A CROSS-CULTURAL STUDY OF ICT COMPETENCY, ATTITUDE AND SATISFACTION OF TURKISH, POLISH AND CZECH UNIVERSITY STUDENTS

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ABSTRACT
Due to various factors, countries begin to have different levels of information and communication technologies (ICT) and they have their own unique culture of ICT usage. This case appears interesting especially when we consider university students' proficiency, attitudes and satisfaction in use of ICT.

The purpose of this study is to examine the similarities and differences of university students in Turkey, EU candidate, and in Poland and Czech Republic, new members of EU, in terms of their proficiency, attitudes and satisfaction in use of ICT.

The data of this study, composed of open-and closed-ended questions, were collected from students studying at departments of social and computational sciences. Statistical analyses of data collected were performed by SPSS 17, statistical package program.

Results showed that a) despite the fact that Turkish students use computer for a shorter time than Polish and Czech students, there is no statistically significant difference between them, b) in terms of attitudes toward computer and their satisfaction, there is no difference between students studying at social departments whereas there is a statistically significant difference between students studying at departments of computational sciences.
Keywords: ICT competency, ICT attitudes, ICT satisfaction, ICT literacy

INTRODUCTION
One of the basic roles of education is to prepare students to information society. This preparation is the most important source of future economic and social development (Hakkarainen et al., 2000). Some instructors argue that learning can be developed and students can be effectively prepared to business areas by integrating technologies and learning processes (Butzin, 2000; Reiser, 2001, Hopson, Simms, & Knezek, 2002).

Nowadays, rapidly increased information has created some important cultural riches in society. Learning and the way how to learn information literacy take an important place in the realization of this richness (Durmus & Kaya, 2010). Reaching information and increasing information literacy are directly related to ICT use, in other words, ICT literacy (ICTL). Although not theoretically clear, researchers and instructors have different descriptions of ICTL and competency which are considered by governments in recent years as an important factor in economic growth and development (Ololube, 2006; Luu & Freeman, 2011). Educational Testing Service (2002) defines ICTL as the ability to use digital technology, communication tools and also the ability to use technology as a tool to research, organize, evaluate, and communicate information. For Katz et al. (2004), ICTL is the ability to use technology as a tool to research, organize, and communicate. Drenoyianni (2004) argue that ICTL is more than the ability to operate a computer system and that ICT literate has to reach, organize and evaluate information.

Despite ICT is considered nowadays as consisting of computer and internet use, ICTL and computer literacy (CL) are two different concepts. Because CL measures skills of computer use whereas ICTL deals with the way how individual reaches information using tools such as computer and internet.

In early years, CL was specifically defined as programming or reprogramming but with newly developed technologies. This definition has to be revised. Even though CL is briefly described as the ability to use computer (Korkmaz & Mahiroğlu, 2009), other definitions exist as well in literature such as "the ability to control computer and programs in order to attain some goals"; "the ability to use computer for information retrieval, communication and problem solving" (Akkoyunlu, 1996). A good computer literate is expected to turn on computer, to know logic of computer work, its components and how to effectively use computer programs in order to reach information (Walsh, 2007). CL is not considered as a unique domain but divided into sub-domains

such as basic computer literacy, programming literacy. Taking into account these definitions, CL can be defined as the ability to do operations relevant to his/her purpose.

In literature, there are several studies researching ICTL and CL. One of these most important and detailed studies is PISA studies, a set of research by OECD (2005, 2006, 2007, 2009). In these studies whose data were collected from developed and developing countries, both national and transnational ICT use was examined, but these studies do not seem to have data regarding students' self-efficacy, attitudes or satisfaction in ICT and computer.

Germany, Poland, Netherlands and Czech Republic are countries having most student exchange programs with Turkey. Among these countries, Poland and Czech Republic, two developing countries like Turkey, are more relevant to conduct a comparative study concerning ICT. Below are presented ICT situations in two countries.

With the reform of the Polish national education system in the school year 1999-2000, ICT has been integrated into almost all school subjects and students began to be prepared to use computers and software in other subjects during separate ICT lessons. Thanks to this reform, ICTL and CL have increased compared to the year 2000 (Gurbiel, Hardt-Olejniczak, Kolczyk, Krupicka, & Syslo, 2005).

As in Poland, some arrangements have also been realized in Czech educational system to become an EU member, special importance has been given to ICT lessons at schools. But ICTL and CL levels did not differ from the previous level as did in Poland.

In Turkey, studies concerning the integration of computer courses in the curriculum began on 1984 but the integration of computer courses in the curriculum from primary school could not be possible until the year 2000 (Er & Güven, 2008). Many studies conducted in Turkey indicated that students had medium or low levels of ICTL and CL (Korkmaz & Mahiroğlu, 2009; Dinçer, 2011). Results also showed that students had low levels of CL due to their lack of personal computers and dissatisfaction about their courses (Dinçer, 2011).

Finally, as a research question, we wished to examine similarities and differences between students in EU candidate Turkey and new EU members Poland and Czech Republic in terms of ICT competency, attitude and satisfaction.

2. METHOD
2.1. Participants
440 students studying at universities in Turkey, Poland and Czech Republic participated in this study. Students continuing their education at departments of computational sciences in Turkey were compared with students at same departments in Czech Republic; students studying at departments of social sciences in Turkey were compared with students at same departments in Poland. Descriptive statistics related to participating students were given in Table 1.

Table 1 Descriptive statistics of students

	Turkey's Social Students	Poland's Social Students	Turkey's Science Students	Czech's Science Students
Male	32 (7.27%)	30 (6.82 %)	46 (10.45 %)	43 (9.77 %)
Female	113 (25.69 %)	115 (26.14%)	29 (6.59 %)	32 (7.27 %)
Total	145 (32.96 %)	145(32.96 %)	75 (17.04 %)	75 (17.04 %)

2.2. Data Collection and Analysis Procedures
The data of this study were collected from a survey which consists of four parts with open-and closed-ended questions. The first part elicits demographic data; the second part concerns computer and Internet use; the third part examines attitudes toward computers and the final part concerns computer competency.

The survey was administered to volunteer students in Turkey, Poland and Czech Republic during spring semester of the academic year 2010-2011. It was carried out in participants' native language and then was translated into English by translators. Independent-samples t-test and Pearson product-moment correlations were performed using SPSS 17 software, statistical package program.

The computer and Internet use variables were chosen from students survey which encompassed satisfaction (1 = satisfaction, 2 = dissatisfaction); computer ownership (1 = yes, 2 = no); students' experiences with computer and Internet (ranging from 1= "less than one year" to 4= "five years or more") and students frequency of computer and Internet use (ranging from 1 = "almost never" to 5 = "four or more hours a day"). Data concerning students' attitudes toward computers were acquired from attitudes toward computers section in the survey (ranging from 1= "strongly disagree" to 4= "strongly agree"). Computer competency data were gathered from the section "computer competency" in the survey (1= "I don't know what this means"; 2= "I know what this means but I cannot do it"; 3=" I can do this with help from someone"; 4=" I can do this very well by myself"). Other data were collected by open-ended questions.

3. RESULTS
Findings of this study showed that all students studying at departments of social sciences both in Turkey and Poland had informatics courses containing only basic computer topics while a great majority of students studying at departments of computational sciences in Turkey and Czech Republic, besides informatics courses, had other courses such as database, computer hardware, programming, operating system and graphic design.

Students were asked if they have a personal computer and if they are satisfied with computer-related course(s) taken in the university, if not, for what reasons they are dissatisfied. They were also asked how long they have been using computer and Internet, how much time they spend using computer and Internet and for what purposes they use computer and Internet. They were asked about their attitudes toward computers and their computer competency too. An independent-samples t-test was performed to determine if there were statistically significant differences between students. Results are given in Table 2 below.

Table 2 Differences in students' ICT use, competency, attitude and satisfaction

	Social Students								Science Students							
	TURKEY			POLAND			Difference		TURKEY			CZECH			Difference	
	N	M	SD	N	M	SD	t	p	N	M	SD	N	M	SD	t	p
Lesson Satisfied	129	1.29	0.46	111	1.16	0.37	2.43	0.16	74	1.35	0.48	68	1.07	0.26	4.22	0.00
Reason of Dissatisfied	32	4.93	1.52	17	2.18	1.01	6.71	0.00	22	3.27	1.03	3	4	1.73	-1.06	0.30
Computer Ownership	145	0.77	0.43	145	0.99	0.08	-6.32	0.00	75	0.99	1.12	75	0.96	1.97	1.01	0.31
Computer Experience Period (year)	145	3.03	1.05	145	3.85	0.57	-8.29	0.00	75	3.49	0.70	75	3.84	0.55	-3.37	0.00
Internet Experience Period (year)	145	2.88	0.99	145	3.86	0.57	-5.98	0.00	75	3.35	0.72	75	3.84	0.53	-4.78	0.00
Computer & Internet Use (hours/week)	145	10.75	5.79	145	14.74	5.62	-5.95	0.00	75	19.01	8.08	75	26.68	7.45	-6.04	0.00
Purpose of Computer & Internet	145	5.78	1.71	145	6.53	1.43	-4.06	0.00	75	6.45	1.73	75	6.31	1.95	0.49	0.63
Computer Attitude	145	2.23	0.62	145	2.13	0.60	1.34	0.18	75	2.60	0.57	75	2.39	0.54	2.35	0.02
Computer Competency	145	3.33	0.39	145	3.42	0.49	-1.69	0.09	75	3.67	0.29	75	3.59	4.43	1.49	0.14

As we see in the table, Turkish (M=1.29, SD=0.46) and Polish (M=1.16, SD=0.37) students studying at departments of social sciences were satisfied with computer-related courses and there was no statistically significant difference between them regarding satisfaction (t (238) = 2.43, p = 0.16). Turkish (M=1.35, SD=0.48) and Czech (M=1.07, SD=0.26) students studying at departments of computational sciences were satisfied with computer-related courses but there was statistically significant difference between them concerning satisfaction (t (140) = 4.22, p = 0.00, $p < 0.05$).

When students dissatisfied with computer-related courses were asked for what reasons they are not satisfied, a statistically significant difference was found in Turkish and Polish students' reasons for their dissatisfaction (t (47) = 6.71, p = 0.00, p <0.05). However, no statistically significant difference was observed in Turkish and Czech students' reasons for their dissatisfaction (t (23) = -1.06, p = 0.30). While 52.60 % of Turkish students

studying at departments of social sciences and being dissatisfied with computer-related courses, told as reasons of their dissatisfaction some hardware problems they confronted in laboratories (computers not working, old hardware, etc.), 38.88 % of Polish students said that they were not satisfied with computer-related courses due to little information. Of all Turkish students studying at departments of computational sciences and being dissatisfied with computer-related courses, 34.63 % showed teachers as reason of this dissatisfaction while little information and newer use are two other factors of dissatisfaction (23.08 % for each). As to Czech students, % 40 of them thinks that little information is the main reason of their dissatisfaction.

When we look at the fact that students participating in this study have or not have personal computers, a statistically significant difference was found between Turkish and Polish students studying at departments of social sciences (t (288) = -6.32, p = 0.00, p < 0.05), but no significant difference was observed between students studying at departments of computational sciences (t (148) = 1.01, p = 0.31). Almost all Polish students (M=0.99, SD=0.08) have a personal computer whereas only three fourths of Turkish students (M=0.77, SD=0.43) have personal computers, which may explain the reason of this difference. Almost all Turkish (M=0.99, SD=1.12) and Czech (M=0.96, SD=1.97) students studying at departments of computational sciences have at least one personal computer.

Findings related to computer experience period showed that there were statistically significant differences both between Turkish and Polish students studying at departments of social sciences (t (288) = -8.29, p = 0.00, p < 0.05) and Turkish and Czech students studying at departments of computational sciences (t (148) = -3.37, p = 0.00, p < 0.05). When we think about the reasons of these differences, we found that Polish students studying at departments of social sciences (M=3.85, SD=0.57) use computers for a longer time than Turkish students (M=3.03, SD=1.05); Czech students (M=3.84, SD=0.55) studying at departments of computational sciences use computers for a longer time than Turkish students (M=3.49, SD=0.70).

Findings regarding Internet experience period indicated statistically significant differences both between Turkish and Polish students studying at departments of social sciences (t (288) = -5.98, p = 0.00, p < 0.05) and Turkish and Czech students studying at departments of computational sciences (t (148) = -4.78, p = 0.00, p < 0.05). When we reflect on the reasons of these differences, we see that Polish students studying at departments of social sciences (M=3.86, SD=0.57) use Internet for a longer time than Turkish students (M=2.88, SD=0.99); Czech students (M=3.84, SD=0.53) studying at departments of computational sciences use Internet for a longer time than Turkish students (M=3.35, SD=0.72).

Findings with respect to weekly computer and Internet use also revealed statistically significant differences both between Turkish and Polish students studying at departments of social sciences (t (288) = -5.95, p = 0.00, p < 0.05) and Turkish and Czech students studying at departments of computational sciences (t (148) = -6.04, p = 0.00, p < 0.05). When we consider the reasons of these differences, we observe that Polish students studying at departments of social sciences (M=14.74, SD=5.62) use computer and Internet for a longer time than Turkish students (M=10.75, SD=5.79); Czech students (M=26.68, SD=7.45) studying at departments of computational sciences use computer and Internet for a longer time than Turkish students (M=19.01, SD=8.08).

Concerning for what purposes students participating in this study use computer and Internet, a statistically significant difference was noted between Turkish and Polish students studying at departments of social sciences (t (288) = -4.06, p = 0.00, p < 0.05) but no significant difference was observed between students studying at departments of computational sciences (t (148) = 0.49, p = 0.63). 36.60 % of Turkish students stated that they use computer and Internet for academic purposes and 27.60 % for social websites. 36.60 % of Polish students explained that they use computer and Internet for social websites and 27.60 % for surfing on diverse websites. A clear majority of Turkish and Czech students studying at departments of computational sciences (about % 58) use computer and Internet for surfing social and diverse websites.

Findings about students' attitudes toward computers showed that no statistically significant difference was found between Turkish and Polish students studying at departments of social sciences (t (288) = 1.34, p = 0.18) but a significant difference was detected between students studying at departments of computational sciences (t (148) = 2.35, p = 0.02). Results also indicated that Turkish students (M=2.60, SD=0.57) at departments of computational sciences had higher attitudes toward computer than Czech students (M=2.39, SD=0.54). Concerning Turkish (M=2.23, SD=0.62) and Polish (M=2.13, SD=0.60) students studying at departments of social sciences, we found that they have computer attitudes at medium level.

When we analyze CL of students participating in this study, we found no statistically significant differences between students studying at departments of both social (t (288) = -1.69, p = 0.09) and computational (t (148) =

1.49, *p* = 0.14) sciences. This may be explained by the fact that a great majority of students (% 89.01) had high level of CL.

The Pearson product-moment correlations test was performed to determine if there was a connection between CL levels and personal computer ownership. Results indicated that there was a positive but low relation between CL levels and personal computer ownership (r (438) =0.26, $p < 0.01$).
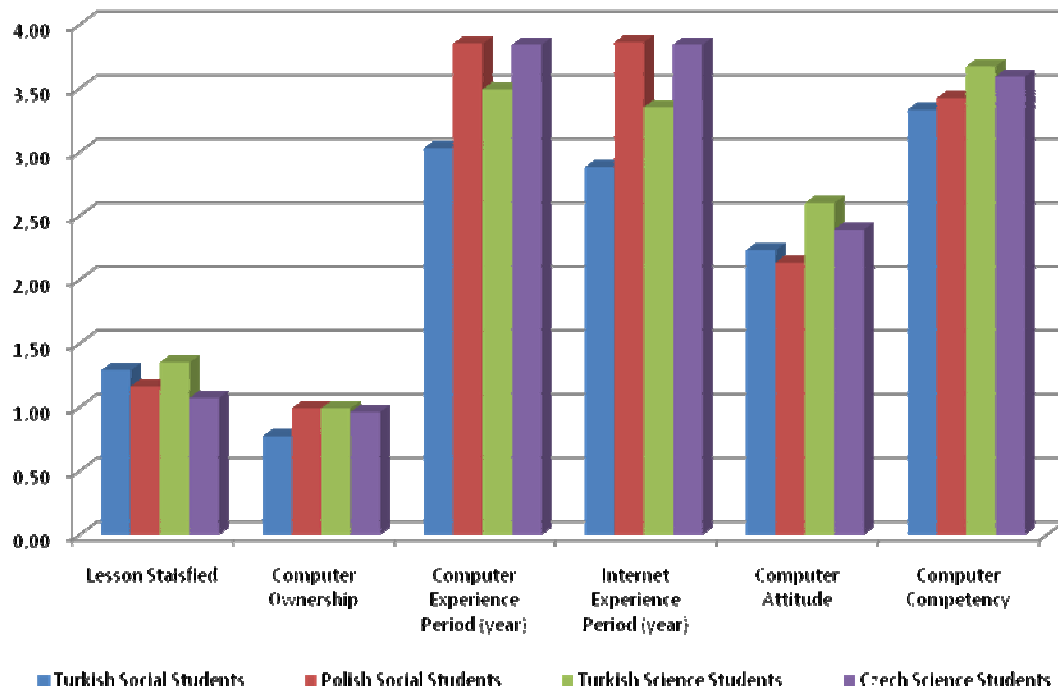

Figure 1 Status in students' ICT use, competency, attitude and satisfaction
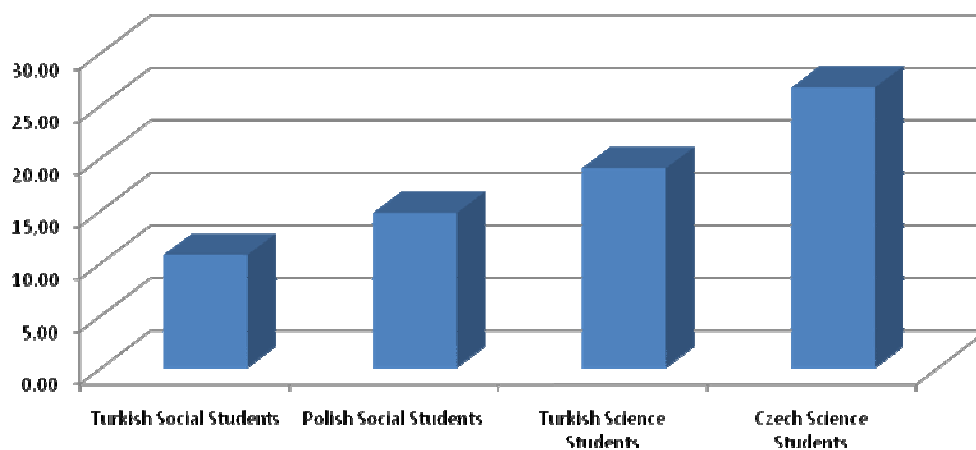

Figure 2 Status in students' Computer & Internet Use (hours/week)

4. DISCUSSION AND CONCLUSION

CL levels have increased in parallel with rapidly developing technology (Varol, 2002; Geçer & Dağ, 2010). Correspondingly, societies with high information literacy levels become stronger than other countries in economic, political and scientific fields (Kaya, 1995; Çakmak, 2008). In developed and developing countries, we

observe many studies being carried out to enhance information literacy. Generally, the most of these studies aim at increasing ICTL with basic computer courses at educational institutions.

Today, because accessing to electronic information became widespread and local libraries have been replaced by Internet, ICT use was identified with computer and Internet use; ICTL and CL have a linear relationship (Zhang & Espinoza, 1998; Gross & Latham, 2007). Therefore, to comment ICT use competency, attitudes and satisfaction regarding computers, we think it is a good starting point to study computer competency, attitudes and satisfaction about computers.

Although a great majority of students participating in this study indicated that they were satisfied with computer-related courses taken in the university, 16.82 % of them expressed their dissatisfaction. As reasons of their dissatisfaction, Turkish students highlighted computers not working in laboratories, unskilled teachers and some programs they have to take in the curriculum and they will never need in real life while Polish and Czech students said that they were not satisfied with computer courses due to insufficiency of information about computer subjects. As we examined dissatisfaction reasons in Turkish students within hardware problems, we observed computer maintenance problems at universities and increased number of students per computer. We also found out that in basic computer courses, they received standard course content and that, in addition to basic computer courses, they asked for a computer course with contents peculiar to their professional fields (Dinçer, 2011).

Since the cost of information and communication technology has declined, computer and Internet access has become common. It is not wrong to say that students using ICT at home have more ICT experiences (Luu & Freeman, 2011). We believe that this affirmation is verified by the fact that a great majority of students participating in this study had personal computers and that they had a high level of computer competency, and that there was a positive but low relation between computer competency and personal computer ownership. Previous studies also indicated that, for students, being deprived of using computer at home posed a more serious obstacle than being deprived of using computer at school (Moos & Azevedo, 2009), which strengthens this affirmation.

Although Turkish students began to use computer and Internet later than Polish and Czech students, no difference was seen between them regarding their computer competency. It is pleasing to see that Turkish students were as competent as Polish and Czech students despite their late use of computer and Internet.

When we look at findings with respect to weekly computer and Internet use, we observe that Turkish students use computer and Internet for a shorter time than Polish students but for a longer time than Czech students. We note that these differences are associated to fields rather than to countries because Turkish students studying at departments of social sciences use computer and Internet for academic purposes while Polish students use computer and Internet for social websites and for surfing on diverse websites. Reasons of computer and Internet use in computational fields vary. Turkish students, like Polish ones, use computer and Internet for surfing on diverse websites and for social websites. We think it should be useful to associate these differences to social structure and to study students 'social life in accordance with their countries and departments.

Finally, no difference was detected between students regarding their attitudes toward computers. However, we should note that, compared with Polish and Czech students, Turkish students have high attitudes toward computers. But, reasons of theses higher attitudes could not be explained.

As students participating in this study could not easily understand open-ended questions, we suggest, for further studies, collecting data by these questions rather quantitatively. We suggest especially reconsidering reasons of computer and Internet use in connection with countries' socio-economic structures.

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