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Instructional Use of Information and Communication Technologies: Teachers' Resistance to the Use of New Technologies

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Abstract: In the present day, the use of information technologies in businesses and industry has increased quickly and extensively. These developments in information and communication technologies have made it compulsory for students to use technologies to be successful members of the knowledge-based world. New technologies have the potential to support education through the curricula and help individuals to adopt the new demands of today's business and industry. However, many teachers still do not integrate these tools in their instruction. As a result, the use of high-level technology is still unexpectedly low. This paper seeks out the attitudes and opinions of teachers about the implementation of new technologies in their classrooms. The aim of this paper is to discover the information technologies that teachers are using and how often they are using them. The participants of the study were public school teachers in Turkey. Data were collected by using a questionnaire. The questionnaire included questions related to demographic characteristics of teachers and the availability of information technologies in the school used for teaching. It is expected that the findings of this research would find data currently not available to educators and education policy makers. The information obtained from this research would also be functional for teacher educators to improve teacher training programs to facilitate the needs of teachers.

Keywords: Information Technology, Teacher Resistance to Change, Teacher Training, Barriers

Introduction

In today's digital world, technology literacy is a fundamental component of an information age society. Technological developments offer lots of resources to enhance teaching and learning processes (Grimus 2000; Yelland 2001). Information and communication technologies (ICT) have become an indispensable part of the world we live in now (Zhang & Aikman 2007; Rahman 2008) and have a vital role in increasing the quality of education (Summak, Bağlıbel & Samancıoğlu 2010). New technologies have the potential to change the societies (Smith & Leo 1994) by supporting education and providing opportunities for effective teaching. In order to keep pace with the information age it is important to follow and employ the technological developments (Üşür 2001). Since the technology literacy is an inevitable skill of today's people, schools as change agents have a crucial responsibility to prepare the next generation according to the needs of society.

The integration of technology in education has a great impact on students to learn to operate in an information age (Bingimlas 2009). Technology can be a significant element for generating effective learning environments for students to discover and create knowledge. Using technology in classrooms allows students to become active participants of the lessons. It also changes the teachers' role from knowledge transmitter to facilitator (Varank & Tozoğlu 2006). Technology can reveal the creative thinking skills of students if teachers are well prepared to use it (Fouts 2000). Since computers and peripherals are seen as indispensable instructional means in schools and classrooms (Becker 2000), today's teachers should ask themselves "how do I integrate ICT in my classes" instead of "should I use technology".

Researchers agree that effective integration of technology into education depends heavily on teachers (Becker 1994; Knezek & Christensen 2002; Hew & Brush 2007; Jacobsen, Clifford, & Frieson 2002; Yildırım 2007). Teachers in any educational grades need to know how to use and integrate technology in their classes. In this context, the present study aims to scrutinize the

frequency of ICT usage in classroom, integration of ICT into lessons, and reasons of hesitation and lack of enthusiasm of teachers about using ICT.

The purpose of this study was to investigate ICT use among teachers; the extent of teachers' integration of ICT into teaching and learning processes, and teachers' reluctance to use technology. With this respect, this study attempted to answer the following questions:

1. How often do the teachers use ICT tools (such as TV, video, smart board, printer etc) in the classroom?
2. What are the ICT competencies of teachers?
3. What are the knowledge/skill levels of teachers about ICT integration into lessons?
4. What are the attitudes of the teachers towards the integration of ICTs in the lessons?
5. What factors do teachers perceive as preventing to successful integration of ICTs in classroom instruction?

Literature Review

The swift developments of ICT have noticeably changed the format of instruction in all levels of education. Since ICT has a great impact on instructional methods and the quality of education, many educational institutions in the world to a greater extent attempt to make reforms in order to maintain widespread use and integration of ICT. The reform movements include improvement of institutional and individual factors that affect the integration of technology in instruction. The institutional factors comprise technologic equipment, infrastructure, technical and administrative support, and facilities of the school. Correspondingly, fears, competences, skills, attitudes, resistance of teachers are considered as individual factors (Hew & Brush 2007; Hope 1997; Zhao & Cziko 2001) affecting the integration of technology.

Like other countries, Turkey has endeavoured to make some fundamental changes in some of the institutional factors. Turkey is an emerging country in where ICT use at all the levels of education has been supported and encouraged by the Ministry of National Education (MONE). Computers began to be placed in schools in 1984 through the Computer-Aided Education (CAE) Project. Then, in 1997, in order to improve the quality of elementary education, information technology (IT) classes started to be established in nearly all elementary schools in Turkey (Akkoyunlu & Yılmaz 2005). Besides, in 2005, MONE has envisaged that all schools have an active website (Özdener & Çakar 2007). In this respect, MONE has determined that all teachers need to have essential information technology skills (MONE 2006). Appropriate use of technology is a crucial aspect of teaching that all teachers should demonstrate. Hereby, it can be claimed that providing appropriate learning environments for students with different abilities by using technology is one of the skills teachers should have (Akkoyunlu & Kurbanoğlu 2003).

As it is clear from the above mentioned improvements, MONE focused on enhancing the facilities of the schools and technologic equipments, but overlooked teacher-related factors such as willingness, aptitudes, and awareness. Having technology does not guarantee effective integration of it, thus, teachers as the implementers of educational innovations should know how to integrate ICT in their instruction. Identifying the causes behind the resistance of teachers in using ICT could help education specialists to improve both pre-service and in-service teacher education programs in order to overcome this issue. Hence, research into teachers' resistance to ICT use is needed.

Methodology

This descriptive study provides both qualitative and quantitative information on opinions of teachers. The qualitative results in this study were used largely to supplement the quantitative data. This study aimed to examine teachers' opinion on the extent to which they believe they have the skills needed to integrate ICT in classroom instruction, the type of skills they need in integrating ICT, their attitudes towards the integration of ICT, and factors preventing them in using ICT in classroom instruction.

Participants

The participants of this study were randomly selected from public schools in seven different cities (i.e. Ankara, Istanbul, Kütahya, Samsun, Ordu, Agri, Mersin) which represent different geographical regions of Turkey. The participants are quite diverse in term of demographic characteristics and knowledge and use of ICT. They consisted of 146 teachers from different grade levels and branches. Among the 146 teachers 55% was female and the remaining was male (45%). The age of the teachers ranged from 23 to 63. Participants were grouped as pre-school (8%), elementary school (92%), and secondary school (1%). Fifty-one percent of the respondents were classroom teachers, six percent of them were Turkish subject teachers, six percent of them were early childhood education teachers, six percent of them were science and technology teachers, and the remaining were mathematics, social sciences, theology, technology and design, and ICT teachers. In terms of location of schools, most of the participants work at city centre (68%). The distribution of teachers who responded the questionnaire according to gender, age and departments is summarized in Table 1 (Eight of the participants did not answer this questions, 138 of them were used as valid values).

Table 1: Distribution of Participants in terms of Gender, Age and Grade Level Teaching

Grade Level	Gender	Age groups			Total
		23-29	30-39	40+	
Early childhood education	Female	5	4	-	9
	Male	-	-	2	-
	Total	5	4	2	11
Elementary school	Female	17	31	15	63
	Male	5	33	25	63
	Total	22	64	37	126
Secondary school	Female	-	1	-	1
	Male	-	-	-	-
	Total	-	1	-	1

Data Collection Instruments and Procedures

For collecting the data, a teachers' opinion survey was developed by the researchers. In order to determine questions and issues to be asked in questionnaire, a comprehensive literature review was conducted. The questionnaire consists of 72 items, the first 8 of which related to demographic characteristics (i.e. age, gender, etc.). The remaining questions classified under 4 sub-topics; information about school, availability, adaptation, and usage of ICT. Teachers were asked to indicate their opinions regarding their own use of technology, by selecting the response that best describes their level of agreement to each statement. For the items in the second part of the questionnaire, a five-point Likert-type scale, ranging from "definitely disagree (1), disagree (2), undecided (3), agree (4), and definitely agree (5)" was used. Before pilot testing, the questionnaire was given to 11 elementary school teachers and the members of educational sciences department to check the items in terms of clarity and content. On the basis of the comments received from the teachers and the faculty members, some items were revised or changed in order to make them clear and comprehensible, or eliminated. To assess the reliability of the questionnaire, it was administered to a group of 52 teachers who were not included in the sample. The reliability coefficient was estimated as .88.

Data for this study were collected in 2011-2012 academic year by using a survey questionnaire. The data were collected in three months period between February and April 2012.

The data were analyzed through both quantitative and qualitative techniques. In order to summarize the demographic characteristics, descriptive statistics were used. Independent samples

t test was used to compare differences of the ICT integration levels in according to gender and graduation year. In addition, Univariate Analysis of Variance procedure was used to compare differences of the ICT integration levels in according to city teachers’ work, age, grade level of classroom they teach, branch, recruitment year, teaching practice, number of teachers in the schools, and class size.

Additionally, qualitative content analysis was used to analyze the qualitative data which collected through open-ended questions. The collected data were transcribed, coded and analyzed by discriminating patterns and constantly comparing incidents to the codes to help establish clearly defined categories (Bazeley 2007; Miles & Huberman, 1994). In order to increase transferability (external validity) of qualitative data, this study includes detailed demographic and situational descriptions. Furthermore, in order to obtain informed consent from the participants, they were informed about the overall purpose of the research and its main features, as well as of the risks and benefits of participation. Moreover, the names of the participants were not recorded and they were given pseudonym in writing the transcripts. The participants were provided an information sheet that asked for verbal rather than signed consent.

Findings

One of the initial questions was to explore the most frequently used ICT tools (such as TV, video, smart board, printer etc) in classroom teaching. To find an answer to this question, the data were analyzed descriptively by using SPSS. The findings revealed that the least used technological tools were interactive boards (90%), and overhead projectors (88%). It was seen that more than half of the teachers never use television (69%), video (60%), VCD/DVD player (53%), and electronic dictionaries (60%). Similarly, significant number of teachers never or rarely uses computers (59%), projection (66%), printer (62%), web sites (65%), and word processing programs (66%). These and other findings are displayed in Table 2.

Table 2: Distribution of Participants’ Frequency of the usage of ICT tools

	Never		Occasionally/ Rarely		Frequently/Everyday	
	f	%	f	%	f	%
Television	100	69	38	26	8	6
Video	88	60	49	34	9	6
VCD/DVD player	78	53	57	39	11	7
Computer	27	19	59	40	60	41
Projection	43	30	52	36	51	35
OHP	128	88	12	8	5	3
Printer	58	40	32	22	56	38
Scanner	91	62	48	33	7	5
Interactive board	131	90	11	47	4	3
Tape	117	80	23	16	5	4
WEB sites	50	34	45	31	51	35
PowerPoint Presentation	50	34	56	38	40	27
Word	50	34	47	32	48	33
Excel	70	48	55	33	20	14
Paint	82	56	53	36	11	8
E-dictionaries	88	60	47	32	11	8

Another inquiry was related to ICT competencies of teachers. The findings showed that only 13% of the participant teachers used computers at advanced level, the remaining were at average

(70%) and beginner level (15%). In the same way, only 14% of teachers used Internet at advanced level, the remaining was at average (72%) and beginner level (14%).

A noteworthy finding of this research was that only 32% of the participants have knowledge about ICT integration into instruction. More than half of them have partial knowledge about ICT integration (58%). In addition, most of the teachers completely (11%) or partially (68%) have difficulty to understand the technological terminology.

The findings revealed that teachers have positive attitudes towards the integration of ICT tools in the lessons. Participating teachers believe that ICT increase the interest of students (94%), 91% of them do not afraid to ask to the one who knows if and when faced a problem while using ICT, 90% of them like to use ICT and try to learn new technological developments being used widely. A large portion of the teachers think that ITs would make teaching enjoyable (89%). Teachers were also willing to take courses about integration of ICT tools in the lessons (85%).

A close examination of Table 3 indicated that 85% of the teachers thought that using ICT in teaching is very important for being effective in teaching profession. The majority of the teachers also believed that use of ICT in the classroom increases student motivation (84%).

On the other hand, 80% of the teachers believed that ICT is not appropriate to their topic of instruction. Yet, 71% of the teachers refrain to make mistakes when using ICT with their colleagues. More than half of them stated that frequent use of ICT can create boredom for students (52%). Similarly, nearly half of them thought that the use of ICT prevents students learning by doing (49%).

Table 3: Teachers' attitudes towards the ICT integration of the lessons

Items related to attitudes towards ICT integration	M	SD	Agree & Strongly Agree		Undecided		Disagree & Strongly Disagree	
			f	%	f	%	f	%
1. I believe that information and communication technologies increase the interest of students.	4.4	.71	137	94	4	3	5	3
2. I like to use ICT.	4.2	.82	131	90	8	6	7	5
*3. I think use of ICT prevents students learning by doing.	3.3	1.1	71	49	36	25	36	25
*4. I refrain to make mistakes when using ICT with my colleagues.	3.7	1.1	103	71	9	6	33	23
5. I think ITs would make teaching enjoyable.	4.3	.80	130	89	9	6	7	5
6. I try to learn new technological developments being used widely.	4.2	.74	132	90	9	6	5	3
*7. Frequent use of ICT can create boredom for students.	3.0	1.1	36	52	43	30	51	35
8. To teach technology literacy to students is the duty of all teachers.	3.7	1.1	100	69	24	16	21	14
*9. ICT is not appropriate to my topic of instruction.	4.0	.92	117	80	15	10.3	13	9
*10. ICT can lead students to unethical learning.	3.1	1.1	45	31	40	27	60	41
*11. Using ICT makes me nervous.	3.6	1.0	19	13	11	7.5	115	79
*12. Effective use of ICT is very difficult for me.	3.7	1.0	24	16.4	12	8	110	75
13. I use every opportunity to enhance my	3.7	1.0	101	69	19	13	25	17

computer skills.									
*14. Use computers in the classroom is nothing but waste of time.	4.1	.90	8	6	10	7	127	87	
15. I want to take courses about how to use ICT in the classroom.	4.0	1.0	124	85	7	5	15	10	
*16. I feel inadequate/incompetent / ignorant / stupid when I need the help others about ICT.	4.0	1.0	14	10	10	7	122	84	
17. I am not afraid of making mistakes in front of students using ICT.	3.5	1.1	95	65	18	12	32	22	
18. Using ICT in teaching is very important for teaching profession.	4.2	.93	124	85	12	8	10	7	
19. I don't afraid to ask to one who knows if I faced a problem when using ICT.	4.3	.85	133	91	4	3	8	6	
*20. To use ICT in the lessons distract students.	3.9	.85	13	9	20	14	113	77	
*21. ICT can push students' laziness.	3.3	1.1	34	23	48	33	63	43	
*22. Not everybody has to use ICT.	3.6	1.0	24	16	29	20	93	64	
23. I enjoy reading articles/information about new ICTs.	3.6	1.0	92	63	25	17	29	20	
24. ICT makes students active in the lessons.	3.8	.90	107	73	24	16	14	9.6	
25. Use of ICT in the classroom makes learning permanent.	4.0	.78	118	81	17	12	9	6.2	
26. I think using ICT makes lessons more efficient.	4.0	.77	123	84	15	10	7	5	
*27. Use of ICT in the classroom pushes the teachers to the secondary importance.	3.7	.93	18	12	29	20	97	66	
28. I can easily use ICT in all areas of my life.	3.7	.88	98	67	29	20	18	12	
29. Use of ICT in the classroom increases student motivation.	3.9	.80	123	84	12	8	10	7	
*30. Use of ICT may weaken students' writing and narrative skills.	3.0	1.0	44	30	49	34	52	36	
31. There is someone in my school if and when I have problems in using ICT.	3.7	.93	110	75	17	12	19	13	

* *These items were reversed.*

In addition to the aforementioned obstacles, the qualitative findings revealed that there were five common reasons for teachers' unwillingness to integrate ICT including, inadequate ICT related in-service training activities offered, lack of appropriate hardware and software, having Internet connection problems, lack of infrastructure, and insufficient teaching materials. The following quotes from participant teachers' answers from the open-ended part of the questionnaire illustrate the fear of breaking down the ICT tools:

When the computer or printer broke down nobody repair those tools. That's why I don't want to use electronic devices in my lessons. (Teacher#8)

Correspondingly, teachers stated that use of ICT in the classroom could push teachers to the secondary importance. The following excerpts illustrate this hesitation:

Using ICT turns teacher into a "devise" and squeezes him/her in a technical realm. Also it prevents students' imaginations. (Teacher#35)

By providing tablet computers (to students) they (politicians) make teachers unnecessary...this reduce the esteem of teachers. (Teacher#46)

Discussion and Implications

The purpose of the present study was to scrutinize the frequency of teachers' use ICT, the extent of teachers' integration of ICT into teaching and learning processes, and teachers' reluctance to use technology. While participants of this study come from diverse branches, grade levels, cities, ages, attitudes and beliefs, each one of them has similar deficiencies when integrating ICT in their lessons.

This study shows that teachers in this study are willing to use new technologies in education, and they believe in that ICTs increase student motivation. Wang (2001) has reached a similar finding that ICTs have an effect on the success of students, when it is used correctly. In this present study, internal (e.g. ICT competencies of teachers, teachers' attitudes towards the integration of ICT tools in the lessons) and external (e.g. in-service education about ICTs, lack of appropriate hardware and software, having Internet connection troubles, lack of infrastructure, and insufficient teaching materials) factors have emerged that have a great impact on the use of ICTs in education. These findings are consistent with the literature.

Many researchers found that teachers' confidence on utilizing technology, and their beliefs about the value of technology, and student learning were internal factors that prevented teachers from using technology (Dexter & Anderson 2002, Newhouse 2001, Zhou, Pugh, Sheldon & Byers 2002).

Furthermore, there are many studies that investigated external factors; such as in their research Aduwa-Ogiegbaen and Iyamu (2005) mentioned cost, weak infrastructure, lack of skills, lack of relevant software and limited access to the Internet as the major obstacles to the successful use of ICTs in secondary schools in Nigeria. Similarly, hardware and software deficiencies, and lack of training and support opportunities were documented as important factors that prevent the integration of technology (O'Mahony 2003, Pelgrum 2001).

The findings of the present study showed that significant number of teachers had very little or not pre-service and/or in-service education about integration of ICT in the lesson. This result is corresponding to the literature (Becker 1994; Knezek & Christensen 2002; Hew & Brush 2007; Jacobsen, Clifford, & Frieson 2002; Yıldırım 2007; Zammit 1992). In addition, it was seen that almost all of the teachers are acquainted with the use of ICT for tasks such as the preparation of lesson plans, worksheets, and homework rather than for the integration of ICT in the lesson. This finding is compatible with the finding of a study conducted by Becker (2001).

The findings of this study revealed that attitudes of the teachers towards the integration of ICTs in the lessons were positive. Ropp's (1999) study also supports this finding in which he claimed that the majority of the teachers had positive attitudes towards ICT but they did not consider themselves qualified for effectively integrating ICT into their instruction. Teachers as potential users of ICT need a sound understanding of how to use new ICT beneficially (Leach, Ahmed, Makalima & Power, 2005). However, in order to be effective in integration of ICT in teaching process continued and qualified in-service education for the teachers is required.

Findings are suggesting that lack of in-service education opportunities is one of the most important obstacles in successful integration of ICT in classroom instruction. This finding is also supported by several other studies (Hennessy, Harrison & Wamakote 2010, McKenzie 2001). As claimed by Hennessy et al. (2010), efficient initial teacher education and continuing professional development are two of the most important supports for ICT integration into teaching process. Similarly, McKenzie (2001) stated that, schools should provide mentors in order to guide the teachers about the use of new technologies in education.

Consistent with Aduwa-Ogiegbaen and Iyamu (2005), there is a great discrepancy between relevant software supply and demand in developing countries. The findings of this study also showed that lack of hardware and relevant software prevents successful integration of ICT in the lessons.

This study also demonstrated that another impediment to ICT integration into the lesson is the lack of high-speed Internet connection. Many teachers stated that their schools are underserved in terms of having high-speed Internet access. This study also suggested that the lack of infrastructure and insufficient teaching materials were another obstacle in the use of ICT. Teachers, especially working in villages and rural areas, complained about power cuts, and slow internet connections. Similarly, literature also suggests that lack of infrastructure is one of the major problems preventing the integration of technology (Aduwa-Ogiegbaen & Iyamu 2005). Along with the literature, lack of equipment was the most frequently mentioned impediments to ICT implementation (Granger, Morbey, Lotherington, Owston & Wideman 2002).

Providing technological tools does not guarantee successful integration of ICT in the teaching-learning processes. Teachers as the implementers of the curriculum need meaningful and continuous training to keep pace with rapidly evolving technology in order to experiment successful implementations in their classroom instruction. If educational policy makers want successful schools, then teachers, as the main actors in the schools, need to be provided with necessary support in terms of teaching material involves using technology, infrastructure needed in classrooms, and continuous in-service training.

The present study has certain limitations that need to be taken into consideration in evaluating the study and its contributions. This study has been limited to only the perspectives of teachers. The opinions of students, administrators, parents and other education stakeholders were excluded. The participants were limited to the teachers in public schools from seven cities in Turkey. In order to generate more reliable and generalizable results, future studies are needed to be conducted on the use of technology in education both in public and private schools.

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