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Teachers' effect on ict use in education: the Turkey sample

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Abstract

This research aims to determine teachers' influence in the use of Information and Communication Technologies (ICT) at schools. Various variables are examined such as years of experience, gender, the duration of computer and Internet use, and to detemine the level of knowledge on and the frequency of ICT use among teachers. The study was conducted with 1540 primary school teachers using Knowledge, Use and Attitude Scales of ICT. The results show that the most commonly used and well-known ICT types among teachers are the Internet, e-mail and word processing, and teachers' attitudes towards computers and the Internet are generally positive. It was also found that their attitudes vary with their years of experience and levels of knowledge.

Keywords: Primary education, information and communication technology, teachers, attitudes, gender.

1. Introduction

Developments about and widesperad use of Communication and Information Techologies (ICT) influence all fields in life, one of which is education. Countries see ICT as potential tools for change and innovation in education (Eurydice, 2001; Papanastasiou & Angeli, 2008) and, thus, make investments in ICT. For instance, Turkey spent about $400 per person, and allocated 11.7% of its budget to ICT. However, this rate is lower than those of Europe and Central Asia, which allocate 22% of their budget to ICT, but higher than the rates in developing countries (World Bank, 2007). In other words, although a considerable quantitative increase has been be observed in personal computer and Internet use in Turkey, the rate still has not reached the rates in developing countries. Morever, according to a research carried out by the Turkish State Institute of Statistics (2008), while 3% of 21 million primay school graduates are Internet users, 69% of 3.5 million university graduates use Internet.

Turkish Ministery of National Education (MNE) make attempts to disseminate ICT at schools as other countries do to overcome educational problems and to enable innovation in education. According to the objectives of Lisbon Submit in 2002, European Union has been preparing to make a shift to information-based economy and community and to develop digital literarcy (Commission of European Communities, 2000). Therefore, the MNE attempts to set up computer labs and to provide Internet connection at schools. Statistically, the schools with Internet connection in 2005 rose from 40% (World Bank, 2007) to 68.1% in 2006 (SPO, 2008). In addition, by 2001, 67% of 520 thousand

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amounted to 604,000. Finally, in 2008, approximately 87% of 45,973 schools in formal education have Internet connection (MNE, 2008a, 2008b). Conclusively, it is aimed that %96 of students will have access to the Internet at schools in 2010 (SPO, 2006).

Both developed and developing countries adopted ICT investments in accordance with their policies in order to increase quality in education, to provide work power, and to educate individuals who have proficiency on ICT (Tondeur, van Braak & Valcke, 2007). While ICT investments for educational innovations and developments have an important potential, it is neglected that there are teachers who will use it in the classrooms as a part of the curriculum (Cohen & Ball, 1990; Vacc & Bright, 1999; Niederhauser & Stoddart, 2001). However, how these teachers perceive these reform efforts is closely related to certain variables such as belief and experience, level of knowledge, attitude toward ICT, educational applications, achievement expectations and learning-teaching approaches. (Schug, 1998; Smerdon, Cronen, Lanahan, Anderson, Iannotti & Angeles, 2000; Kozma, 2003; Lim & Khine, 2006; Thomas & Stratton, 2006). As a result, integrating ICT investments with school curricula requires that teachers' knowledge, level of use and attitudes towards those technologies are determined and guided.

1.1. ICT attitude and use

One of the factors that determine educational development and innovation in general is teachers as they are the ones to use the ICT investments for educational development. Technology does not have an educational value in itself. It becomes important when teachers use it in learning-teaching process. Although there are some who claim that the presence of technology in the classroom creates a pressure and requires effective use (Kozma, 2003), research results show that these are also related to teachers' attitudes and levels of knowledge (Pelgrum, 2001; Garland & Noyes, 2004; Torkzadeh, Chang & Demirhan, 2006; Lim & Khine, 2006; Zhang, 2007; Paraskeva, Bouta & Papagianni, 2008).

An individual's knowledge and experience affect his/her attitudes towards a particular object; besides, the individual's knowledge is also affected by attitudes (Freedman & Carlsmith, 1989). Therefore, there are certain factors that affect ICT use and individual's attitudes towards ICT. These factors could be listed as follows, in accordance with related research in the literature.

ICT attitudes, knowledge and use (Jeong & Lambert, 2002; Teo, Chai, Hug & Lee, 2008a; Aral, Bütün-Ayhan, Ünlü, Erdoğan & Unal, 2006; Aydın, 2007a), individual characteristics (gender, age, years of teaching experience) (Durndell, & Thomson, 1997; Hartley & Bendixen, 2001; Aydın, 2007b), self-efficacy (Karsten & Roth, 1998; Çelik & Bindak, 2005; Torkzadeh, Chang & Demirhan, 2006; Paraskeva, Bouta & Papagianni, 2008), anxiety (Igbaria, Parasuaman, & Baroudi, 1996; Hong & Koh, 2002), culture (Torkzadeh, Chang & Demirhan, 2006; Albirini, 2006; Li & Kirkup, 2007), beliefs (Lim & Chan, 2007; Teo, Chai, Hug & Lee, 2008a), experience of ICT use (Çelik & Bindak, 2005; Aral and et. al., 2006; Anderson, 2006; Bove´e, Voogt & Meelissen, 2007; İşman, Evirgen & Çengel, 2008; Paraskeva, Bouta & Papagianni, 2008), learning and teaching approach (Niederhauser & Storddart, 2007; Teo, Chai, Hug & Lee, 2008b), access to technology and attitudes (Hong & Koh, 2002).

Attitudes affect teachers' behaviours. Additionally, they have a considerable effect on openness to new experiences, as well as on reflecting and implementing change. Positive attitudes towards ICT, though too limited, support their use in classes. The effectiveness of ICT investments can be achieved with their effective application in the classroom as a part of the curriculum. By this way, learner-based learning environments can be created.

1.2. Study purpose

The literature suggests that the success of ICT integration in learning and teaching process depends partly on teachers' qualifications. In perspectives, the study aims to investigate the status of Turkey primary school teachers with regard to their levels of knowledge on and use of ICT, and their attitudes towards computers and the Internet. With those concerns in mind, the study examines the following research questions:

1. What are teachers' levels of knowledge on ICT?
2. What are the levels of ICT use in education among teachers?
3. What are their attitudes towards computers and the Internet?
4. What are the relationships between certain variables such as gender, teaching experience, Internet and computer use per hour each day, and the dependent variables highlighted above?

2. Method:

In the study, the data were collected from primary school teachers using a survey method with a scale consisting of five sections.

2.1. Participants

The data collection was limited to public primary school teachers in Turkey. In the academic year 2007-2008, the total number of public primary schools was 33,226 and the number of teachers was 422,264 in 81 provinces of Turkey (MNE, 2008b). In order to determine the provinces, the basic results on "development ranking of regions and provinces" prepared by Dincer, Özaslan, & Kavasoğlu (2003) were used. According to the results of their research, provinces were divided into five regions. In the study, 41 provinces were randomly selected from five regions. Two provinces from the most developed region (5 in total), 10 from the second most developed region (20 in total), 11 from the third most developed region (21 in total), 10 from the fourth most developed region (19 in total), 8 from the fifth most developed region (16 in total) were selected. The scale was administered to 1540 volunteer teachers who work in 330 schools with a computer lab in 41 provinces. Some part of the data was collected in the seminars and the rest by post and e-mail. 54.8% (844) of the participants is female and %45.2 (696) consists of male teachers.

The average number of years of experience in education was 6-10 years (in a range from 1-5 to 21 years and more). 83.7% (1289) of these teachers took a computer course previously. Classroom and branch teachers (all of whom work in primary schools) were included in this study: 676 classroom teachers and 864 branch teachers.

2.2. Instruments

2.2.1. Personal inquiry form

The personal background form used in the study was composed of five questions concerning teaching experience, gender, duration of daily Internet and computer use and previous participation in an ICT course.

2.2.2. Teachers' knowledge of ICT and frequency of ICT use

The second section of the questionnaire aimed to determine teachers' software knowledge and frequency of software use in education. The questionnaire used in the research was developed by Papanastasiou & Angeli (2008). The scale assessing teachers' ICT knowledge (ICT-K) consists of 14 items and is a 1-to-5 Likert-type scale (with response options as follows: I cannot use it, I can use it to a small extent, I can use it satisfactorily, I can use it well, I can use it very well) that assesses teachers' knowledge on various software. The questionnaire of frequency of ICT use in education (ICT-U) consists of 15 items. Teachers' response options in ICT-U are respectively "never, once or twice a semester, once or twice a month, once or twice a week, almost every day". The questionnaire was first translated from English to Turkish and the translation was scrutinized by 3 field and linguist experts in both Turkish and English version. After the pilot study, it was administered to 272 teachers from various fields working in public primary schools.

The responses were analyzed using the main components analysis, and then, varimax rotation method was applied. The values of KMO obtained in ICT-K and ICT-U were high (.801 and .863) and the results of Barlett test were significant ($p<0.000$), which indicated that the data were appropriate for the analysis. The results of varimax rotation method for ICT-K (14-items) revealed three factors (eigenvalue over 1.00). Papanastasiou & Angeli (2008) found the number of factors as two. The differences observed in the factor values are ascribed to the differences in information levels. The analysis produced three factors that explained 58.032% of the variance of these 14 items. The first factor that explained 31.306% of the variance is composed of 5 items (publishing software, webpage, authoring software, programming languages, modeling software microworlds/simulations), the second factor that explained 16.522% of variance is composed of 5 items (word processing, Internet, email, graphics, presentation software) and third factor that explained 10.204% of variance is composed of 4 items (databases, spreadsheets, multimedia authoring software, concept mapping).

The results of varimax rotation method for ICT-U revealed two factors that explained 60.21% of the variance of these 15 items. The factor number and the items of each factor were the same as calculated by Papanastasiou & Angeli (2008). Cronbach's reliability coefficient for ICT-K and ICT-U was found to be 0.826 and 0.881 when it was applied to 272 teachers from various fields working in public primary schools.

2.2.3. Computer and Internet attitude scale

The computer attitude scale (CAS) used in the scale was developed by Papanastasiou & Angeli (2008). Internet attitude scale (IAS) was developed by the researcher. The scales aim to assess teachers' beliefs about computers and Internet's value in educational use. The two scales were 1-to-5 Likert-type scales (from 5= completely agree to 1= completely disagree). CAS consists of 15 items developed by Papanastasiou & Angeli (2008). The scale was translated into Turkish. The translation was scrutinized by field and linguist experts in both Turkish and English version. Next, the Internet attitude scale was prepared which consists of 23 items. Subsequently, the two scales were pilot-tested to be administered to 272 teachers from various fields working in public primary schools.

After the pilot study, Kaiser–Meyer–Olkin (KMO) coefficients on computer and Internet attitude scales were .814 and .875, and a Barlett Sphericity test value for the two scales was found to be significant ($p<0.000$). The results of varimax rotation method for CAS revealed two factors that explained 56.946% of the variance of these 15 items. The factor numbers were the same as calculated by Papanastasiou & Angeli (2008); however, item numbers in each factor were found to be different. The first factor that explained 30.96% of the variance is composed of 7 items, and the second factor explaining 25.98% of variance is composed of 8 items. The alpha reliability coefficient of the CAS was calculated as 0.91. The Cronbach coefficient of sub-scales was 0.92 and .93.

The results of varimax rotation method for IAS revealed three factors that explained 72.21% of the variance for these 23 items. The first factor consisting of nine items explained 30.90% of variance, the second consisting of eight items explained 24.19% of variance, and the third consisting of six items explained 17.12% of variance. The analysis of subscales reveals first factor as "opportunities of Internet" (O); the second as the change in education (CE); and the third as the effects of daily life (EDL) (Appendix 1).

The reliability of IAS and all other subscales was measured by the Cronbach coefficient. The Cronbach coefficient for the 23 items was 0.86. The Cronbach coefficient of subscales is as follows: first factor 0.93; second factor, 0.94; third factor, 0.94.

3. Results

3.1. Demographic variables

The data based on teachers' demographic variables showed that 83.7% (1289) of the respondents had previously received a computer course. Distribution of teaching experience was 1-5 years for 32%, 6-10 years for 25.4%, 11-20 years for 22%, and 21 years and more for 20.6%. The daily computer usage of teachers was almost never for 9.7%, 1-2 hours for 66%, 3-4 hours for 18%, 5-7 hours for 3.7%, and 8-10 hours for 6.2%. Computer use ranged from 0 to 10 hours daily (M=.2.23, SD=.77). The daily Internet usage of teachers was almost never for 11.6%, 1-2 hours for 69.6%, 3-4 hours for 13.6%, and 5-7 hours for 5.2%. The rate of teachers with personal computers was 89.2% (1373) and the rate of access to the Internet at home was 77.4% (1192). Locations of Internet access for teachers were home for 45.5%, school for 21.2%, both for 19.9%, Internet cafe for 8.7%, and other for 4.7%.

3.2. Teachers' levels of knowledge on ICT

Information levels about ICT among teachers were rated through responses including 14 statements from 1 to 5 (from 1 representing "I cannot use" to 5 representing "I can use it very well"). Scores ranged from 14 to 70. Mean levels of teachers' knowledge about ICT are given in Table 1.

Table 1: Teachers' knowledge of ICT use in education

Items	I cannot use it	I can use it to a small extent	I can use it satisfactorily	I can use it well	I can use it very well	M	SD
Word processing (e.g., Word)*	2.9	9.3	15	50.6	22.3	3,80	,98
Databases (e.g., Access)	37.1	20.9	22.8	15.5	3.7	2.28	1.21
Spreadsheets (e.g., Excel)*	12.5	22.4	24.4	30.4	10.4	3.04	1.20
Graphics *	13.2	18.5	24.5	31.2	12.5	3.11	1.23
Multimedia authoring software	56.1	18.2	13.9	9.7	2.1	1.83	1.11
Presentation software*	13.1	18.8	20.7	30.0	17.4	3.20	1.29
Concept mapping	41.6	21.2	18.5	15.2	3.5	2.18	1.22
Internet*	1.2	4.9	11.3	49.6	33	4.08	.86
E-mail*	8.8	7.5	12.7	42.2	28.9	3.75	1.21
Publishing software	54.8	14.5	15.5	9.9	5.3	1.96	1.25
Webpage authoring software	59.7	15.4	12.2	8.2	4.4	1.82	1.19
Programming languages	72.1	11.9	9.0	5.1	1.9	1.53	.98
Modeling software	80.4	10	5.8	3.2	6	1.34	.78
Microworlds/Simulations	81.7	8.8	5.9	2.9	0.6	1.32	.77

* = indicates a high level of ICT knowledge

According to teachers' responses, the most widely used ICT type is the Internet (M= 4.08, SD= .86), which is followed by "word processing" (M=3.80, SD=.98). The least widely used ICT types are "microworlds/simulations" (M= 1.32, SD= .77) and "modeling software" (M= 1.34, SD= .78). The mean scores of the responses in relation to 14 items are close to having little information (M= 2.51, SD= .96). The results indicate that teachers had a high level of knowledge about six of ICT softwares while they had low levels of information on most of the softwares.

3.3. Frequency of ICT use in education

Teachers' responses on the use of ICT in education were scored from 1 to 5. (1= "I cannot use it" to 5= "Almost everyday") to expose an overall picture of computer "scores". The results are shown in Table 2.

Table 2: The means and distribution of the frequency of ICT use among teachers

Items	Never	Once or twice a semester	Once or twice a month	Once or twice a week	Almost every day	M	SD
Play games (e.g., Solitaire)	31.3	25.6	18.8	19.3	5.5	2.42	1.26
Make presentations (e.g., PowerPoint)	15.8	40.5	28.1	14.4	1.2	2.45	.96
Process texts (e.g., Word) *	3.5	15.3	24.3	35.6	21.3	3.56	1.11
Publish materials (e.g., Publisher)	70.3	18.6	6.0	3.8	1.2	1.47	.86
Prepare spreadsheets (e.g., Excel)	61.4	19.5	11.2	6.0	1.9	1.68	1.01
Create graphics (e.g., Paint)	27.8	36.8	20.8	11.0	3.6	2.26	1.09
Communicate (e.g., e-mail)*	6..9	11.1	15.8	31.2	34.9	3.76	1.23
Access the Internet*	3.1	5..3	7.0	28.1	56.5	4.29	1.02
Develop web pages (e.g., FrontPage)	69.7	16.5	6.4	4.4	3.0	1.55	1.00
Develop multimedia (e.g., HyperStudio)	71.8	17.0	6.5	3.6	1.1	1.45	.85
Author microworlds/simulations	75.3	16.0	5.6	2.5	.5	1.37	.75
Map concepts (e.g., Kidspiration, Inspiration)	62.5	25.5	8.4	3.3	.5	1.54	.82
Model complex systems (e.g., Model-It, Stella)	83.6	11.0	3.3	1.6	.5	1.25	.64
Program the computer (e.g., Logo, C)	81.4	10.8	3.8	3.0	.9	1.31	.76
Use educational CDs*	16.8	29.4	25.4	21.0	7..5	2.73	1.18

*= frequency of ICT use is at a high level

The results show that the most widely used ICT type was the Internet (M= 4.29, SD= 1.02), which was followed by communication (M= 3.76, SD=1.23) and processing text (M= 3.56, SD= 1.11), modelling complex systems (M= 1.25, SD= .64), programming the computer (M= 1.31, SD= .76) and authoring micro-worlds/simulations (M= 1.37, SD= .75). The software types frequently used by teachers are the Internet, communication, processing texts, and using educational CDs. Other ones are less frequently used.

3.4. Teachers' attitude towards computers

Each item was rated from 1 to 5 (1=completely disagree to 5= completely agree) (including positive and negative attitude items) to create overall scores (minimum 15, maximum 75). The results showed that scores ranged from 30 to 75 and the mean score was 56.97 (SD= 7.12). Teachers' attitudes towards computers were positive and at moderate levels. That is, the mean teacher attitude score is above 52.5.

3.5. Teachers' attitudes towards the Internet

Teachers' attitudes towards the Internet were assessed by an attitude scale made up of 23 positive and negative items rated 1-5 (1=completely disagree to 5= completely agree). Scores ranged from 52 to 115 and the mean was 83.87 (SD=9.30). Considering the attitude scores are 23 at the minimum and 115 at the maximum, teachers' average attitude scores are above medium level. In terms of sub-dimensions, in the "opportunities of Internet" sub-dimension in particular (minimum 12, maximum 45), the mean score was 31.64 (SD=4.33), while in the CE (minimum 8, maximum 38) the mean score was 26.79 (SD=3.34), and in the EDL sub-dimension (minimum 9, maximum 30) it was 22.71 (SD=2.69).

3.6. Gender and ICT

The results showed that there were differences between male and female teachers in terms of their overall scores on the frequency of ICT use ($t=7.617$, $p<0.01$), knowledge of ICT ($t=3.990$, $p<0.01$) and overall Internet attitude ($t=2.733$, $p<0.01$) sub-scales in favor of males. However, there were no differences between male and female teachers in terms of their attitudes toward computers, a finding which is in contrast to most studies on this subject ($t=1.079$, $p=.281$).

3.7. Teaching experience and ICT

ANOVA was used to find out whether the teachers' knowledge of ICT use, frequency of ICT use, computer and Internet attitudes varied with teaching experience and previous participation in a computer course. The results showed that there was a statically significant difference in all dependent variables. Tukey test was conducted so as to determine in which variable the difference was observed. According to the results of the analysis, information levels of teachers differ in accordance with their professional experience ($F_{(3-1536)}= 82.321$, $p<0.01$), frequency of ICT use ($F_{(3-1536)}= 41.868$, $p<0.01$), computer attitudes ($F_{(3-1536)}= 18.332$, $p<0.01$), and overall Internet attitudes ($F_{(3-1536)}= 8.507$, $p<0.01$). The difference is in the range of 11-20 and 21 and more years. Internet attitudes differ in only 1-5 years. Furthermore, it was found that there exists a significant difference with regard to previous participation in a computer course and information level on ICT ($t=7.555$), ($t=4.373$), ($p<.001$).

3.8. Examination of Relationships (ICT use, frequency of ICT use and attitudes towards computers and the Internet)

Spearman's Rank Order Correlation analyses were conducted to examine possible relationships between the overall computer and Internet attitudes, knowledge of ICT use, frequency of ICT use, as well as the relationship between each of these and the variables used in the study. The results are shown in Table 3.

Table 3: Spearman's Rank Order correlation coefficients between certain variables

	Computer attitude	Internet attitude	Knowledge of ICT use	Frequency of ICT use
Internet attitude	.334**			
Knowledge of ICT use	.323**	.215**		
Frequency of ICT use	.315**	.232**	.703**	
Computer use daily per hour	.254**	.174**	.314**	.353*
Internet access daily per hour	.246**	.161**	.272**	.301*

** = correlation is significant at the 0.01 level (two-tailed).

The data showed that there was a significant relationship between computer and Internet attitudes, knowledge of ICT use, frequency of ICT use, and duration of computer and Internet access in hours.

4. Conclusion and Discussion

The findings of the study can be summarized under six headings, which are the levels of knowledge on and the use of ICT, independent variables related to knowledge and use of ICT, attitudes towards the Internet and computers, the correlation between attitudes and independent variables.

The first shows that teachers' ability in ICT and their ICT use in learning-teaching process are fairly low. The most common uses of ICT are the Internet, e-mail, word processing and educational CDs, though rarely used. The results seem similar to the results of previous research (Schug, 1998; Garland & Noyes 2004; Thomas & Stratton, 2006; Alghazo, 2006; Tondeur, van Braak & Valcke, 2007). The study also revealed that ICT use in classroom is limited, a finding which is attributed to the level of experience; and the most commonly used ICT types were determined as the Internet, e-mail, word processing, and educational CDs. The second finding demonstrates that teachers' level of knowledge of ICT is low, too. According to the results of the study, most teachers know how to use the Internet, email, word processing, graphics and presentation software. The low levels of knowledge on ICT might result from the fact that these technologies require technical knowledge. In relation to these results, another finding is that there is a significant correlation between the levels of knowledge about ICT and the use of ICT in education. This is an important finding as it shows that the higher the level of knowledge on ICT, the higher its level of use in education Another finding supporting this result is the significant differences observed between teachers in terms of their previous participation in a computer course. As demonstrated by Anderson (2006), Bove´e, Voogt & Meelissen (2007), İşman, Evirgen & Çengel (2008), Paraskeva, Bouta & Papagianni (2008) in their research on ICT, the higher the mean level of knowledge, the more the ICT use. Teachers with previous computer experience have higher levels of knowledge on ICT and their ICT use is more frequent. Teacher's levels of ICT use show that they use these technologies as information transmission-based tools. How teachers use ICT in teaching-learning process is affected by their teaching approaches, which is also supported by findings of study (Alghazo, 2006; Niederhauser & Storddart, 2007; Teo, Chai, Hug & Lee, 2008b).

The third finding is related to attitudes. It shows that teachers' attitudes towards both the Internet and computers are at a medium level. However, their levels of attitude towards computers are lower than those towards the Internet. The findings of this research confirm those of Hong & Koh (2002), Paraskeva, Bouta & Papagianni (2008), Garland, & Noyes, (2004), Aral et al., (2006); Torkzadeh, Chang, & Demirhan (2006), Albirini (2006) on computers and the Internet. These researches concluded that teachers had positive attitudes.

The fourth finding concerns the gender variable. In the comparisons in terms of gender, ICT knowledge, their use in education and attitudes towards the Internet show statistical differences. Male teachers had higher scores than female teachers in terms of knowledge and usage. They had more positive attitudes than female teachers did. On the other hand, in terms of attitudes towards computers, there exist no significant statistical differences. There are similar findings revealed in the literature by Garland & Noyes (2004), Çelik & Bindak (2005), and Hong & Koh (2002). In these researches, gender was found to be a significant variable itself but rather it can be assumed to be shaped by experience, as well as cultural and educational objectives.

The fifth finding involves teachers' experience. Teachers' knowledge of ICT and levels of use and attitudes towards the Internet and Computers show the same difference according to years of experience. The less the years of experience, the higher their knowledge and ICT use. In addition, they have more positive attitudes, a finding which is, in fact, not suprising. In the framework of Lisbon Submit of 2002, the studies conducted at schools to disseminate ICT use and the growing of these youth with these technologies may be effective factors. Furthermore, openness of the youth to innovations may be another factor. The research conducted by the National Center for Educational Statistics (2006) indicated that teachers with less years of experience use ICT more for educational purposes. However, in the research conducted by Niederhauser & Stoddart (2001), no differences could be found.

The last finding of the research is the positive correlation between teachers' experience and knowledge of ICT, computer and Internet attitudes. These findings reveal that the more the teachers' level of knowledge, the more their positive attitudes. Furthermore, as the duration of Internet and computer use increases, experiences and attitudes toward ICT also improve. These results are similar to those of Garland & Noyes (2004), Alghazo (2006), Torkzadeh, Chang & Demirhan (2006), Paraskeva, Bouta & Papagianni (2008).

Teachers' knowledge on how to use these technologies in the learning-teaching process has an important effect on using them effectively. Attitudes have also important effects on teachers' use of these technologies. Given that

those with less years of experience had higher levels of knowledge and more positive attitudes, as ICT experience increases, their attitudes also improve, which is a very important result as it shows that teacher training will be a significant factor in the the effective use of ICT in learning-teaching process. Although most of the teachers received computer courses, it is difficult to say that they are good enough to use ICT. Despite the opportunities offered by these technologies, teachers use these for informational purposes. This is too far from forming a learner-based learning environment.

In educational systems, the decision-makers and practicians should have enough knowledge on whether the investments for the integration of ICT in curricula reach its aims. The investments can be directed according to teachers' level of knowledge, how they use it in learning-teaching process, as well as their attitudes. As it is teachers who will use these technologies in the classroom to integrate them into the curricula, educating teachers will become a more important issue.

Furthermore, research acitivities could examine the impact of variables such as teachers' educational approaches and levels of ICT use, their self-efficacy about ICT, objectives of ICT use, objectives of using ICT and success expectations, cultural effect in ICT Internet and computer use. In addition, comparative studies could be conducted to examine that how the way teachers use ICT affects students' success.

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Appendix 1: Internet attitude scale (factor numbers and eigenvalues):

Items	Factoactor 1	Factor 2	Factor 3
Internet			
18. offers new opportunities like distance learning	.897		
15. helps me get rid of boredom by performing varrious activites	.897		
14. helps me improve mself by learning new things	.887		
22. supports perspective development	.879		
9. relaxes students	.875		
5. makes access to information easier	.779		
16. irritates me due to wrong information	.740		
13. keeps me and my students away from bad habits	.726		
12. makes finding friends easier	.687		
21. supports development in education		.888	
19. helps me learn about different cultures		.876	
10. improves curiosity		.857	
7. its use causes problems		.828	
20. enables equality in education		.820	
4. drives students toward laziness		.799	
23. causes estrangement of students to their values.		.764	
8. reduces the time allocated to learning		.746	
2. helps me with my job			.951
3. gives me the opportunity to follow daily events			.950
1. makes life easier			.940
11. it excites me to reach the world from home and school			.900
17. leads to addiction			.786
6. causes estrangement to ourselves			.735