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Barriers to Information and Communication Technologies Integration into Elementary Schools in Turkey

H.İ. Yalın, Ş. Karadeniz and S. Şahin
Department of Computer Education and Instructional Technologies,
Faculty of Education, Gazi University, 06500 Ankara, Turkey

Abstract: With the fact that integrating Information and Communication Technologies (ICT) into teaching and learning to improve and update the education provided to younger generations is important, Turkish government has made considerable investment in acquiring hardware and software for schools, connecting them to the Internet and helping educators improve their ICT-related knowledge and skills. However, it is important to periodically assess the actual situation of ICT in educational practice in order not only to account for the financial investments, but also to inform decisions about the content and directions of future policies. The purpose of this article is to present the perceptions of classroom teachers and school principals in Turkey regarding barriers to ICT integration into teaching-learning process.

Key words: Information and communication technologies, ICT integration, barriers of ICT integration, ICT integration in Turkey, elementary education

INTRODUCTION

In twenty first century, information societies need independently and creatively thinking individuals, who can solve problems and manage their learning process and also need schools, which educate these individuals. Policy makers realized this fact and understood the necessity that information and communication technologies should be effectively included in education system (UNESCO, 2003).

Information and communication technologies are composed of such tools as hardware (computers, scanners, digital cameras, etc.) and software (database and multi-media programs), which enables accessing, obtaining, recording, organizing, using and presenting information electronically and telecommunication tools like telephones, faxes, modems and computers, which enables accessing and using information possible (UNESCO, 2002). But, integration means unification into a whole. As Earle (2002) stated, integration of ICT is not a product but a process. Integration of ICT into schools means using ICT effectively and efficiently in all dimensions of the processes including the necessary infrastructure, teaching program and teaching-learning environments.

Researchers identified many barriers affecting ICT integration process (Pelgrum, 2001; Ertmer, 2001; Pelgrum and Law, 2003; Hew and Brush, 2007). Lawson and Comber (1999) determined 4 factors, which affect integrating ICT successfully into schools: attitudes of teachers towards innovation, the role of ICT coordinator, attitude of senior administrators and lack of appropriate support and training. Moreover, Williams *et al.* (2000) state that the basic factors, which prevent using ICT in teaching-learning process are lack of knowledge, skill and support, lack of ICT, access to technology. As a result of a study held in 26 countries, it has been found that the basic barriers faced during integration of ICT are lack of computer and teachers' lacking of knowledge (Pelgrum, 2001).

Ertmer (2001) groups factors, which prevent teachers from deciding to use ICT in the classroom under two categories; the first barrier group includes the agents that are out of teachers' control: access to technology, implementation time and technical support, resources, content and training. Even if all these barriers are removed, many teachers may not be able to use technology at all. However, the second barrier group includes agents that are related to teachers themselves: attitudes, beliefs, implementations and endurance. Teachers' beliefs determine their planning style and implementations in the classroom.

In the report of European Schoolnet (2006), in which the impact of ICT in European schools is examined, the factors affecting ICT integration are determined as for teachers, school and system level. Lack of ICT skills,

Corresponding Author: Ş. Karadeniz, Department of Computer Education and Instructional Technologies,
Faculty of Education, Gazi University, 06500 Ankara, Turkey Tel: +90 312 202 83 19

low motivation for using new technologies and lack of confidence and inappropriate teacher-training constitute a barrier as for teachers to teaching-learning processes of ICT. As for the school, these barriers are lack of ICT infrastructure, poor quality and inadequate maintenance of hardware, limited access to ICT equipment, lack of appropriate training software. At the same time, lack of project experiences, which are required for systematic planning and absence of viewpoint, concerning ICT mainstreaming into schools strategies, are important barriers as for schools. At last, in the report it has been stated that rigid structure of traditional educational systems, traditional assessments, restrictive curricula and restricted organizational structure constitute barrier at the level of system to integration of ICT into education.

Hew and Brush (2007) determined 123 barriers as a result of meta-analysis study of 48 studies, which examined the barriers faced during technology integration into teaching-learning at K-12 level. They categorized these barriers as resources, knowledge and skills, institution, attitudes and beliefs, assessment and subject culture. They have found that ICT integration is directly affected by attitudes and beliefs of teachers, lack of knowledge and skills in the field of technology, lack of technology supported pedagogy, lack of technology-related classroom management, lack of leadership skills and lack of time-tabling structure and technology integration plan, which will enable institution to develop a common vision, lack of such resources as technology, access to technology, time and technical support.

ICT integration in Turkey: In Turkey, various policies have been developed and projects have been conducted since 1993 in order to integrate ICT into schools. Ministry of National Education has been equipping primary and secondary schools with contemporary information and communication technologies, through Basic Education and Secondary Education Projects. Within the scope of 1st and 2nd Phase of Basic Education Project, a total of 8590 ICT classes and/or Information Technologies Laboratories were established in 7202 elementary schools. Within the frame of protocol signed by Ministry of National Education and Turk Telekom Corporation, a total of 42.534 schools have been provided with ADSL internet accession and services. (TUBİTAK, 1999; MEB, 2004; TBD, 2006).

As discussed earlier, researchers identified many barriers affecting ICT integration into teaching-learning process. However, in the case of Turkey, it is not known what kind of barriers teachers, school administrators mostly face during the integration of ICT into education. The purpose of this study is to investigate barriers faced by teachers and school administrators during the integration of ICT into education in Turkey. Therefore, this study is aimed to identify barriers of ICT integration in elementary schools in Turkey.

MATERIALS AND METHODS

Population: The study was carried out in 227 elementary schools which have at least one ICT classroom. The population consisted of 2270 teachers and 227 principals of those schools. The selection of the schools, sample of teachers and school principals were guided by several factors. The researchers selected teachers from many subject areas and grade levels to ensure that the data would reflect the full spectrum of teaching disciplines and educational technology uses.

Development of the data collection instrument: A survey research method was employed as the technique for acquiring the data necessary for the purpose of this study. This technique involved the use of a mail questionnaire. Two questionnaires, one for teachers and one for school principals were developed through a review of the related literature and the opinions of experts.

To assure that the questionnaires were adequately designed to collect sufficient data to answer the research questions, they were validated by ICT experts. The questionnaires were also field tested with a sample of 140 teachers. These teachers were not included in the final study.

The instruments consisted of three parts: (1) general characteristics of the participants (2) Items to identify the respondent's ranked order of the barriers to ICT integration (3) an opportunity for stating additional barriers.

Presentation and analysis of data: Descriptive statistics were utilized to analyze the data. To determine the barriers to integrating ICT into education perceived by the teachers and school administrators, the rank order of the items was calculated utilizing the item means.

The data presented in Table 1 and 2 is a result of the questionnaires returned from 1039 public elementary school teachers and 145 school principals. Since the questionnaires were sent to 2270 teachers and 227 school principals, the data represents 46% of the teachers and 64% of the school principals surveyed.

RESULTS

Barriers to ICT integration by school administrators and classroom teachers: Both the school administrators, classroom teachers were asked to rank the barriers they face during the integration of ICT into teaching-learning processes in their schools.

Table 1: Barriers faced during ICT integration in schools by school principals

Barriers	f	(%)
Lack of training	112	77.2
Lack of hardware	112	77.2
Lack of technical support	108	74.5
Teachers' insufficient knowledge and skills as for using computer	106	73.1
Old or insufficient hardware	99	68.3
Insufficient software	92	63.4
Lack of time for developing materials by using computer	88	60.7
Problems faced with planning the use of such equipments as computer, data projector	82	56.6
Insufficient technological infrastructure	76	52.4

Table 2: Barriers faced during ICT integration in schools by teachers

Barriers	f	(%)
Lack of hardware	822	79.1
Lack of training	817	78.6
Lack of time for developing materials by using computer	768	73.9
Lack of technical support	761	73.2
Problems faced with planning the use of such equipments as computer, data projector	728	70.1
Insufficient knowledge and skills of teachers as for using computer	722	69.5
Old or insufficient hardware	722	69.5
Not receiving help from formatter teacher, when needed	641	61.7
Insufficient software	620	59.7
Lack of administrator support	589	56.7
Insufficient technological infrastructure	398	38.3

As in Table 1, school administrators identified lack of training and lack of hardware as the most important barriers to ICT integration, followed by lack of technical support. Insufficient technological infrastructure was perceived as the least important barrier to ICT integration into education by school principals.

Table 2 presents the rank order of the barriers to ICT integration from the perspective of classroom teachers. As shown in Table 2, lack of training and lack of hardware were also identified as the most important barriers to ICT integration into education by teachers. It is interesting that lack of time to develop materials to use in classrooms received third highest ranking by teachers as an obstacle to ICT integration. Like school principals, classroom teachers perceived Insufficient technological infrastructure as the least important barrier to ICT integration into education.

To sum up, most of the school directors and teachers stated that barriers they mostly faced during ICT integration are lack of training, lack of hardware and lack of technical support. School directors also emphasized insufficient computer knowledge and skills of teachers and old hardware as important barriers while the teachers emphasized not having enough time for developing electronic materials and having problems about planning use of ICT tools.

DISCUSSION

Integration of ICT into teaching-learning environments in order to prepare students for the present economic conditions is gaining more and more importance in Turkey. Therefore, Turkey has enthusiastically set a number of goals in order to improve its education system. While the efforts concerning realization of ICT integration in schools are going on, it is necessary to identify the problems, experienced during this process and to develop appropriate ways in order to solve these problems. The barriers that school directors and teachers face during integration of ICT into their teaching-learning processes in elementary schools in Turkey, have been identified within the scope this study.

The results of this study showed that the basic barriers, faced during ICT integration in elementary schools in Turkey, are lack of training, lack of hardware, lack of time for developing materials by using computer and lack of technical support. According to Earle (2002), ICT integration will not be insured by only providing hardware and software and establishing infrastructure. Similarly, Hew and Brush (2007) asserted that beside lack of hardware and software, insufficient opportunities to access to these resources will decrease the chance of teachers to integrate technology into teaching programs.

The basic factor that affects learning is not technology but the pedagogy behind it (Mandell *et al*., 2002). From this perspective, one of the essentials of ICT integration in schools is use of appropriate pedagogical software. Although lack of pedagogical software is supposed to be given priority among barriers by scientist, it is given less importance by teachers and school directors. This may be because of insufficient knowledge of school directors and teachers about ICT integration. Therefore, in-service training organized for school directors and teachers should not only focus on subject

area; but also include activities on integrating technology into it. Considering that in-service training are expensive and difficult to make widespread pre-service teacher training could be also helpful. Beside, the approach of learning with technology rather than learning technology itself, which has been begun to be widely used for teaching K-12 students, need to be adopted in the field of teacher training. According to the report of UNESCO (2003) while teacher training programs of developing countries in Asia-Pacific region include contents, based on basic computer literacy, more developed countries focus on ICT integration and pedagogical approaches.

Teachers will also need contents, open strategies and examples related with teaching program, in order to use ICT effectively in their classrooms. Therefore, online resources including good examples of technology aided course plans and materials should be provided by national education authorities to support teachers. In schools, teachers should be supported by school directors and formatter teachers.

One of the findings of this study was that teachers do not have enough support from formatter teachers. One of the reasons for this result may be that formatter teachers have a number of responsibilities such as planning, maintaining and managing ICT classrooms etc. other than supporting and training teachers in Turkey. Increasing formatter teachers' number or decreasing their responsibilities could be helpful to overcome this barrier.

In conclusion, the literature reports that barriers of ICT integration into schools have similarities but priorities differentiate (Wiiliams *et al*., 2000; Pelgram, 2001; Lawson and Comber, 1999; Ertmer, 2001; Hew and Brush, 2007). In the context of Turkey the priorities include eliminating lack of training and hardware and improving teachers' technology knowledge and skills.

Future research may include qualitative research methods (e.g., interviews, case studies) to examine the barriers in depth with participation of all stakeholders (e.g., students, parents). Also it would be beneficial to identify the practices and gained experiences of these stakeholders to overcome the ICT integration barriers in different levels of schools.

REFERENCES

Earle, R.S., 2002. The integration of instructional technology into public education: Promises and Challenges. Edu. Technol., 42: 5-13.

Ertmer, P.A., 2001. Responsive instructional design: Scaffolding the adoption and change process. Edu. Technol., 41: 33-38.

European Schoolnet, 2006. The ICT Impact Report: A Review of Studies of ICT Impact on Schools. In: Europe, Brussels: European communities. <http://insight.eun.org/shared/data/pdf/impact_study.pdf>.

Hew, K.F. and T. Brush, 2007. Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. Edu. Technol. Res. Dev., 55: 223-252.

Lawson, T. and C. Comber, 1999. Superhighways technology: Personal factors leading to successful integration of information and communications technology in schools and colleges. J. Inform. Technol. Teacher Edu., 8: 41-53.

Mandell, S., D.H. Sorge and J.D. Russell, 2002. Tips for technology integration. Technol. Trends, 46: 39-43.

MEB, 2004. Millî Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü, Temel Eğitim Programı, Bilgi ve İletişim Teknolojileri, Politika Raporu.

Pelgrum, W.J., 2001. Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. Comput. Edu., 37: 163-178.

Pelgrum, W.J. and N. Law, 2003. ICT in education around the world: Trends, problems and prospects. Paris: UNESCO, International Institute for Educational Planning.

TBD, 2006. Hükümetin 2005 Yılı Programında Bilişim, <http://www.tbd.org.tr>.

TUBİTAK, 1999. Türkiye'nin Bilim ve Teknoloji Politikası.

UNESCO, 2002. Consultative workshop for developing performance indicators for ICT in education. 1st, Manila, the Philippines, 28-30 August.

UNESCO, 2003. ICT for Education in Asia-Pacific. ICT Policy and Strategy. UNESCO Asia-Pacific Regional Bureau for Education, Bankok, Thailand. <http://www.unesco.org/ bankok/education/ict/ict_enabling/main.htm>.

Williams, D., L. Coles, K. Wilson, A. Richardson and J. Tuson, 2000. Teachers and ICT: Current use and future needs. Br. J. Edu. Technol., 31: 307-320.