ICT IN VOCATIONAL AND TECHNICAL SCHOOLS: TEACHERS' INSTRUCTIONAL, MANAGERIAL AND PERSONAL USE MATTERS

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ABSTRACT

The focus of this study is to determine the teachers' usage of Information and Communication Technologies (ICT) in vocational and technical schools in Turkey according to their age, level of education, opportunity of access to computers and ways of learning to use computers. Study group of the research was four hundred and sixteen teachers from vocational and technical schools in Turkey. Data were obtained a questionnaire which was designed by the researchers. One-way analysis of variance (ANOVA) was used to analyze the data. The results of the analysis reveal that teachers use ICT most frequently for managerial purposes, and the least for instructional purposes and there is a significant difference in teachers' usage of ICT based on their ages, level of education, opportunity of access to computers, ways of learning to use computers. Level of education appears as the variable which has the greatest effect on teachers' purposes of using ICT.

Keywords: Teachers' ICT Usage, Vocational and Technical Education, Purposes of ICT Usage

INTRODUCTION

It is a common acceptance, in accordance with the requirements of information age, providing educational support to the individuals in their growing, technology is an indispensable part of education. International standards can be seen as an indication of this common acceptance (ISTE, 2006).

To this direction many governments have developed plans, in the late 1990s, to intensify their investments regarding ICT usage in education (Ping, Swe, Hew, Wong, and Shanti, 2003; Pelgrum, 2001). In Turkey, using information technologies in the field of education also started in 1984 with the establishment of "Specialization Committee on Computer Training in Secondary Education" by the Ministry of National Education (MONE) in Turkey. In order to promote the use of technology throughout the process of education and instruction, laboratories were established in schools, and in-service trainings were offered to teachers and administrative staff. Among the recommendations of the Commission first was teaching how to use computers to the students, then initiating computer training and computer-assisted education in upper secondary schools in 1985-1986, training teachers and enlarging the required systems to achieve these purposes.

National and international projects have still been carried out by the central organization of the MONE so as to make ICT applications more widespread throughout the country. In Turkey most of the projects funded by foreign resources are supported by two main bodies: The World Bank and The European Union (EU) (Celik, 2003).

The common objective of these projects and programs, whether they are World Bank-EU or local, carried out in Turkey is to develop the physical and equipment capacity of secondary education institutions and to improve the quality of education and training in consideration of changing needs of the individuals and society with the rapid developments in technology (MONE, 2003b. p. 66), and to make computer-assisted education and computer training more widespread.

In addition to these projects, schools exert individual efforts to meet their own requirements; however, it is not possible to provide exact figures about their efforts.

Vocational and Technical Education in Turkey

In Turkey, secondary education is composed of general secondary schools, and vocational and technical secondary schools. However, the concept of vocational and technical education is used mostly to refer to vocational and technical secondary education. The rate of schooling in vocational and technical secondary education has increased 170 times since the proclamation of Republic in Turkey (MONE, 2001. p. 27).

The MONE initiates the above mentioned projects which overwhelmingly focus on pre-service and in-service training for teachers to ensure teachers' active involvement to the fulfillment of objectives. One of the decisions concerning vocational and technical education adopted in 16th National Education Council on 22-26 February 1999 was to train individuals who are able to recognize, implement and develop the evolving technologies (MONE, 2001).

PROBLEM

Despite of training and resources investments and important political supports made by governments, ICT usage in teaching and learning process is still insufficient (Gill and Dalgarno, 2008; Martin and Vallance, 2008; Dawson, Forster, and Reid, 2006). Namely, it is not only enough to talking about effect of technology on education. Because effect of technology on education is not a linear one, it was found out that teachers established their own premises and judgments in the usage of ICT in their classroom (Jedeskog & Nissen, 2004; Cope & Ward, 2002; Mumtaz, 2000).

While the rapid changes are occurring in Turkey, the rapid development in ICT and multimedia alternatives provide a wide range of instructional opportunities for teachers. Though it is a complex and multidimensional issue how and when ICT should be used in education and instruction, Higgins (2004) suggests that the ways of using ICT by teachers result in differences in teaching and learning process. Hence, teachers' purposes of using ICT in education pose an important problem (Braak, 2001). At this point, it is clear that teachers play a key role in using ICT effectively in the teaching and learning process.

However studies showed that teachers don't benefit from ICT in activities they developed in the classroom environment already and teachers' ICT usage often remains on a personal level. Teachers cannot transfer their ICT usage from personal purposes to professional life, especially to instructional purposes (Holden, Ozok, and Rada, 2008; Usluel, Mumcu, and Demiraslan, 2007; Askar, Usluel and Mumcu, 2006).

However, the researchers studied usage of ICT in teaching and learning process mostly focused on teachers (Muir-Herzig, 2004; Bucci, Copenhaver, Lehman, and O'Brien, 2003; Demetriatis, Barbas, Molohides, Palaigeorgiou, Psillos, Vlahavas, Tsoukalas, and Pombortsis, 2003; Loveless, 2003; Pelgrum, 2001). To receive expected output from ICT usage in learning, primarily depend upon the teachers' awareness on ability, provided by ICT and regular usage of ICT in classroom activities (Demiraslan and Usluel, 2008; Muir-Herzig, 2004; Bucci et. al., 2003; Roblyer, 2003; Milliken and Barnes, 2002; Kennewell, 2001).

The researchers have developed various points of views about the relation between education and technology. Szabo (2000) focuses on the technical and nontechnical aspects of the relation between education and technology. According to Szabo, using technologies such as software, hardware, telecommunication and digital instruction tools in education is the technical aspect of the problem whereas variables such as vision, objective, strategy, education and infrastructure concern its nontechnical aspect. Toots and Idnurm (2001) distinguish between direct and indirect relation between technology and education. In the basis of the indirect relation lies the conception that school is not a whole of classes, but a kind of miniature world which consists of teachers' and students' social attitudes and personal characteristics. The direct relation of ICT with the learning process is based on the need for using computers by teachers and students both in course preparations and in-class activities.

Toots and Idnurm (2001) suggest that the criteria for measuring the direct relation are the frequency of using ICT and the development of the habit of using ICT-related information and skills. As for teachers, the focus of the problem is being able to use computers at a desirable and "actual" level in their professional tasks, and the requirement for computer skills and training for their tasks.

Proulx and Campbell (1997) examine using computers in terms of task-related purposes, distinguishing between instructional purposes and other purposes whereas Szabo and Suen (1998) make a classification of instructional and non-instructional purposes. Usluel and Askar (2002) categorize teachers' use of ICT for instructional and managerial tasks. These researches revealed that teachers have started to use ICT; however, they use these technologies overwhelmingly for managerial purposes, and that their using ICT in instructional tasks has not been sufficient yet.

At this point, in regard to benefits of ICT usage in teaching and learning process how to make the teachers use ICT appears as an important issue (Bucci et. al., 2003; Loveless, 2003). Different researches showed that proper ICT usage in learning environment made development in students' high level thinking skills (Muir-Herzig, 2004; O'Mahony, 2003; Ping et. al., 2003; Harun, 2001).

Besides, teachers' use of this wide range of alternatives depends on numerous variables. These variables may be personal ones such as their education level, age, experience, understanding or institutional ones such as the opportunities of access to resources and support from the management. And, this subsequently necessitates the closer look to the issue.

This study focuses on the use of ICT by teachers, adopting an approach which deals with the direct relation between education and technology. To this end, teachers' purposes of using ICT, and the relations between their purpose and some variables were examined. Teachers' ICT using purposes were categorized as instructional, managerial and personal purposes.

- Instructional purposes: Teachers' instructional ICT using purposes are divided into two as out-class and in-class uses of ICT. Out-class uses involve preparation for the course, preparation of handouts and search the Internet for the course content whereas among the in-class tasks are using instructional software during the course, making presentations, carrying out the tasks in laboratories or workshops and experimenting.
- Managerial purposes: Managerial purposes are using ICT for preparing course plans as well as monthly and annual plans, preparing examinations and for official correspondence.
- Personal purposes: Among the personal purposes is personal communication, chatting, surfing through the Internet, preparing and storing personal information and files.

In this study the response to the following question was sought for: ' Does the teachers' ICT usage in vocational and technical schools differ by their ages, level of education, opportunity of access to computers, ways of learning to use computers? Does the difference make significant effects on purposes of ICT usage?'

METHODOLOGY
Research Group
The research group is composed of 416 teachers from Ankara, the capital of Turkey. These teachers work in 8 vocational and technical schools in Cankaya, one of eight central districts in Ankara.

68.8 percent of the research group is female teachers whereas 31.2 percent are male teachers. The age groups of teachers are categorized as follows: 10.6 percent between 20 and 29, 40.9 percent between 30 and 39, 41.8 percent between 40 and 49 and 6.7 percent between 50 and 59. As for their years of experience, 10.1 percent of the teachers have been working for 1-5 years, 17.8 percent for 6-10 years, 28.6 percent for 11-15 years and 19.7 percent for 16-20 years.

Collection and Analysis of the Data
The data were collected by Mumcu (2004) through a questionnaire which was originally used for her master's thesis. The questionnaire consists of three parts. First part consists of demographic questions, second part consists of questions about using computers and third part consists of questions about purposes of using computers.

There are 7 questions about demographic features of teachers (age, gender, year of experience, etc.), 5 questions about using ICT (period of using ICT, opportunities of access to computers, how they learned to use ICT, etc.) and a total of 10 questions about the purposes of using ICT (4 questions about using ITC for instructional purposes, 3 questions for managerial purposes and 3 questions for personal purposes). In these questions 3-likert type scale was used and the points of the choices were as follows: I mostly use (3), I sometimes use (2) and I never use (1).

The tasks concerning instructional purposes were coded respectively as I1, I2, I3, I4; managerial tasks as M1, M2 and M3; and personal tasks as P1, P2 and P3.

Instructional Purposes:
- I1: preparation for the course, preparation of handouts and search the Internet to find additional information about the course content
- I2: using instructional software for the lecture, repetition of the subjects, reinforcing students' understanding of the subjects, exercising
- I3: making presentations during the course
- I4: carrying out the tasks in laboratories or workshops and experimenting

Managerial Purposes:
- M1: preparing course plans as well as monthly and annual plans, preparing examinations, and for official correspondence
- M2: preparing the exam questions, making exams and organizing the grades of students
- M3: making and storing official correspondence

Personal Purposes:
- P1: chatting and being in contact with friends (e-mail, ICQ, etc.)
- P2: preparing and storing personal information and files
- P3: surfing through the Internet for fun

Frequency, percentile distribution and one-way analysis of variance (ANOVA) were used for the analysis of the data in view of the objective of the research. For ANOVA, probability of type-1 error (significance level) is set $\alpha=0.05$. The grading used for analysis of variance is as follows: I mostly use (3), I sometimes use (2) and I never use (1). Scheffe test was applied to find out among which groups are the difference in means. In addition, Eta (η) coefficient was used to measure the effect size.

DATA ANALYSIS AND FINDINGS
The analysis of the data reveals that 71.8 percent of the teachers use ICT.

20 percent of the teachers stated that they never had computer education and did not use computers whereas nearly half of them (41.1 percent) mentioned that they had recently started to use computers (1-3 years). The rate of teachers who stated that they had been using computers more than 10 years is merely 13.5 percent. 2 percent of them mentioned that they met computers; however, they did not use them, and it is assumed that these teachers are at the beginner level as computer users.

Most teachers have access to computers in their homes (66.4 percent) whereas 5.6 percent of the teachers stated that they had no opportunity of access to computers.

Nearly half of the teachers (45.9 percent) said that they learned to use computers in in-service trainings. This rate is followed by the ones who learned by their own efforts (38.7 percent) and who learned it at the university (15.4 percent). In addition, 1.7 percent of the teachers stated they had elective computer courses in upper secondary school, a one teacher stated s/he learned it when working in a data processing centre.

Comparing the purposes of using ICT, it is found out that teachers mostly use ICT for managerial purposes and the least for instructional purposes.

For managerial purposes, teachers mostly use ICT in preparing exam questions (44.3 percent) and the least in official correspondence (37.3 percent).

For personal purposes, teachers mostly use ICT in preparing their personal files, and the least for Internet (17.4 percent) and e-mail (17.4 percent).

For instructional purposes, teachers mostly use ICT in preparation stages of the course (25.4 percent) and the least for making a presentation in the classroom. It is found out that teachers' use of ICT for in-class activities (I2, I3, and I4) is less than their uses for out-class activities (I1). In the study of technology and its effects on classroom, Muir-Herzig has found out that most of the teachers, in fact, use the ICT for instructional purposes, in the out of classroom implementations.

1. Age
ANOVA analysis was used to find out whether there is a significant difference between age and teachers' use of ICT for instructional, managerial and personal purposes. The results of the ANOVA are illustrated in Table 1.

Table 1. One-way ANOVA Results for Comparison of ICT Usage Means, by Age

Variable	Purpose of Use	Groups	$\overline{X}$	S.D.	$F_{3,400}$	P	Scheffe
Age	Instructional	20-29 (1)	6,977	,331	8,109	,000	1[a], 2[a,b], 3[b], 4[b]
		30-39 (2)	6,078	,170			
		40-49 (3)	5,435	,168			
		50-59 (4)	4,929	,415			
	Managerial	20-29 (1)	6,932	,342	6,267	,000	1[a], 2[a], 3[a,b], 4[b]
		30-39 (2)	6,377	,176			
		40-49 (3)	5,852	,175			
		50-59 (4)	4,857	,429			
	Personal	20-29 (1)	6,432	,286	12,542	,000	1[a], 2[a,b], 3[b,c], 4[c]
		30-39 (2)	5,665	,147			

		40-49 (3)	4,812	,145			
		50-59 (4)	4,536	,358			

There is a significant difference at the level of .05 between age and teachers' use of ICT for instructional, managerial and personal purposes. Scheffe test was applied to find out between which groups are the difference in means. It is identified that there is a significant difference in using ICT for instructional, managerial and personal purposes between the young teachers and their colleagues in favor of young teachers. Ferrero (2002) also discloses in his study that there is a significant difference by age and that this difference is in favor of young teachers. Ferrero (2002) suggests that young teachers form a more homogeneous structure in using ICT thanks to the self-confidence of receiving training about using a computer.

The effect size of the variable of age on ICT using is as follows by Eta coefficient (η): 5.7 percent on instructional purposes, 4.4 percent on managerial purposes and 8.5 percent on personal purposes. It is seen that the variable of age has more influence on the use of ICT for personal purposes.

2. Education Level
A great majority of the teachers (81.2 percent, 337 teachers) have an undergraduate degree. Before making an analysis about education level, 35 teachers holding an undergraduate diploma were randomly chosen in order to decrease the difference between this group and other groups of educational level. Hence, 24 teachers holding an associate degree, 20 teachers graduating from a degree completion program, 35 teachers holding an undergraduate degree and 34 teachers holding a graduate degree were included in the analysis. The results of the ANOVA carried out to find out whether there was a difference in ICT using purposes by educational level are illustrated in Table 2.

Table 2. One-way ANOVA Results for Comparison of ICT Usage Means, by Educational Level

Variable	Purpose of Use	Groups	$\overline{X}$	S.D.	$F_{3,100}$	P	Scheffe
Educational Level	Instructional	Associate degree (1)	4,667	,437	5,653	,001	1[b], 2[a,b], 3[a,b], 4[a]
		Degree completion prg. (2)	5,950	,478			
		Undergraduate degree (3)	5,706	,367			
		Graduate degree (4)	7,032	,384			
	Managerial	Associate degree (1)	4,826	,428	10,670	,000	1[b], 2[b], 3[b], 4[a]
		Degree completion prg. (2)	5,550	,459			
		Undergraduate degree (3)	5,882	,352			
		Graduate degree (4)	7,806	,369			
	Personal	Associate degree (1)	5,542	,369	5,306	,002	1[b], 2[b], 3[a,b], 4[a]
		Degree completion prg. (2)	4,950	,404			
		Undergraduate degree (3)	5,412	,310			
		Graduate degree (4)	6,387	,324			

There is a significant difference at the level of .05 between educational level and teachers' using ICT for instructional, managerial and personal purposes. Scheffe test was applied to find out between which groups are the difference in means. It is identified that there is a significant difference in using ICT for instructional, managerial and personal purposes between teachers holding a graduate diploma and other groups in favor of teachers holding the graduate diploma.

In consideration of sub-groups of instructional, managerial and personal purposes, it is found out that there is no significant difference among the groups of educational level about using ICT to make a presentation in the classroom (I3). Toots and Idnurm (2001) also suggest that more than half of the teachers prefer traditional methods during instruction. Moreover, the lack of sufficient hardware which enables use of technology in classrooms may be a determining factor.

The effect size of the variable of education level on ICT using by Eta coefficient (η) is not similar to that of the age variable. Educational level has more influence on the use of ICT for managerial purposes. It is followed by the influence on the use of ICT for instructional purposes. Hence, there is a difference between teachers who have post graduate degree level and the others about the use of ICT for managerial and instructional purposes.
It may be concluded that while the teachers' educational level is getting higher (such as MA or PhD), their ICT usage getting more frequently.

3. Opportunities of Access to Computer
The data concerning the opportunities of access to computer among teachers are classified as follows:
- Teachers who have access to computers at home or at school: "I have access to computers",
- Teachers who rarely have access to computers: "I hardly have access to computers" and
- Teachers who expressed that they did not have any access to computers: "I do not have access to computers"

The results of the ANOVA carried out to find out whether there was a difference between ICT using purposes and teachers' opportunities of access to computer are illustrated in Table 3.

Table 3. One-way ANOVA Results for Comparison of ICT Usage Means, by Opportunities of Access to Computer

Variable	Purpose of Use	Groups	$\overline{X}$	S.D.	$F_{2,400}$	P	Scheffe
Opportunities of Access to Computer	Instructional	I have access to computers (1)	4,174	,451	18,258	,000	1[b], 2[b], 3[a]
		I hardly have access to computers (2)	4,522	,319			
		I don't have access to computers (3)	6,124	,118			
	Managerial	I have access to computers (1)	3,174	,435	47,263	,000	1[c], 2[b], 3[a]
		I hardly have access to computers (2)	4,348	,307			
		I don't have access to computers (3)	6,565	,113			
	Personal	I have access to computers (1)	3,391	,386	29,509	,000	1[b], 2[b], 3[a]
		I hardly have access to computers (2)	3,978	,273			
		I don't have access to computers (3)	5,634	,100			

There is a significant difference at the level of .05 between teachers' opportunities of access to computer and their using ICT for instructional, managerial and personal purposes. Scheffe test was applied to find out among which groups are the difference in means. The results of the test reveal that there is a significant difference in using ICT for instructional, managerial and personal purposes between teachers who can easily access ICT and the ones who can hardly or never access ICT in favor of teachers who can easily access ICT. In brief, access to ICT has an effect on the use of ICT. Muir-Herzig (2004) suggests that teachers must be able to access computers easily in order to integrate ICT with instruction. As a matter of fact, some researchers have also highlighted that inaccessibility of ICT opportunities is an obstacle to using ICT in education (Usluel, Mumcu, and Demiraslan, 2007; Mumcu and Usluel, 2004; Pelgrum, 2001).

The effect size of teachers' opportunities of access to computer is more noticeable on managerial purposes. It is followed by personal and instructional purposes. Hence, there is a difference between teachers who have access to computers and the others about the use of BIT for managerial purposes.

4. Way of Learning to Use Computer
The results of the ANOVA carried out to find out whether there was a difference between teachers' ICT using purposes and their ways of learning to use computers are illustrated in Table 4.

Table 4. One-way ANOVA Results for Comparison of ICT Usage Means, by Way of Learning to Use Computer

Variable	Purpose of Use	Groups	$\overline{X}$	S.D.	$F_{2,400}$	P	Scheffe
Way of Learning to Use Computer	Instructional	In-service training (1)	5,797	,183	15,312	,000	1[b], 2[b], 3[a]
		My own efforts (2)	6,056	,199			
		At the university (3)	7,784	,312			
	Managerial	In-service training (1)	6,216	0,167	9,379	,000	1[b], 2[a,b], 3[a]
		My own efforts (2)	6,944	0,181			
		At the university (3)	7,529	0,284			
	Personal	In-service training (1)	5,196	,145	25,252	,000	1[c], 2[b], 3[a]
		My own efforts (2)	5,856	,157			
		At the university (3)	7,216	,246			

There is a significant difference at the level of .05 between and teachers' ways of learning to use computers and their using ICT for instructional, managerial and personal purposes. Scheffe test was applied to find out among which groups are the difference in means. The result of the test reveals that there is a significant difference in using ICT for instructional, managerial and personal purposes between teachers who learned to use ICT at the

university and the ones who learned it in in-service trainings or by their own efforts in favor of teachers learned it at the university.

In consideration of sub-groups of instructional, managerial and personal purposes, it is found out that there is no significant difference between the teachers who learned it at the university and the ones who learned it by their own efforts about using ICT for M2, M3 and P2.

The way of learning to use computers has more influence on the use of ICT for personal purposes. It is followed by the influence on the use of ICT for instructional purposes.

CONCLUSION
The results of the analysis reveal that teachers use ICT most frequently for managerial purposes, and the least for instructional purposes and there is a significant difference in teachers' usage of ICT based on their ages, level of education, opportunity of access to computers, ways of learning to use computers. However, it is remarkable that teachers' use of ICT for in-class activities is less frequent than their use of it for out-class activities. In short, it can be concluded that teachers are not able to integrate ICT into teaching and learning process yet. The integration of ICT into teaching and learning process is a multidimensional and complex process which requires both equipment and skills; however, it is undeniable that teachers play a significant role in this process.

Briefly, as the age of teachers increases, their use of ICT for instructional, managerial and personal purposes decreases; and as their educational level increases, their use of ICT for these purposes increases. In addition to this, the easier teachers' access to ICT, the more they use ICT. It can be said that teachers' opportunities of access to computers influence their use of ICT. It is expected that "A Notebook Computer for Every Teacher Project" which was initiated by the MONE in 2005 and still continues will have positive effects on our education system, contributing to technology ownership among teachers. Although, having ability to access ICT does not mean effective use of ICT in teaching-learning process.

The teachers who learned to use ICT at the university use ICT for instructional, managerial and personal purposes more than the ones who learned it in in-service trainings or by their own efforts. The teachers who learned to use computers in-service trainings use ICT for instructional, managerial and personal purposes less than other teachers. Hence, it is recommended that the content, structure and functioning of in-service trainings have to revised. When organizing the content of in-service trainings, it should be kept in mind that in-service trainings must focus on technology literacy and that the most significant objective of in-service training is to ensure the use of ICT for instructional purposes in order to assure the integration of ICT teaching-learning processes. The use of technology for in-class activities is of primary importance in using ICT for instructional purposes. Furthermore, taking into consideration that the teachers who learned to use ICT at the university use ICT more than their colleagues, it can be concluded that the content of the programs of teacher training institutions have to be revised. Researchers say training teachers in ICT is a continuing process (Muir-Herzig, 2004; Ping et. al., 2003). Demetriatis et. al. (2003) indicate that although teachers express considerable interest in learning how to use technology they need consistent support and extensive training in order to consider themselves able for integrating ICT into their instructional practice. Balanskat, Blamire and Kefala (2006) expressed that poor ICT skills, low motivation and lack of confidence to use new technologies in teaching are the most important barriers to teachers' ICT usage for instructional purposes. According to authors, especially these three barriers are directly related to prospective teachers' education program and in-service training program of teachers.

Consequently, there is no single or simple solution for using ICT effectively in education and instruction (Higgins, 2004). However, it is certain that teachers have to develop new technical and pedagogical skills. Teachers have to be prepared to adopt new technologies.

Technology may become a distinctive tool in education when it integrates into teaching-learning. However, it is certain that education and time are required to use ICT as an effective instructional method (Muir-Herzig, 2004).

When the investments made on ICT usage in education and the implemented projects -in terms of numbers, magnitude and their objectives-, are considered; to make effective use of projects, ability for the continuous access to the ICT, pre-service and in-service training should be provided to the students and teachers respectively.

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