**.007**	.591	**.000**	**.000**	**.000**

communication and interaction, others argued that it may prevent socialization among students. Surely, ICT has both contributions and limitations depending on the method of use, like many educational tools. Consequently, while Clark (1983) has argued that media has no effect apart from the limited impact arising from its newness, Kozma (1994) reported that the use of media through effective methods may affect both learning and motivation.

5.2. Influential factor differences between preservice teachers in terms of gender, university, and department

The present study also investigated differences between the preservice teachers in terms of their intentions to use ICT in future lessons and influential factors according to gender, university, and department. It is possible that the largeness of the sample of the present study makes the research results more generalizable. Gender was seen to have no influence on the dependent variables, which is consistent with the results of some recent studies (Sang et al., 2010; Teo, 2008; Wong et al., 2013). University was also determined to have no influence on the dependent variables included in the study. Therefore, it is likely that similar trainings are provided on the use of ICT in Turkish faculties of education. The preservice teachers also exhibited similar levels of intention to use ICT in their future lessons, which may be because the participants were close in age and had similar experiences.

On the other hand, department did lead to a difference among the preservice teachers in terms of all variables except for SI. In terms of perceived usefulness, the preservice teachers studying primary mathematics were different from preservice teachers in all other departments except teaching Turkish. Similar problems making effective use of ICT were experienced by preservice teachers studying primary mathematics and Turkish. The literature has revealed that preservice mathematics teachers do not think there is a need to use ICT in lessons, as it only increases student amusement (Umay, 2004). In a study by Atli, Aksut, Atar, and Yildiz (2007), preservice Turkish language teachers stressed that using ICT in lessons is important, but educational websites do not support their subject. Lower perceptions regarding the usefulness of ICT

among preservice Turkish and primary mathematics teachers in comparison to preservice teachers from other departments may be attributed to their difficulty in finding effective and appropriate software.

Preservice teachers studying science and English were different from preservice teachers in all other departments in terms of PEUE, which is again consistent with the literature (Wong, Goh, Hanafi, & Osman, 2010). Preservice teachers studying English and science also demonstrated lower anxiety about using ICT in their lessons. This decreased anxiety may be because these students can access greater numbers of practical materials such as animations, videos, and pictures on the web, making ICT easier to use. What's more, Usta and Korkmaz (2010) reported that preservice teachers studying math or science (physics, biology, chemistry) have higher perceptions of technology and technological efficacy in comparison to those in non-math (verbal) departments. Though the findings of the present study are consistent with Usta and Korkmaz (2010) in terms of science, they are not consistent in terms of primary mathematics.

6. Conclusion and recommendations

This study revealed levels of factors influential on preservice teachers' intentions to use IT in future lessons. Even though the number of participants was statistically significant, the study was limited to 16 Turkish state universities out of 109. Gender and university were seen to have no influence on the variables. As to department, preservice teachers studying primary mathematics and Turkish had lower usefulness and ease-of-use perceptions regarding ICT in comparison to peers from other departments. Based on all these data, four recommendations are put forward:

- Platforms which allow teachers to share their materials inside and outside their institutions should be established considering social influence, which is one of the important factors influential on BI. The awareness of preservice teachers regarding these platforms should be raised, and they should be encouraged to create sample environments. As a matter of fact, the literature highlights the importance of sharing platforms for information management (Zhang, de Pablos, & Xu, 2014; Zhang, Vogel, & Zhou, 2012).
- The thought that lessons may not be finished on time causes anxiety among preservice teachers when considering the use of ICT. Thus, strategies focusing on the integration of ICT into lessons should be emphasized.
- One important point for the generalization of ICT use in lessons is the existence of support for teachers. Such people or units encourage teachers to use ICT in their lessons with decreased fear of making mistakes.
- The preservice teachers indicated that ICT in the classroom might be used for non-educational purposes. Technology control software may prevent students from using Internet resources for unapproved purposes, and awareness should be raised on this subject in faculties of education.
- The preservice teachers argued that IT could be used for purposes other than education. They can use appropriate technology filtering software in their future lessons in order to prevent students from using the Internet resources for non-educational purposes. The awareness of preservice teachers may be raised on this subject in faculties of education.
- Web-based systems such as Turnitin and iThenticate may be introduced to preservice teachers to prevent their students from plagiarizing assignments. In this way, possible acclimation problems to ready-made content resulting from the use of ICT may be eliminated.

Notes on contributor

This study was conducted as part of the “a model proposal to determine preservice teachers' intentions of classroom ICT use” doctoral thesis.

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