BARRIERS IN THE INTEGRATION OF ICT AT THE SCHOOL FOR THE HANDICAPPED

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Abstract

Before developing action plans for effective information and communication technologies (ICT) integration, it is important to determine and overcome the barriers encountered in the teaching-learning process of the educational institutions. Therefore the purpose of this study is to determine the barriers experienced in the process of ICT integration at the School for the Handicapped (SfH)- the only school in Turkey that gives vocational higher education to hearing impaired students. The study was carried out with the qualitative case study at the SfH in the academic year of 2007–2008. The participants of the study were all from the SfH, 60 hearing-impaired students, 21 faculty members and 3 administrators. The data were collected through the participant observations. Interviews, open-ended questionnaires, researcher's journal, documents, archival records and artifacts were compiled and analyzed inductively. Among the findings obtained in the study, the barriers experienced in the process of the ICT integration were the problems experienced by administrators, by the faculty members and by the students. The barriers experienced in the process of ICT integration by the participants at the SfH were found to be in relation to technical problems, technical support problems and problems based on lack of knowledge. The data have been discussed in the light of the related literature.
Key words: *barriers; case study; hearing impaired; ICT integration; participant observation.*

Introduction

In the developing and changing world, for countries to increase their competitive power, it is an obligation for them not only to use information but also produce it. In addition, the development of a country is measured via the information and technology produced in that country. In this respect, the roles of higher education institutions are increasing more and more. Because, they aim to train the individuals having the professional knowledge, skills, attitudes and culture required by the modern society regardless of their physical handicaps such as having hearing loss.

Similar to hearing individuals, hearing impaired individuals can take vocational education appropriate to them in a higher education institution and are expected to participate in the society as productive individuals (Kretschmer & Kretschmer, 1978; Schirmer, 2000; Uzuner, 2009). In order to help hearing impaired students acquire the professional knowledge as appropriate to the higher education goals, ICTs should be integrated in the teaching-learning process (Unluer, 2010). ICT is among the most important technologies that facilitate and enrich the learning experiences of hearing impaired students (Carlson, 1996; Lucner, Bowen & Carter, 2001; National Centre for Technology in Education [NCTE], 2008; Roberson, 2001). One of the significant variables for helping hearing impaired individuals use ICTs effectively and for equipping them with the skills in these technologies is the integration of ICTs into the teaching-learning process.

In higher education institutions, ICTs are used for various purposes ranging from the structuring of management-information systems to the course evaluation schemes. ICT integration can be defined as the process of using and spreading the Internet and computer applications in reaching information in in-class learning and in improving communication to develop learning (Van Melle, Cimellaro & Shulha, 2003). ICT integration is a multi-dimensional and comprehensive process that covers both the technological sources forming the infrastructure dimension and the stakeholders forming the human-force dimension. No one component in itself is sufficient to provide good teaching. However, the presence of all components increases the possibility of excellent integration of ICT in learning and teaching opportunities (Bingimlas, 2009). In the comprehensive ICT integration process, any situation that prevents especially the instructors from benefitting from ICT opportunities in the teaching-learning process is defined as the barriers in ICT integration (Gillespie, 2006). In literature, a number of barriers influencing the ICT integration process are defined. According to teachers, the factors such as inappropriate teacher training, lack of motivation and confidence in using ICT and lack of ICT skills are regarded as barriers to ICT integration in teaching-learning processes. According to educational institutions, the absence and poor quality of ICT infrastructure, limited access to ICTs and lack of suitable educational software are all barriers in the ICT integration process. Furthermore, lack of experience in ICT-based projects in school strategies and lack of systematic planning and lack of ICT mainstreaming into schools' strategy are among other barriers in terms of schools. The rigid structure of traditional education systems, traditional assessment, restrictive curriculum and restricted organizational structure are the barriers to the integration of ICT in education in terms of the system (European Schoolnet, 2006).

The basic factors influencing ICT use in the teaching-learning process are defined by Williams, Coles, Wilson, Richardson and Tuson (2000) as lack of information, skills and support and access to technology. According to the results of research conducted in 26 countries, the basic problem encountered in ICT integration is stated to be the deficient number of computers and the lack of teachers' knowledge (Pelgrum, 2001). Ertmer (1999) categorized the factors - which prevent teachers from using ICT in their classes – in two groups: the factors out of teachers' control such as access to technology, time, technical support, sources, content and education, and the factors due to the teachers themselves such as attitudes, beliefs, application and consistency. It is stated that factors that prevent the teachers from integrating ICTs into their teaching were lack of time and lack of education (Rheaume, 2001). It was also found out that lack of infrastructure and the limited access to the software and hardware constituted the most significant barriers in ICT integration (Brill & Galloway, 2007). In a study conducted by Robertson, Grady, Fluck and Webb (2006), lack of time, lack of convenient place, intensive curriculum, lack of source management and the busy working-schedule of teachers were determined as the barriers for ICT integration.

In another study that aimed determining the institutional, environmental and professional development factors influencing the integration of ICTs into the school environment, it was found out that lack of time was the most important barrier that created worried teachers and prevented them from integrating ICTs into their courses. Some teachers reported that there should be someone who coordinates ICT use in every school. These teachers also stated that in this way, the possible problems could be solved and that teachers would avoid wasting time. Lack of directives regarding the use of the computer room leads to the fact that students play computer games or use only the educational software, which results in competition among students. Many of the projects developed regarding ICTs in schools were not successful or completed. Lack of successful projects influences teachers' attitudes towards ICT use. As a result, few teachers use ICTs in the teaching-learning process. It was also revealed via research that there is a need for teachers trained not only in technical but also in instructional aspects regarding ICTs (Puga, 2006).

In a study conducted to determine the barriers experienced by teachers and school administrators in the integration of ICT into education in Turkey, it was revealed that the barriers encountered with most by the school administrators and teachers within in the ICT integration process were inefficient trainings on ICTs, lack of ICT resources, and lack of technical support. In addition to these barriers, according to the school administrators, teachers' inefficient skills and knowledge about computers and old-fashion ICT resources were other barriers to ICT integration. Furthermore, the administrators also reported that the teachers did not have enough time to develop electronic materials and that there were problems regarding the planning the usage of ICTs (Yalın, Karadeniz & Şahin, 2007).

Since various barriers are likely to occur at any time of the integration process, educational institutions should develop strategies to cope with various types of barriers for the purpose of supporting the instructors in the integration process. Therefore, before developing action plans for effective ICT integration, it is important to determine and overcome the barriers encountered in the process.

Among the studies conducted with various research designs, qualitative case studies seemed to enabled the researchers to examine in more detail the ICT integration process of educational institutions (e.gs. Chitiyo, 2006; Demiraslan & Usluel, 2006; Eteokleous, 2008; Hsu, 2006; Işıkoğlu, 2002; Lim & Hung, 2003; Lim & Khine, 2006; Pompeo, 2004; Puga, 2006; Robertson, Grady, Fluck & Webb, 2006; Shafiei, 2005; Shanahan, 2006; Shigemitsu, 2004; Toledo, 2005; Wilson & Peterson, 1995). However, studies that examined the ICT integration process of a higher education institution with the design of qualitative case study with hearing and hearing-impaired students have not been met in Turkey. Therefore, it is crucial to conduct case studies that examine how ICTs are integrated and how the barriers are overcome during the teaching-learning process of the hearing impaired individuals who are attending higher education institutions in Turkey.

Depending on this significance, the purpose of this case study was to examine how ICTs are integrated and how the barriers are overcome during the teaching-learning process at the SfH. During the course of the study, ICT infrastructure of the SfH, the usage of ICTs in the teaching-learning process, working aspects and barriers encountered in the ICT integration process, their effect to the ICT integration process and the solution suggestions of the stakeholders for the barriers were examined.

Specifically, in this article it is aimed to present the barriers encountered in the ICT integration process at the SfH. The research questions were as follows:

According to the administrators, the faculty members and the students;
1.   What were the barriers experienced in the ICT integration process at the SfH?
2.   What were the sources of the barriers?
3.   How did the barriers affect the ICT integration process?

Methodology of Research

Research Model

Based on the necessities mentioned above, this research designed as a qualitative case study. Case studies are comprehensive studies that focus on a phenomenon, event, case or groups, make it possible to examine all participants by interviews or observations, by providing supportive data through various data sets (Bogdan & Biklen, 2007; Tellis, 1997; Yin, 1994). In a case study, the researcher focuses on a case or cases. This case extends from an individual to the

whole community, society and to institutions. The data are collected in a natural environment and reflect the perspectives of the researchers and of the participants (Gall, Gall & Borg, 1999). The ICT integration process at the SfH examined in depth as required by the case study design.

Research Setting

The process of Bologna that aims to create a European Higher Education Area (EHEA) based on international cooperation, academic exchange and development of higher education institutions' strategic management and internal quality culture caused the Turkish higher education institutions to revise their educational systems. It is also believed at Anadolu University as a Turkish higher education institution, that the European Union of Universities evaluation process makes significant contributions to the sustainability of its development efforts. In this evaluation process the strategic plan of Anadolu University for the years of 2009-2013 has been developed. The strategic plan of Anadolu University emphasizes ICT integration in higher education as a strategic purpose for maintaining regular and wide-spread use of information and communication technologies in education (Anadolu University, 2008).

This strategic plan determined by Anadolu University covers both the individuals in need of special education and those with normal development processes. Although there are students with various handicaps that continue their education at various faculties at Anadolu University, SfH is the only higher education institution in Turkey that gives vocational education to hearing-impaired students. The setting in the SfH was designed in a way to meet the educational needs of hearing impaired individuals who need special education. Oral verbal approach used by the instructors in the teaching-learning processes at the SfH. In the SfH, the programs that have been executed since 1993 are Graphic Arts Program (Bachelor's Degree) and Ceramic Arts Program (Bachelor's Degree) in the Department of Applied Fine Arts, Computer Operating Training Program (Associate's Degree) in the Department of Administrative Professions and Architectural Drafting Program (Associate's Degree) in the Department of Architecture.

ICTs are greatly used in teaching-learning processes by the students, administrators and faculty members in the Architectural Drafting Program, Graphic Arts Program and Computer Operating Training Program. Some of the faculty members teaching the courses of Architectural Drafting, Computer Operating and Language Arts at the SfH use ICTs in the teaching-learning process for such purposes as preparation for the lessons, transfer of content and communication in the teaching-learning process. In the process of preparation for the lessons, most of the faculty members use ICTs to prepare course materials, and the faculty members dealing with projects make linguistic editing on the course materials that they have reached via the Internet. For the transfer of content, the faculty members teach the content with the help of a PowerPoint presentation that they have prepared to visualize instruction for hearing-impaired students, while in the courses in which the faculty members teach computer programs, they usually teach how to use the computer program with the help of datashow. In the Graphic Arts Program, the courses are executed via projects assigned to students; in addition, computers are always used during lessons, and faculty members give continuous and individual feedback to students' designs. The students' products are prepared with the help of a number of graphic design programs. In addition, faculty members do not use ICTs to teach these programs. In the Ceramic Arts Program, faculty members do not use ICTs in the teaching-learning process depending on the belief that courses in the department do not require use of ICTs.

When the study was conducted all the programs at the SfH had laboratories and hardware suitable to their program specialties. The ICT infrastructure of the SfH is given in the Figure 1 (see also Appendix).
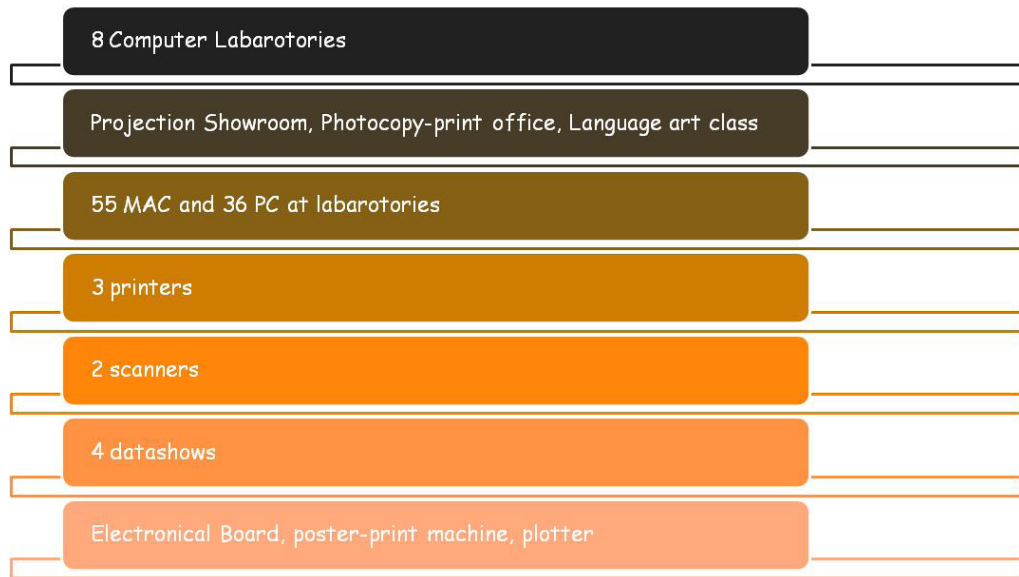
Figure 1: The ICT infrastructure of the SfH.

Laboratories at the SfH are also the classes of the students. The laboratories were available for the use of students during and after the instructions. This would create a more authentic environment and provide more practice chances for the students.

Participants

The participants of the study were all from the SfH, 60 hearing-impaired students, a total of 21 faculty members and 3 administrators. Among the faculty members there were a professor, four assistant professors and 16 instructors. The administrators were consisted of a principal and two vice principals. Among the hearing impaired students 27 were male and 35 were female. 27 were attending in the first class, 13 were in the second class, 10 were in the third class and 10 were in the fourth class. 41 students were attending to Graphic Arts, 9 were attending to Ceramic Arts, 4 were attending to Architectural Drafting and 6 were attending to Computer Operating Training programs. Most of the students wore hearing aids or they are cochlear implanted. They interact both with oral verbally and sign language. In the final report, the real names of the participants were used according to their demands otherwise not. All participants voluntarily attended the study.

As an instructor in Computer Operator Training Program in the SfH, the author was the researcher. One of the advisors of the author was an expert in the field of educational technology, and the other one was an expert in the field of qualitative research and education of hearing-impaired individuals. They all constituted the trustworthiness committee. All the situations experienced during the data collection were shared with the trustworthiness committee. Being one of the faculty members at the SfH, the second advisor acted as a key informant. She also performed as a guide for the perspectives of qualitative research methods. So the researcher realized which data were important to be collected and decided what and how much data must be included in the final report. In addition, being experienced in educational technology but not the member of the SfH, the first advisor brought outsider perspectives considered as invaluable contributions.

Data Collection and Analysis

The study was conducted in 2007–2008 Fall and spring terms at the SfH. The data were collected through the participant observations of the author by compilation of various types of interviews, open-ended questionnaires, researcher's journal, documents, artifacts and archival records. In order to determine the views of the administrators, interviews were conducted, while open-ended survey forms were applied to reveal the views of faculty members and of the students. The validity of the data collection and analysis processes was carried out by the trustworthiness committee.

The research data were analyzed via inductive analysis, which is a qualitative data analysis method (Cresswell, 2005). NVivo 8 qualitative data analysis program was also utilized in coding and schematizing (Saillard, 2009). Each transcript was read and coded by the author of this article and the first advisor. Code labels were examined, and the themes- similar codes aggregated together to form a major ideas- were determined. The validity of the themes was confirmed by the trustworthiness committee (Creswell, 2005).

Results of Research

According to the administrators, faculty members and the students in the SfH, the barriers experienced in the ICT integration process, the sources of these barriers and their affects to the ICT integration process were grouped under such headings: problems, their sources and affects experienced by the administrators, the problems, their sources and affects experienced by the faculty members and the problems, their sources and affects experienced by the students.

The Problems, Their Sources and Affects Experienced by the Administrators

The views of the administrators in the SfH about the problems experienced regarding the use of ICTs in the teaching-learning process, the sources of these problems and their affects to the ICT integration process were thematized as 1) problems, their sources and affects experienced solely being an administrator and 2) problems, their sources and affects experienced both being an administrator and a faculty member.

Problems, their sources and affects experienced solely being an administrator

All the administrators in the SfH stated that in the process of ICT integration, the stakeholders such as faculty members and students now and then experienced problems regarding ICT use. These were faculty member-based problems, student-based problems, hardware problems, software problems, and technician-based problems.

The administrators stated that faculty members reported the technical problems to them and that these problems generally occurred in the computers they used in their own offices due to their own usage errors. For instance, the principal of the SfH, mentioned this situation saying:

"the computers in some of our instructors' offices become out of order. Their own private computers break down. The basic reason for the break-down of these machines is that they download everything from every kind of website. Thus, problems occur due to such downloads" (Interviewee 1, 04.10.2007).

The principal of the SfH, reported that students, especially those attending the Graphic Arts Program, experience problems in saving their projects because of the insufficient memory of the computers and that this problem mostly occurs due to some of the students' own usage errors. Regarding this point, the principal of the SfH stated that

"the biggest problem experienced by the students mostly occur in Graphics Program. Since they need a very high capacity of memory in computers, the memories of computers become insufficient and thus they lose their works. In fact, we taught them how to overcome this problem, but they don't do it…" (Interviewee 1, 04.10.2007).

The administrators also stated that hardware problems were experienced in the teaching-learning process in the SfH regarding ICT use such as break-down of computers, failure to take printouts, and failure to connect to the Internet as well as software-based problems such as failure to update the software in computers. For example, one of the vice-principals of the SfH, reported that

"…there are software problems. For example, programs do not work, and the versions of the programs are not updated. In fact, this is because the systems continuously change, and programs like Photoshop or Illustrator do not work on that computer." (Interviewee 2, 01.08.2007).

Two of the administrators in the SfH stated that certain technician-based problems could occur regarding ICT use. The principal of the SfH, stated that

"we have a good technician. He is hearing-impaired, but actually, he is sometimes stubborn. That is, it is sometimes hard to have him do his job. He is a difficult technician. There is no problem that he can not solve if he wants to do so. You shouldn't make him angry if you want him to do what you want" (Interviewee 1, 04.10.2007).

In addition, one of the vice principals of the SfH, explained this situation stating that

"if there is technology, then there will be problems… in general, there are technical problems such as break-down of computers… we report the problem to our technical staff. And we could experience problems with the technical staff." (Interviewee 2, 01.08.2007).

Problems, their sources and affects experienced both being an administrator and a faculty member

All the administrators in the SfH stated that they experienced technical problems in the teaching-learning process as faculty members. These technical problems were inadaptability among programs or computers - a presentation that worked on a computer did not work on another – and loss of information in a computer or a memory.

The Problems, Their Sources and Affects Experienced by the Faculty Members

The problems experienced by the faculty members regarding ICT use in the SfH, the sources of these problems and their affects to the ICT integration process were thematized as 1) faculty member-based problems, 2) technical problems, 3) technician-based problems, 4) student-based problems, and 5) problems that occur beyond the SfH.

Faculty Member-Based Problems - Lack of knowledge

Three out of four faculty members stated that there were problems experienced due to their lack of knowledge about using ICTs in the teaching-learning process. For example, one faculty member teaching language courses stated

"I don't know computer programs exactly, and thus, I can not use the programs properly".

Another faculty member reported that they experienced problems regarding the use of computer programs and that they wanted in-service training, stating

"I don't know many of the computer programs… I wish there were an in-service training opportunity in our school".

One of the faculty members participating in a project executed in the SfH and video-recording her course reported problems regarding the working of the video-camera and stated

"I experience problems regarding changing the video-cassette of the video-camera - and its working as well - that I used in the course.… I request help from a skilled student during the course".

Technical Problems

The faculty members stated that they experienced various technical problems regarding the use of ICTs during the teaching-learning process. These technical problems were expressed by nine faculty members as "computer breakdown"; by four faculty members as "being unable to connect to the Internet"; by three faculty members as "unavailability of extension cable"; and by one faculty member as "problems with taking printouts".

Among the technical problems experienced by the faculty members regarding ICT use during the teaching-learning process, computer breakdowns were the most significant. The faculty members reported computer failure, operating system related problems, computer update and viruses.

Three faculty members who stated that they experienced technical problems regarding the unavailability of the extension cable in the class stated that the extension cable was taken out of their classroom without being informed about this and that they did not know the reason for this. For instance, a faculty member stated this situation

"From time to time someone is taking the extension cable from the class. I don't understand why this occurs. For this reason I didn't perform some of my lessons using computer".

It was found out that taking the extension cable out of the class influenced the teaching-learning process negatively.

Technician-Based Problems

Regarding the use of ICTs during the teaching-learning process, 11 faculty members reported that they experienced technician-based problems. Five out of 11 faculty members stated that the technician did his job "in the way he wanted". For example, two faculty members complained about the "technician did not connect a printer" to their computers. One faculty member stated that the "technician did not solve the problems in time", while the other faculty

member reported that "it took a long time to overcome the technical problems". While a faculty member said that the "technological tools should always be ready for use" the other one reported that "technical support provided by those who know about computers but are not technicians in the SfH partly served the purpose". A faculty member emphasized the importance of an "experienced technician". Another faculty member reported that the most important barrier to ICT integration attempts was "the technician" and this situation was due to the fact that the "duties of the technician were not defined in the SfH".

Student-Based Problems

The faculty members stated that they experienced various student-based problems regarding the use of ICTs during the teaching-learning process. These student-based problems were expressed by three faculty members as "students' trying to use the designs developed"; by one faculty member as "students' infecting viruses to the computers"; by one faculty member as "students' excessive connection to the Internet"; and by one faculty member as "students' experiencing difficulty in determining the goal while searching for a project subject". The reason for student-centred problems mentioned by the faculty members could be said to result from the hearing-impaired students' limited vocabulary knowledge and from their limited world knowledge (Girgin, 2003).

Problems that occur beyond the SfH

Regarding ICT use during the teaching-learning process, the faculty members reported that they experienced certain problems occurring out of the SfH. These problems were expressed by two faculty members as "the financial dimensions of technology"; by one faculty member as "firewalls implemented by the university"; and by one another faculty member as "rapid development of technology".

In addition to these barriers experienced by faculty members, a faculty member from the department of Graphic Arts stated that he didn't experience many problems due to the operating systems of the MAC computers. Some of the faculty members reported that "not all the faculty members benefitted from the same opportunities regarding ICT use in the teaching-learning process". A faculty member from the Ceramic Arts Program stated that "the number of data-shows and computers was limited in the school". Another faculty member coming out of the school reported that they were "unable to access the ICTs when necessary". Another faculty member stated that the "lack of access to ICTs used in the teaching-learning process would lead to loss of time as well as cause students to show irregular behaviors".

The Problems, Their Sources and Affects Experienced by the Students

The problems experienced by the students regarding ICT use during the teaching-learning process, their sources and affects to the ICT integration process in the SfH were thematized as 1) technical problems: i) hardware problems, ii) software problems, iii) internet connection problems; 2) technician-based problems; and 3) problems due to students' lack of knowledge.

Technical problems

During the teaching-learning process in the SfH regarding ICT use, students stated that they experienced technical problems at most. These technical problems were found to be related to software, hardware and Internet connection.

Software problems

It was revealed that the students experienced such software-based problems in the SfH as lack of programs in their computers, program failures, foreign languages of the programs and computer viruses.

Among the students in the SfH, especially those in the Graphic Arts Program were found to complain about the fact that the computer programs in the SfH did not open their projects or caused program conflicts. For example, one of the junior students attending the Graphic Arts Program stated

"the computer program (Adobe Illustrator) did not open my document". Similarly, one of the third-grade students attending the same program reported

"I experience some problems with the computers even when I tried to study for my lessons. I can't open a file, or I can't draw or paint".

One of the senior students from the same program mentioned program incongruities stating

"while working with the graphic programs, you can not run two programs at the same time. When you try, one of them is automatically closed. In fact, this is not normal. This can even happen when you save your project. Then your efforts and the time go for nothing. When you use the Macintosh computers with Turkish language support, you face a lot of problems. They (school administrators) couldn't find a solution to this problem. I don't know what will happen".

Another student who reported that he experienced problems since the program used a foreign language stated

"it is not easy for me to use a computer with programs in English. Thus, I can't always study on the computer in a way I want".

In addition, the students attending the Architectural Drafting Program experienced software-based problems and complained about the fact that they were not able to work the computer programs since these programs required a high-capacity computer.

Also, the students attending the Computer Operating Program experienced problems such as losing their documents due to *"computer viruses"*. The students also reported that they encountered with problems in their courses since the computers they used lacked the necessary programs.

Hardware problems

The students in the SfH, especially those in the Programs of Computer Operating and Graphic Arts, reported hardware problems stating that the computers' performances were slow; that they were unable to take printouts from the printers; and that they were unable to scan anything with the scanners. Therefore, the students complained about the waste of time. For example, one of the second-grade students attending the Program of Computer Operating stated

"during the course, we wasted time since some of the computers did not have Internet connection and the computers were problematic".

Similarly, one of the students from the Graphic Arts Program stated

"we had problems with the printers and computers as well as with the photocopy machines. There was not a good technical maintenance for the machines, and this caused us to waste our time".

Internet connection problems

The students in all the programs in the SfH experienced problems regarding Internet connection at most among the technical problems. It was also revealed that this problem was mostly experienced in the mornings. One of the junior students from the Graphic Arts Program stated

"we only experience Internet-related problems. In the mornings, there is no Internet connection. The Internet connection is available only after the morning. I don't know why this problem occurs".

It was also found out that especially the students attending the Graphic Arts Program were not able to do their homework due to the Internet connection problems. One of the senior students from the Graphic Arts Program stated

"when there is no Internet connection, I can't find any information, and when the computer does not work, I can't do any designing".

Technician-based problems

The students in the SfH, especially those attending the programs of Computer Operator Training and Graphic Arts who experience technical problems, complained about the fact that "the technician did not overcome the problems in time"; that "the technician ignored the problems"; and that "the technician did not install the necessary programs on the computers". For instance, one of the students from the Graphic Arts Program stated

"I inform the authorities (technician) and experts (the other technician) about any problems when they occur, at least as much as I can".

This student is aware of his insufficient language skills because of his hearing loss. One student from the Computer Operating Program stated

"the technician helps nobody. I requested him to give me the Office and Filemaker CDs, but he didn't give them to me. I had to buy these CDs outside of the school as the technician did not give them to me".

In addition, one of the students attending the Graphic Arts Program reported that the technician did not deal with the problems in time and stated

"when there is a problem with one of the computers, the technician does not immediately fix it. He just says 'later'. And I think I have to get accustomed to this situation".

Problems due to students' lack of knowledge about computer programs

The students in the SfH, especially those attending the Ceramic Arts Program, experienced problems as they did not know how to use the computer programs. These students also complained about the fact that there was no one to ask for help about this. For example, one of the junior students from the Ceramic Arts Program stated

"Sometimes, we make mistakes while using the computers. There is no one that can teach us how to use the computer programs. Sometimes, we meet errors when we use flash-discs, and the files in the flash-discs may get damaged. And I don't know how to fix this."

In addition to all barriers experienced by the students, five students from the Ceramics Arts Program and one student from the Graphic Arts Program reported that they did not experience any barrier regarding ICT use during the teaching-learning process. The students attending the Ceramic Arts Program reported that they did not experience any problems since ICTs were not used in their courses during the teaching-learning process, stating

"Generally, I don't use computer in the department of Ceramics; therefore, I don't have any problems".

In addition, one student who reported that he did not experience any problems in the Graphic Arts Program stated that he did not encounter with any problems thanks to the MAC computers.

Discussion

The characteristics of the programs, the faculty members, the students and their needs and the projects conducted at the SfH determined the usage of ICTs at the SfH. SfH had sufficient infrastructure to access hardware, software and other resources related to ICT for effective ICT integration. By being instructor an administrator influenced the teaching-learning process dimension of ICT integration positively at the SfH. However, some barriers which were related to the various dimensions of the ICT integration process were encountered in the SfH. Although the barriers encountered at the SfH were classified separately, there are multifaceted relationships between these barriers.

Similar to other studies in the literature (Pelgrum, 2001; Rheaume, 2001; Williams, Coles, Wilson, Richardson & Tuson, 2000), the present study revealed that all the stakeholders especially the faculty at the SfH encountered with barriers due to lack of knowledge to use ICTs. In the related literature, lack of teachers' competence to use ICTs in the teaching-learning process has been cited as the main barriers to the ICT integration (Al-Alwani, 2005; Albrini; 2006; Almohaissin; 2006; Pelgrum, 2001). The faculty at the SfH stated that they needed in-service training through which they would be able to develop their knowledge and skills in ICT use in the teaching-learning process. In fact all faculty members need leadership and require training in methods for integrating ICTs in their classrooms. Thus they can be role models for their students to use ICTs in teaching-learning process. In addition, the barrier most frequently referred to in the literature is lack of effective training (Albirini, 2006; Balanskat, Blamire & Kefala, 2006; Beggs, 2000; Özden, 2007; Schoepp, 2005; Toprakçı, 2006).

The administrators, faculty members and students at the SfH stated that experiencing various technical problems and not remedying these problems in time by technicians are the main barriers in ICT integration efforts at the SfH. The departments of the SfH were visual departments and ICTs are mostly used in every stage of the instruction according to the

educational needs of hearing-impaired students. Reading and writing skills play an important role in the basis of academic achievement at any level. It is known that hearing-impaired students' literacy level is lower than their hearing peers and that the most important reason for this is the degree of hearing loss and accordingly the delay in language development (Girgin, 2003). It is now known that spoken and written language development of children with hearing loss can be similar to development in hearing children, but is often delayed in various language components (Kretschmer & Kretschmer, 1978; Schirmer, 2000). The educational environment for hearing-impaired students should include different activities and be prepared as appropriate to their individual development. In the educational environment for hearing-impaired students, the use of various materials appropriate to the learning goals and the use of ICTs that will provide visual support to instruction lead to more effective results for the education of hearing-impaired students (Çeliker & Celep, 2003). So the barriers such as technical problems encountered in the educational context of the hearing impaired students influence directly the teaching-learning process negatively. Similarly, Bingimlas (2009) quoted in Sicilia's study (2005); technical problems were found to be a major barrier for teachers and seen as "impeding the smooth delivery of the lesson or the natural flow of the classroom activity".

In the related literature, it is also stated that the teachers can solve simple technical problems however they should not be expected though to cope with problems that require complex maintenance. In addition, it is necessary to fix and change the necessary tools via constant technical support in schools (Mumcu, Haşlaman & Usluel, 2008; UNESCO, 2005). Lack of technical support can prevent teachers from successfully integrating ICT into education (Almohaissin, 2006; Gomes, 2005; Toprakçı, 2006). The administrators, faculty members and students at the SfH stated that, there was a technician in the school who was supposed to overcome the possible technical problems. However, similar to the findings of other studies (Akbulut, 2008; Tallent-Runnels et. al., 2006), the findings of the present study revealed that the faculty members and the students did not receive immediate and effective support when they encountered a problem in computer laboratories and that they were unable to reach the technical staff in cases of any technical problems. Different from the other studies, the present study revealed that the administrators, faculty members and students reported technician-based problems during the teaching-learning process of ICT integration in the SfH – for example, the technician did his job only when he wanted to. This situation could be due to result from the fact that the job definition of the technician is not precise. Follow up and guiding systems such as in-service training activities and appropriate awarding systems are lacking.

Several studies indicate that lack of access to ICT resources is another complex barrier that discourages teachers from integrating ICTs (Alampay, 2006; Akbulut, 2008; Korte & Hüsing, 2006; Ertmer, 1999; Pelgrum, 2001). In these studies the barriers related to accessibility of ICTs were indicated as lack of hardware, lack of software, insufficient number of computers, insufficient peripherals, insufficient number of copies of software and insufficient simultaneous Internet access. In contrast with the studies in the literature, the barriers regarding access experienced at the SfH were not related to the lack of ICT resources. Since the SfH has a quite powerful ICT infrastructure. Although in general, the faculty members and the students access the ICT resources and applications when they needed, some of the faculty members and many of the students reported that they were unable to access the necessary ICTs. Some of the faculty members stated that they wasted their time during the teaching-learning process as the necessary ICT was taken away without giving any information to them and that they thus observed irregular behavior among the students. The datashows and computers were not equally distributed to the departments at the SfH. This situation may be the result of factors such as poor organization of the ICT resources, inappropriate hardware and software and lack of technology planning at the SfH.

In addition to all these barriers encountered with in the process of ICT integration at

the SfH, the students reported that they experienced several problems because the language of the computer programs was English. Hearing loss starting from birth or in early years of life has important effects on hearing-impaired children's comprehension of spoken language, their acquisition of their mother tongue and development of their cognitive skills. In the following years of their lives, these problems also influence their academic achievement at school. If they are not provided with any support or special-education services, the results caused by hearing loss become worse. One important problem for hearing-impaired children is the difficulty they experience in learning to read. However, they experience the real difficulty when they try to make sense of the text they read. Their limited vocabulary knowledge, the delay in their acquisition of linguistic structures and their limited world knowledge all make it difficult to comprehend the text they read. All these reasons cause hearing-impaired students to show low performances in writing skills as well (Tüfekçioğlu, 2003). Thus, hearing-impaired SfH students experiencing difficulty even in basic communication skills will inevitably have difficulty learning how to use computers programs whose content is presented in a foreign language. Depending on this, all faculty members teaching at the SfH should consider themselves as teachers of the hearing-impaired and should therefore teach hearing-impaired students the professional terminology while teaching them how to use the computer programs necessary for their future profession (Baumann & Kame'enui, 2004; Grambel, Morrow & Pressley, 2007; Schirmer, 2000).

In courses in which basic ICT information is presented, students can develop their ICT-related skills. However, an ICT-integrated curriculum causes students' perceptions of integration strategies to change substantially (Willis & Sujo des Montes, 2002). In ICT-integration in higher education, it is known that rather than teaching technology as a separate course, the integration of technology into the curriculum will increase graduate students' proficiencies (Surry, 2005). Therefore, what is important in ICT integration is not the integration of curriculum into the ICTs but the ICTs integration into the curriculum (Earle, 2002). Therefore, effective ICT integration should focus on pedagogy design by justifying how the technology is used in such a way and why. Besides the methods and techniques used in teaching language courses, the courses given in the Ceramic Arts Program in SfH - which do not require presentation of any information about ICTs - and the courses given in Graphic Arts Program – where ICTs are practically used –, the integration of ICTs into the whole curriculum will contribute to the successful and systematic integration of ICTs at the SfH.

Conclusions

From the results of this research there are various barriers encountered in the ICT integration process at the SfH. To create an environment of effective ICT integration, the education programs of th SfH must focus on eliminating these barriers. Therefore, for the purpose of coping with the barriers revealed by this study and thus for an effective ICT integration at the SfH, further research should be carried out. In this respect, some suggestions could be put forward for future research and applications.

For an access to the required technologies in the teaching-learning process in the SfH when necessary, a technology planning supported by the administration of the SfH could be done. To find a solution to the problems related to technical support in the SfH, the duties of the technician could be defined. The technician could also be supported to increase his field knowledge via in-service training activities with adequate reward mechanisms to improve his/her motivation. During the ICT integration process at the SfH, "action research" could be conducted with the support of the administrators and the faculty members. For the generalization of the findings obtained from the present study, the same study could be replicated in different educational settings with different participants by different researchers. Using different research techniques, research could be carried out to determine the variables that interpret the factors

and barriers in the ICT integration process at the SfH. Also, the findings obtained from research conducted with faculty members working with individuals with different handicaps could be compared with those of the present study.

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Note

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Appendix. The ICT infrastructure of SfH.

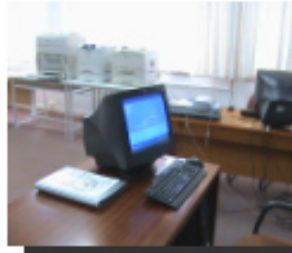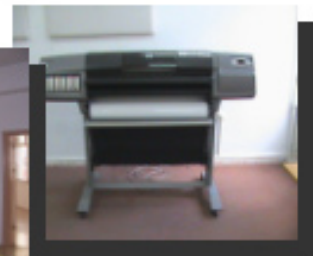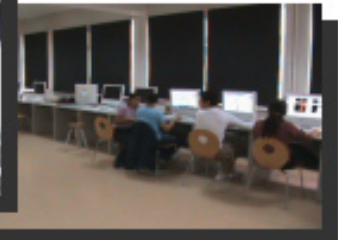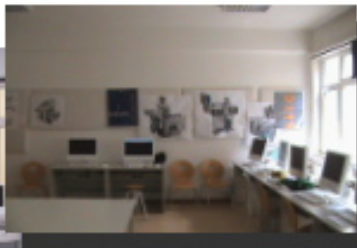PHOTOCOPY-PRINT OFFICE

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