Obstacles and Their Solutions in Integrating ICT into K-12 Schools in Turkey

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Abstract

The main focus of the current study is to explore major problems and their solutions for integrating ICT into K-12 schools in regard to teachers' perceptions. The design of the study is cross-sectional survey method. The data were collected from 69 schools in 35 cities of 12 different regions of Turkey with a convenience sampling method to represent the population. The questionnaire was distributed to the 3353 K-12 teachers requesting their participation in completing the questionnaire, and 1429 teachers responded the questionnaire. The data gathered through the questionnaires were analyzed by descriptive statistics.

Introduction

In the information age, ICT has a critical role of enhancing the quality of education. The role of ICT is to serve education in particular, by helping teachers to do their professional job (The Independent ICT in School Commission, 1997). In these contexts, teachers' shifting role in 21st century involves an essential mission, which is being the frontier of applying technological innovations to teaching-learning process. To achieve this aim, teachers should be equipped with the adequate skills and knowledge in education. Every semester, new teachers start their careers and they are required to be furnished with skills to merge today's ICT into learning activities that will stimulate and maintain students' interest while preparing them for the future. Teachers are expected to be ICT leaders, role models for appropriate use of emerging types of ICT, and integrate a variety of ICT into the curriculum effectively (Ozogul, 2002).

In this process, teachers face some problems in integrating ICT into teaching/learning process. Many countries are regularly monitoring the status of ICT in education in order to reveal these problems. Cagiltay et al, (2001) indicated that the teachers, in Turkey, classified some problems related to integration of computer to the curriculum. These problems are:

- lack of enough number of computers,
- lack of teacher education about computer literacy,
- inappropriate instructional programs,
- lack of teachers' knowledge about how to use computer in instruction,
- load of the curriculum.

However, in regard to Turkey's educational system, there are not much extensive research studies that uncover these problems. Most of the research studies are done in specific schools or regions, with limited amount of participants. As a result of this necessity, the main focus of the current study is to explore major problems and their solutions in integrating ICT into teaching/learning process in K-12 schools. Therefore, the purpose of this study is to uncover the obstacles faced in ICT integration process in K-12 schools and their solutions according to K-12 teachers' opinions. Consequently, this study addressed the following research questions.

(1) What are the obstacles faced in ICT integration in K-12 schools according to K-12 teachers?
(2) What are the solutions of K-12 teachers to overcome current ICT integration problems in their schools?

Method

Design of the Study

The design of the study is cross-sectional survey method. Hence, the data gathered through questionnaire, and were analyzed by descriptive statistics namely means and standard deviations.

Population and Sample

558,876 teachers serving at K-12 level as of 2004, in Turkey, in regard to Ministry of National Education (MONE) documents was the population of this study. The data were collected from 69 schools in 35 cities of 12 different regions in terms of Nomenclature of Units for Territorial Statistics (NUTS) Level 1 with a convenience sampling method to represent the population. Initially, from each region, at least one city was selected by convenience sampling method, and then 6‰ of the target population were chosen from these cities through convenience sampling method. Therefore, a representative sample of 3,353 teachers was selected from each of the regions (see Table 1).

Table 1: The Number of K-12 Teachers in Terms of NUTS Level 1

Code	Name of the Regions	Population	Sample (6/1000 of Population)
TR1	Istanbul	66,797	401
TR2	West Marmara	25,290	152
TR3	Aegean	78,386	470
TR4	East Marmara	59,385	356
TR5	West Anatolia	56,994	342
TR6	Mediterranean	79,377	476
TR7	Middle Anatolia	36,925	222
TR8	West Black Sea	34,223	205
TR9	East Black Sea	24,718	148
TRA	Northeast Anatolia	19,818	119
TRB	Middle east Anatolia	29,214	175
TRC	Southeast Anatolia	47,827	287
	TOTAL	**558,876**	**3,353**

Instruments

A questionnaire was used to gather data regarding the K-12 teachers' perceptions of the use of ICT in their schools. The questionnaire composed of 16-items with multiple close-ended quantitative type items , 5-point Likert-type items, and 4 open-ended items. However only some part of data related with "major problems of integrating ICT" and "solutions of major problems for integrating ICT" were used in this study.

The instrument was developed by the researchers based on the research studies conducted previously by Queitzsch (1997), MirandaNet (2000), Orhun (2000), and SCRTEC (1998). The instrument was distributed to the seven experts and necessary revisions were made based on the experts' reviews, and then a pilot test was conducted. The Cronbach alpha coefficient was calculated as .81 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale whether the items measure two factors.

The questionnaire was distributed to the 3353 K-12 teachers requesting their participation in completing the questionnaire in April 2005. A follow-up questionnaire was sent in May 2005 to the teachers who did not respond to the first query. After the responds of 1429 participants, the Cronbach alpha coefficient was re-calculated as .97 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale whether the items measure two factors. The Cronbach alpha of the Factor 1 is .97 and the Cronbach alpha of the Factor 2 is .94.

Data Analysis

Descriptive statistics were used to explore major problems and their solutions in integrating ICT into teaching/learning process in K-12 schools considering the teachers perceptions. For this purpose, means and standard deviations of the questionnaire items were calculated.

Results

Obstacles as Perceived by K-12 Teachers

The teachers were asked about the obstacles, they faced in integrating ICT into their schools. They rated their level of agreement on the five-point Likert items (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Neutral", 2 indicating "Disagree", and 1 indicating "Strongly Disagree").

The data revealed that the obstacles the teachers faced in integrating ICT into education are "lack of inservice training about ICT" (M=4.17), "lack of technical support" (M=4.14), "lack of hardware" (M=4.10), "lack of basic knowledge-skills" (M=4.08), "inadequate repertoire of knowledge and skills about ICT in instruction" (M=4.07), and "lack of appropriate software and materials for instruction" (M=3.97), which are above the overall mean (M=3.93). The items below the overall mean are "lack of physical environment for integrating ICT in classroom" (M=3.88), "inappropriate course content and instructional programs" (M=3.81), "the constraints related to hardware" (3.64), "inadequate support from upper positions" (3.58) and "lack of time for integrating ICT in classroom" (M=3.36) as the lowest mean score observed. The teachers agreed with the all items as obstacles except the item "lack of time for integrating ICT in classroom" which was at undecided (neutral) level.

Table 2: The obstacles faced in integrating ICT into K-12 schools according to their teachers (n=1429)

	M	SD
Lack of inservice training about ICT	4.17	.90
Lack of technical support	4.14	.87
Lack of hardware (computer, printer etc.)	4.10	1.01
Lack of basic knowledge and skills about ICT	4.08	.91
Inadequate repertoire of knowledge and skills on the integration of ICT in instruction	4.07	.90
Lack of appropriate software and materials for instruction	3.97	.99
Lack of physical environment for integrating ICT in classroom	3.88	1.07
Inappropriate course content and instructional programs	3.81	1.00
The constraints related to hardware (i.e. incompatibility with software, insufficient memory)	3.64	1.03
Inadequate support from upper positions	3.58	1.14
Lack of time for integrating ICT in classroom	3.36	1.20
Overall mean	3.93	

Note: For this and the following table, 1 for "Strongly Disagree", 2 for"Disagree", 3 for "Neutral", 4 for "Agree", and 5 for "Strongly Agree"

Solutions as Perceived by K-12 Teachers

The possible solutions indicated by the teachers for the obstacles in integrating ICT into their schools are "more budget should be allocated to ICT" (M=4.64); "the in-service teacher training about ICT should be improved in quantity and quality" (M=4.61); "the preservice teacher training about ICT should be improved in quantity and

quality" (M=4.61); "the content of the courses should be redesigned to acquire more benefit from ICT" (M=4.52); "for the public use of ICT tools and materials, ICT centers should be constructed in school districts, and the existing ones should be improved" (M=4.49) which are above the overall mean (M=4.48). The items below the overall mean are "the teachers who integrate ICT in their courses should be supported" (M=4.48); "technology plan for implementing ICT in K-12 schools should be prepared" (M=4.46); "specific units and personnel should be allocated for peer support about the use of ICT in instruction" (M=4.45); and "the course load of the teachers should be decreased" (M=4.06) as the lowest mean score observed. The findings indicated that majority of the teachers strongly agreed with all the statements in this portion of the scale except "the course load of the teachers should be decreased" which was at agree level.

Table 3: The perceptions of K-12 teachers to overcome current ICT integration problems in their schools (n=1429)

	M	SD
More budget should be allocated to ICT	4.64	.56
The inservice teacher training about ICT should be improved in quantity and quality	4.61	.59
The preservice teacher training about ICT should be improved in quantity and quality	4.61	.57
The course content should be redesigned to acquire more benefit from ICT	4.52	.67
For the public use of ICT tools and materials, ICT centers should be constructed in school districts and the existing ones should be improved.	4.49	.64
The teachers who integrate ICT in their courses should be supported (such as incentive payment)	4.48	.69
Technology plan for implementing ICT in K-12 schools should be prepared	4.46	.60
Specific units and personnel should be allocated for peer support about the use of ICT in instruction	4.45	.69
The course load of the teachers should be decreased.	4.06	1.00
Overall mean	4.48	

Conclusions

The present research results indicated that majority of K-12 teachers agreed with all statements as the barriers except "lack of time for integrating ICT in classroom". The majority of the K-12 teachers strongly agreed with the all statements except "the course load of the teachers should be decreased". In order for the K-12 teachers to use ICT effectively in their classrooms, support and possible solutions needs to be provided. Additionally, to uncover the problems K-12 teachers face in ICT integration into teaching/learning process, more extensive research studies can be conducted and solutions to these problems can be produced by the policy makers.

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